

Joint Replacement Surgery at Sheikh Zayed Hospital Lahore, Review of 102 Cases

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SUMMARY

From September 1986 to Aug. 1991 one hundred and two total joint replacements were performed at Federal Postgraduate Medical Institute, Sheikh Zayed Hospital, Lahore. There were seventy two total hip replacements and thirty total knee replacements. Follow-up ranged from three to sixty months with mean of twenty four months. Excellent or good results were obtained in eighty percent of patients.

INTRODUCTION

The modern era of joint replacement surgery started with the pioneer work of Sir John Charnley in all aspects of total hip arthroplasty, including the concept of low friction torque arthroplasty, surgical alteration of hip biomechanics, lubrication materials, design and operating room environment. His major contribution was use of cold-curing acrylic cement (polymethylmethacrylate) for fixation of components. His periodic reviews of significant number of patients have been invaluable, especially concerning wear, infection, loosening and stem failure¹. A major breakthrough in total knee arthroplasty began with Gunston report in 1971 of his experience with minimally constrained total knee arthroplasty². The history of arthroplasty has been dynamic, and research continues to improve results, especially in younger patients. Investigations have proceeded along two major paths, one to eliminate the use of bone cement and other to improve the cemented implants. The advancements in bone cementing techniques have produced eighty-seven percent good or excellent results at 15.3 years after surgery with low friction hip arthroplasty³ and eleven year after total condylar knee arthroplasty⁴.

Joint replacement surgery is still in introductory phase in Pakistan and other third world countries, due to economic reasons, lack of proper facilities and skilled personnel. This study is a preliminary report of experience at Sheikh Zayed Hospital Lahore regarding joint replacement. The aim of present study is to evaluate the results of joint

replacement surgery in group of patients from our social, cultural, and economic setup and determining its limitations in our customs where majority of population has to perform its daily activities while sitting or squatting on the floor.

MATERIALS AND METHODS

From September 1986 to August 1991, total of one hundred and two joints were replaced at the Department of Orthopaedics, Sheikh Zayed Hospital, Federal Postgraduate Medical Institute Lahore. There were seventy two total hip replacements and thirty total knee replacements.

Total Knee Replacement

We used twenty eight posterior stabilized total condylar prosthesis and two Lubeck prosthesis. The total number of patients was twenty seven. There were fifteen (55.56%) females and twelve (44.44%) males. The average age was 58.2 years and it ranged from 45 years to 75 years. Out of twenty seven patients, twelve had associated illness like ischemic heart disease, hypertension, diabetes, and asthma; five were taking steroids prior to their admission in the hospital. The average hospital stay was fourteen days. The preoperative clinical and radiographic detail is given in following tables.

Technique of operation

All patients were operated by a single surgeon (GA Shah) in conventional operation theater with ultra violet lamp facilities but no laminar flow

Table 1: Preoperative clinical and radiographic detail of 30 knee replacements in 27 patients.

		Number	Percent
Diagnosis	Osteoarthritis	18	66.67
	Rheum. arthritis	09	33.33
Category	Unilateral disease	10	37
	Bilateral disease	17	63
	Unilateral operation	24	88.89
	Bilateral operation	03	11.11

Table 2: Preoperative clinical and radiographic detail of 30 knee replacements in 27 patients.

		Number	Percent
Simultaneous Surgery	Ipsilateral hip and knee replacement	01	03.33
	Other	00	00
Previous surgery	Tibial osteotomy	00	00
	Synovectomy	00	00
	Other	00	00

Table 3: Preoperative clinical and radiographic detail of 30 knee replacement.

		Number	Percent
Deformity (degrees)	Varus	23	76.67
	mean 13 range 5-20		
Valgus	mean 15 range 10-20	04	13.33
	Flexion contracture	20	66.67
mean 24 range 5-10	No deformity	03	10.00

system of sterilization. The surgical technique described by Insall⁵ was used in 28 knee. Anterior mid line incision was applied in all knees. We aimed at valgus alignment of 6-10 degrees. Ligament release was used to correct the deformity. This facilitates the insertion of prosthesis without excessive bone resection. We agree with Dorr⁶ that in varus knees,

not more than 5 mm of bone on the medial side and 10 mm on the lateral side should be removed so as to preserve the stronger subchondral bone⁷. Flexion contractures of 20-25 degrees were corrected by slightly more generous distal femoral resection and more severe contractures required a posterior capsulotomy. In all patients, patella was resurfaced. All patients received one gram of Cephazolin Sodium before application of pneumatic tourniquet as prophylactic antibiotic while 1.5 grams of Zinacef were mixed in the bone cement.

