

ORIGINAL ARTICLE

Management of Knee Joint Osteoarthritis with Total Knee Arthroplasty

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Abstract

Background: Osteoarthritis is thought to be the most prevalent chronic joint disease. The incidence of osteoarthritis is rising because of the ageing population and the epidemic of obesity. Pain and loss of function are the main clinical features that lead to treatment, including non-pharmacological, pharmacological, and surgical approaches. **Aim:** To assess the clinical outcome of the procedure. To study radiological variable influencing the outcome of total knee Arthroplasty. **Methods:** The present study was conducted in KMC, MGM Hospital Warangal Orthopedic unit. The patients were selected as per inclusion and exclusion criteria. Ethical permission for the study was obtained from Institutional Ethical Committee. All patients after thorough pre-op evaluation were taken up for surgery by the same surgical team under general or regional anesthesia. **Results:** Of the 30 Arthroplasties performed 2 patients (2 knees) were lost to follow-up for various reasons 28 patients (28 knees) were available for clinical review. The mean follow up period was 11.6 months (range 3-18 months). According to the Knee Society Clinical Scoring system of the 28 patients assessed in the study 24 patients (92.8%) had Excellent, 3 patients (5.4 %) had fair, and 1 patient (1.8 %) had good results. **Conclusions:** Total Knee Arthroplasty improves the functional outcome of the patient and the ability of the patient to get back to pre-disease state, which is to have a pain free mobile joint, as reflected by the improvement in the post-op Knee Clinical Score and Knee Functional Score.

Keywords: Osteoarthritis, Total Knee Arthroplasty [TKA].

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Introduction

Total Knee Arthroplasty (TKA) is considered to be an effective treatment for end stage knee osteoarthritis.^[1] In most arthritic knees, some degree of instability, deformity, contracture or a combination of these elements, can be found.^[2-4] The common causes of arthritis of the knee includes Osteoarthritis (OA), Rheumatoid Arthritis (RA), Juvenile Rheumatoid Arthritis, Post traumatic Arthritis or secondary Osteoarthritis and other types of inflammatory arthritis. Osteoarthritis is thought to be the most prevalent chronic joint disease. The incidence of osteoarthritis is rising because of the ageing population and the epidemic of obesity.^[5] Pain and loss of function are the main clinical

features that lead to treatment, including non-pharmacological, pharmacological, and surgical approaches. The concept of improving knee joint function by modifying the articular surfaces has received attention since the 19th century. The surgical technique has varied from soft tissue interposition arthroplasty to resection arthroplasty to surface replacement arthroplasty. In surface replacement arthroplasty different types of prosthesis were developed to address the complex knee kinematics.^[6] Total knee replacement was introduced approximately 40 years ago. Total Knee arthroplasty has brought to the field of orthopaedic surgery a successful and predictable procedure for the management of the painful and degenerative knee. Though there are procedures such as osteotomy, unicompartmental replacement, which could

serve purpose in carefully selected patient populations, TKR remains by far the procedure of choice for many degenerative knees because of high reproducibility of predictable good to excellent results. [7-9] Various systems are available with specific features regarding the geometry of the components, the degree of conformity of the articulating surface and the anchoring technique. With the advancements in TKA it became necessary to study the outcome of TKA using standard criteria. With this background we tried to evaluate the results of TKA from the point of view of clinical, functional and radiological outcomes.

Materials & Methods

A Prospective study was done between the period of June 2015 – Jan 2017 after due approval of the ethical committee of KMC MGM Hospital Warangal. The study was conducted at the Department of Orthopaedics, 30 patients who consented and underwent Total Knee Arthroplasty in Mahatma Gandhi Memorial Hospital, Warangal this study was done to analyze functional outcome of Total Knee Arthroplasty using Knee Society score using a Posterior Cruciate substituting Knee Prosthesis and were assessed clinically, functionally and radiologically using Knee Society score. [10] The postoperative discharge follow up period was at 3, 6 weeks 3 months, 6 months and 1 year.

Inclusion Criteria

1. Rest Pain, Stiffness and deformity not relieved by analgesics, Physiotherapy and change in life style habits.
2. Age greater than 50 years
3. Both sexes
4. Post traumatic osteoarthritis
5. Failure of previous high tibial osteotomy

Exclusion Criteria

1. Age less than 50 years
2. Patient having neurological co morbid conditions like hemiplegia, Quadriplegia and cerebral palsy Inadequate skin coverage at operative site / poor distal circulation
3. Extensor mechanism discontinuity or severe dysfunction

4. Recurvatum deformity secondary to muscular weakness
5. Presence of a painless well functioning knee arthrodesis
6. Recent or current knee sepsis
7. Remote source of ongoing infections