Table 4: Preoperative clinical and radiographic detail of 30 knee replacement.

	Number	Percent
Maximum flexion		
mean 65°		
range 10-100°		
Stiff knee (ROM < 50°)	04	13.33
Ankylosed Knee	01	03.33

Postoperative care

All patients were monitored carefully postoperatively. Knee was placed in bulky soft dressing. Intravenous antibiotics were administered for 48 hours and were stopped after removal of suction drain. The bulky dressing was removed on third day and normal dressing was applied. The patients were then allowed to walk using crutches in department of physiotherapy. Active flexion exercises were delayed for one week. Manipulation under anaesthesia was not performed in any patient. All patients received Tab. Disprin 150 mg twice a day to provide prophylaxis against deep venous thrombosis. Continuous passive motion exercises were not used in any patient.

Clinical evaluation

Preoperatively and postoperatively, all patients were evaluated using the rating scale of Hospital for Special Surgery⁸. Of the 100 points for a normal knee, 30 points are for lack of pain, 22 for function, 18 for range of movement and 10 each for muscle strength, absence of flexion deformity and stability.

Radiological evaluation

Standard anteroposterior radiographs were

taken on a 30 cm by 40 cm x-ray film, with a standard lateral view and a skyline view at 45 degrees⁹. The x-ray beam was aligned parallel to the prosthesis-bone interface by use of image intensifier and these interfaces at all three components were studied by zone method¹⁰. The ideal position for tibial component was considered to be at 90 degrees plus minus 2 degrees to the long axis of tibia in frontal plane. In sagittal plane, we accepted up to 5 degrees of posterior tilt but no anterior tilt. The ideal position for the femoral component was considered to be 6-10 degree of valgus, with anterior flange of the femoral component flush with the anterior cortex.

RESULTS

Out of thirty total knee replacements, twenty five were available for Follow-up. The mean follow-up was thirty months and it ranged from three to sixty months. The average knee score increased from 55 to 90. Twelve knee had excellent result while eight knee had good result. Out of four fair results, one had subluxation of knee, two months after surgery and three had difficulty in mobilization due to multiple joint involvement. Walking distance was over five hundred meters in twelve patients, eight with osteoarthritis and four with rheumatoid arthritis. Ten patients were able to ascend stairs with or without use of hand rail.

Table 5: Comparative results of posterior stabilized total condylar knee replacement as given in numbers and percentages.

	Knees replaced	Knees evaluated	% O.A.	Follow-up years
Insall et al. 1982 ¹⁰	133	118	92	2-4
Scott and Robinstein 1986 ¹¹	62	56	86	3-6
Aglietti and Buzzi 1988 ¹²	95	85	72	3-8
Shah and Iqbal 1991	30	25	66.67	3/12-5

The maximum postoperative flexion was 125 degrees while ten knees had more than 100 degrees. A residual contracture of 10 degrees was found in

three knee. The symptoms of patellar impingement were present in three knees.

Table 6: Comparative results of posterior stabilized total condylar knee replacement as given in numbers and percentages.

	Score Pre/postop.	Excellent results	Good results
Insall et al. 1982 ¹⁰	50/90	88	9
Scott and Robinstein 1986 ¹¹	47/90	87	7
Aglietti and Buzzi 1988 ¹²	40/80	38	50
Shah and Iqbal 1991	45/85	50	30

Table 7: Comparative results of posterior stabilized total condylar knee as given in numbers and percentages.

	Max. Flex. pre/postop.	Unlimited walking	Stairs normally
Insall et al. 1982 ¹⁰	95°/115°	76%	76%
Scott and Robinstein 1986 ¹¹	88°		
Aglietti & Buzzi 1988 ¹²	90°/98°	12%	17%
Shah and Iqbal 1991.	90°/125°	48%	30%

Table 8: Comparative results of posterior stabilized total condylar knee replacement as given in numbers and percentages.

	Impingement symptoms	Patellar stress Fx.
Insall et al. 1982 ¹⁰	2.5%	11%
Scott and Robinstein 1986 ¹¹		5%
Aglietti and Buzzi 1988 ¹²	20%	0
Shah and Iqbal 1991	10%	0

Radiographic results

The ideal position for the tibial component was

obtained in twenty knees. There was no correlation between tilt from 2 degrees anteriorly to 8 degrees posteriorly and any subsequent radiolucency.

The ideal position for the femoral component with 6-10 degree of valgus was achieved in eighteen knees (72%). There was 0-5 degrees of valgus in 6 knee (24%) and 11-15 degrees in 4 knees (16%). The anterior flange of femoral component was not flush with the distal femoral cortex in two knees (8%); the femoral component had been cemented in slightly flexed position.

There were insignificant radiolucent lines (less than two mm and non progressive) in six knees (24%) but there was no loosening.

Table 9: Comparative results of posterior stabilized total condylar knee replacement as given in numbers and percentages.

	Insignificant tibial lucent lines	Probable loosening	Reoperation
Insall et al. 1982 ¹⁰	31%	00	01%
Scott and Robinstein 1986 ¹¹	41%	09%	00
Aglietti and Buzzi 1988 ¹²	55%	05%	02%
Shah and Iqbal 1991.	24%	00	00

Complications

One patient presented with mild subluxation of the knee one month after surgery. It was managed by plaster cylinder in extension for three weeks. The recovery was smooth and uneventful later on.

The wound healing was delayed in three patients. All of them were taking steroids because of rheumatoid arthritis for a long time. In these patients, active flexion was delayed for three weeks but weight bearing was allowed. Wounds healed without subsequent problems.

There was difficulty in mobilization in two patients. One of them has surgery of the right wrist (resection of distal ulna) along with total knee replacement. She was patient of rheumatoid arthritis with multiple joint involvement. Her right knee had already been replaced. She was depressed and had less than desired motivation to get up from

bed. However, with intensive efforts of department of physiotherapy, she was able to walk with the help of walker, twenty five days after surgery. Second patient also had involvement of multiple joints due to rheumatoid arthritis.

There was lateral subluxation of patella in two patients. Both recovered after lateral release of patella.

One knee developed deep infection, three months after surgery. She was seventy five years old lady with advanced degenerative changes in knee. The medial condyle of the knee had disappeared. Total knee arthroplasty was performed using Lubeck prosthesis with reconstruction of medial condyle of tibia using bone grafts. Her infection was controlled with repeated aspiration, culture and sensitivity and appropriate antibiotics.

Table 10: Complications of T.K.R.

Mild subluxation of knee	01
Delayed wound healing	03
Difficulty in mobilization	02
Lateral subluxation of patella	02
Infection	01
Patellar Clunk Syndrome	01

Total Hip Replacement

From Sep. 1986 to August 1991, seventy two total hip replacement were performed at Department of Orthopaedics Sheikh Zayed Hospital Lahore. There were fifty two Muller (72.22%), fifteen Harris Galante (20.83%) and five Charnley (06.94%) prosthesis were used. The total number of patients was sixty four, out of which thirty eight (59.38%) were males and twenty six (40.63%) were females. Fifty six (87.5%) were unilateral and eight (12.5%) were bilateral procedures. Patients age ranged from twenty one to seventy five years (mean forty eight years).

Table 11: Total hip replacements.

	No.	Percent
Total No. of Patients	64	
Males	38	59.38
Females	26	40.63
Unilateral	56	87.5
Bilateral	08	12.5

The indications for surgery are given in table 12. The most common indication was secondary degenerative arthritis of hip followed by primary degenerative arthritis.

Table 12: Indications of surgery (T.H.R.)

	No.	Percent
Secondary degenerative arthritis	45	62.5
Old untreated traumatic condition of hip	35	48.61
Complications of Austin Moore Prosthesis	06	08.33
Cut out D.H.S.	04	05.56
Rheumatoid arthritis	07	09.72
Primary degenerative arthritis	10	13.89
Ankylosing spondylitis	06	08.33
Avascular necrosis	04	05.56

Twenty four patients (37.51%) had associated illnesses, at the time of preoperative evaluation. The detail is presented in Table 13.

Table 13: Co-existing Disease (T.H.R.)

	No.	Percent
Diabetes mellitus	08	12.5
Chronic bronchitis	06	9.38
Bronchial asthma	04	06.25
Ischemic heart disease	06	09.38

Technique of operation

All hip replacements were performed by the senior author in conventional operation theater, used only for orthopaedic surgery. Postero-lateral surgical approach was used in sixty nine hips while anterolateral in three hips. Trochanteric osteotomy was performed in only three cases, where surgical exposure was difficult. Cemented arthroplasty was performed in fifty seven hips (79.17) and non-cemented in fifteen hips (20.83). Muller prosthesis was used in fifty two (72.22%), Harris Galante prosthesis in fifteen (20.83%) and Charnley prosthesis in 05 (06.94%). Femoral component was fixed in slight valgus, both cup and femoral component were fixed in neutral rotation. Methylemethacrylate was routinely mixed with Cephazolin Sodium 2 gm. Bone cement was used in

doughy state, by finger thumb technique. All patients were given injection Cephazolin Sodium one gram at the time of induction of anaesthesia.

Post operative care

The operated limb was placed in slight abduction by placing a pillow between two thighs. To prevent flexion of the operated limb, another pillow was wrapped around knee joint. The pillows were removed between seven to ten days. Passive abduction exercises were started on the first post operative day. On the fourth day, standing with walker, and on seventh day, walking with walker was allowed. Full weight bearing was allowed after three weeks and resumption of light activity after six weeks. Prophylactic antibiotic were used for 48 hours postoperatively. For prophylaxis of deep venous thrombosis, aspirin was used in doses of 150 mg twice daily, but for high risk patients, warfarin was given. Check roentgenograms were made on the day of operation, at discharge from hospital and at each follow-up visit. Average stay in the hospital was about two weeks.

Evaluation

The medical records of all patients were studied to find out early post-operative and intra-operative complications. The mean follow-up was thirty months and it ranged from three to sixty months. The patients were evaluated using Harris Hip Scoring System, in which there are total of 100 points, 44 for pain, 47 for activity, 05 for range of motion, and 04 for absence of significant deformity. The results were classified in to excellent, good, fair, and poor according to score, as given in following table.

Table 14: Result By Harris Hip Score.

Excellent	90-100%
Good	80-89%
Fair	70-79%
Poor	below 70%

Most of follow-up was performed by detailed interview and examination of the patients. The patients, who were not available for follow-up examination, a detailed questionnaire was prepared and sent to them by post. The clinical results were

calculated from their responses. One patient died during this time due to myocardial infarction, one developed hemiplegia and nine were lost to follow-up. The results are displayed in Table 15.

Table 15: Results of 72 T.H.R.

	No.	Percent
Excellent	43	59.72
Good	15	20.83
Fair	10	13.89
Poor	04	05.56

We have selected series of Sutherland et al¹³ for comparison because the number of patients in this study is small and follow-up is also relatively short. The comparison is given in Table 16, 17.

Table 16: Comparative Results of T.H.R.

	No. of Cases	Follow-up
Sutherland et al 1982	53	10 years
Shah and Iqbal	72	3/12-5

Table 17: Comparative Results of T.H.R.

	Excel.	Good	Fair	Poor
Sutherland et al., 1982.	43%	28%	11%	18%
Shah, Safdar and Iqbal 1991.	60%	21%	14%	05%

The complications which our patients suffered during this short follow-up are listed in Table 18. The most common was dislocation of femoral component with in four months of surgery. Three patients developed superficial wound infection. Two needed opening of wounds, through washing with saline, resuturing and antibiotics according to culture report. The infection was controlled in all of them. We performed only three trochanteric osteotomies and one developed nonunion. We

routinely do not perform trochanteric osteotomy but in three hips it was necessary due to ankylosed hips in abduction or adduction.

Table 18: Complications of T.H.R.

	No.	Percent
Dislocations	5	7
Wound Infection	3	4
Troch. non-union	1/3	33
Myositis ossificans	1	1.4
DVT	2	2.8
Vascular	1	1.4
Thyroid crisis	1	1.4
Death due to IHD	1	1.4

DISCUSSION

Secondary osteoarthritis is quite common in this part of the world. It is due to neglected or mismanaged intraarticular fractures and dislocations, ligamentous and meniscal injuries, undiagnosed cases of acetabular dysplasia, slipped capital femoral epiphysis and Perthe's disease. Incongruity of joint surfaces cripples the patient at younger age. The hip and knee are usually involved. It was the most common indication for joint replacement in present series.

The knee is frequently involved in patients with long standing rheumatoid arthritis. Although involved at the onset of disease in only eight percent of patients⁴ early in the course of disease process, one or both knees will be involved in nearly ninety percent of patients. Involvement is unilateral in 30-35 percent. By comparison, the hip is involved early in the course of the disease in fewer than 10 percent and fewer than 40 percent of patients with long standing rheumatoid arthritis have hip involvement¹⁵. Frequent involvement of both upper extremities make the mobilization both difficult and painful. For this reason this is highly desirable to achieve at least 105 degrees of flexion in patients undergoing knee arthroplasty for rheumatoid arthritis¹⁶. Surgical immaturity may not be a contraindication to surgical treatment if the patient is bedridden with progressive deformity¹⁷. In present series thirty three percent knees and ten percent hips had rheumatoid arthritis.

Ninety degrees of knee flexion has been generally considered as the minimal amount

necessary for daily life in western societies. In eastern societies, patient demand greater flexion postoperatively due to cultural needs. Shoji, Yoshing, and Komagamine¹⁸ have reported Y/S total knee arthroplasty system with improved range of movement. In their series thirty nine out of fifty patients were able to squat fully with minimum follow-up period of one and half year. Because the contact area of the joint shifts far more posteriorly in deep flexion, the articular surface of the tibial component was flattened to the posterior end to allow a sliding and rolling motion of the femoral condyle to the posterior region. While the articular surface was elevated anteriorly to provide an intrinsic stability within the prosthesis for extension and less flexion range, together with intercondylar eminence of the tibial component, the posterior edge of the center was cut out so that it could be used retain the posterior cruciate ligament. We hope this prosthesis could suit best to social requirement of our country.

One patient developed patellar clunk syndrome two years after total knee arthroplasty. This syndrome consists of the appearance of patellar pain some time after a seemingly successful total knee arthroplasty. The patient often complains of a catching of the knee when attempting to rise from a chair, plus a sense of crepitation. Examination reveals a relatively normal range of motion, but a jumping or clunking of the patella occurs as the knee is extended from a fully flexed position. Patellar crepitus is also present. Roentgenographic examination may reveal a relatively proximal placement of the patellar button on the patella. Surgical removal of fibrous nodule often solves the symptoms. Revision of patellar prosthesis is some time needed¹⁹. The patient did well after surgical excision of fibrous nodule.

After posteriorly stabilized total condylar knee arthroplasty, the maximum flexion was 125 degrees in four out of twenty five evaluated knees. No patient in this series was able to squat on floor. However one lady, four years after Charnley total hip arthroplasty could squat comfortably. She was able to offer her prayers while sitting on floor.

The incidence of trochanteric nonunion with or without proximal migration of the trochanter varies from 3-8 percent. In present series, the nonunion was without proximal migration so it produced no pain or disability. However if the displacement is more than 2 cm, abductor weakness results that may

induce a limp and increase the incidence of loosening, dislocation, and stem failure²⁰. The trochanteric osteotomy is not required for exposure or fixation of the components in primary total hip arthroplasties or in revisions. Moreover, failure to obtain fixation of the trochanter by other surgeons has now become one of the factors in the failure of revisions²⁰.

One patient in present series developed infection after total knee arthroplasty which was controlled with repeated aspirations and appropriate antibiotics. Infection after arthroplasty is usually catastrophic. It is painful, disabling, costly, usually requires removal of both components and the cement, and is associated with reported mortality of 7% to 62%. The large mass of foreign material embedded, the large dead space left in the wound, the mobility of the joint, and the fact that the procedure is usually performed on older and somewhat debilitated patients are predisposing factors for infection. The incidence of infection is higher in patients with obesity, diabetes, alcoholism, rheumatoid arthritis and in patients receiving immunosuppressive drugs, steroids, or anticoagulants. The likelihood of infection is also increased when the period of hospitalization before surgery is prolonged. Additional factors are an operation lasting more than two hours, previous hip surgery and urinary tract infection. The management of infection consist of antibiotic therapy, incision and drainage of joint, debridement and resection arthroplasty, one or two stage revision arthroplasty and arthrodesis.

The average incidence of dislocation after total hip arthroplasty regardless of type of components used, is approximately three percent¹⁴. The incidence of dislocation in present series was seven percent. These dislocations occurred in early postoperative period. Inadequate nursing care during shifting from theater and early postoperative period was leading cause of this increased incidence. As the staff became trained, there were less dislocations in later on.

One of our patients developed thyroid crisis after total hip arthroplasty. She was fifty years old female and never had thyroid symptoms or signs preoperatively. She developed severe hypertension after surgery leading to unconsciousness. She was shifted to intensive care unit and investigations revealed thyroid crisis. She was very well managed by the department of endocrinology and her life was

saved. She was put on antithyroid drugs and had no problem later.

External iliac artery compression by screw of Harris Galante implant was encountered in one patient, who in recovery room developed a blue cold room and absent pulses. The screw was repositioned and intraoperative angiography of common iliac vessels was normal. Iliac vessels compression by the screw was the most likely cause rather than tear of the vessel. At discharge, the limb was normal.

We are convinced that joint replacement is excellent and rewarding reconstructive surgical procedure in our population. It provides enormous benefits to the patients, in relieving their pain, improving movement at the joints and upgrading the quality of life.

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