Preoperative Clinical Assessment with detailed history of all patients was taken. All patients were assessed clinically and functionally using the Knee Society Score. Radiographic Assessment Standard guidelines were utilized to get knee radiographs – standing Anteroposterior view and a lateral view and a skyline view of the patella and presence of osteophytes, any bone defects in the tibia and femur and the quality of bone is assessed. All patients after thorough pre-op evaluation were taken up for surgery by the same surgical team under general or regional anaesthesia, Tourniquet was applied at the thigh region and sterile preparation done from thighs to toes and draped with patient in supine position and knee flexed to 90 degree an anterior midline incision was made. After following the due procedure of exposure and bone cutting, with the knee flexed, place the appropriate size femoral trial on the distal femur using the femoral impactor. Insert the trial tibial insert of equal size and appropriate thickness onto the trial base and complete the trial reduction. Bone cement was spread over the cut surfaces of femur and tibia for preparing for the femoral and tibial component implantation. Once the cement surrounding the tibial base has cured, the appropriate tibial insert may be locked into place. After closure of the capsule and the extensor mechanism patella femoral tracking was assessed. Wound closure done in layers and compressive dressing was given.

Results

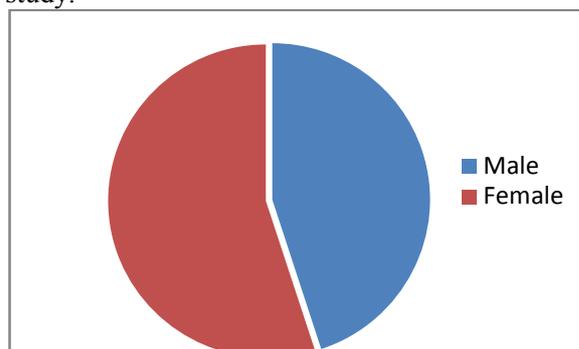
Of the 30 Arthroplasties performed 2 patients (2 knees) were lost to follow-up for various reasons 28 patients (28 knees) were available for clinical review. The mean follow up period was 11.6 months (range 3-18 months). The mean age of the patients at the time of surgery was 61.33 years (rang 50-68). The mean age of male patients was 61.57 years (range 55-65) and that of female patients was 61 years (range 50-68). The mean age of the patient at the time of surgery was 61.33 years (range, 51-70). See Table 1. Females (55%) and males (45%) slight

higher prevalence of Osteoarthritis was generally seen in females. Fig.1.

Table 1: Age distribution in years

AGE (YEARS)	Frequency	Percentage
51- 55	3	11
56-60	9	33
61-65	13	45
66-70	3	11
TOTAL	28	100

Fig 1: Sex Distribution of Cases involved in the study.



There was a predominance of Primary osteoarthritis in this study; accounting for 94% of the patients only 6% patients were diagnosed with Post traumatic Arthritis [PTA] table 2. There was a predominance of left side in our study, accounting for 55% of the patients

Table 2: Primary Diagnosis

Diagnosis	Frequency	Percentage
Primary Osteoarthritis (OA)	27	94
Post traumatic Arthritis	1	6
Total	28	100.0

According to the Knee Society Clinical Scoring system [] of the 28 patients assessed in this study 24 patients (92.8%) had Excellent, 3 patients (5.4 %) had fair , and 1 patient (1.8%) had good results table 3.

The functional Score n=14 (50%) patients had Excellent score and n=11 (39.29%) had Good score and 10.71% had fair score see table 4.

Out of 24 Patients having Excellent Knee Clinical Score 14 had excellent Knee functional Scores and 10 had Good Functional scores. Good Knee clinical Score was seen in 1 patient. There were 3 patients who had Fair knee clinical

score and knee functional scores. None had poor scores in our study see table5.

Table 3: Grading of Knee Clinical Score (Post Operative)

Grading	Frequency	Percentage
Excellent	24	85.71
Good	1	3.5
Fair	3	10.71
Poor	0	-
Total	28	100

Table 4: Grading of Knee Functional Score (Post Operative)

Grading	Frequency	Percentage
Excellent	14	50
Good	11	39.29
Fair	3	10.71
Poor	0	-
Total	28	100

Table 5: Comparison between the Knee clinical Score and Knee Functional Score

Knee Clinical Score	Knee Functional Score				Total
	Excellent	Good	Fair	Poor	
Excellent	14	10	0	0	24
Good	0	1	0	0	1
Fair	0	0	3	0	3
Poor	0	0	0	0	0
Total	14	11	3	0	28

Discussion

In this randomized, controlled study, we enrolled 30 patients with moderate-to severe knee osteoarthritis who were eligible for unilateral total knee replacement. However 2 patients were lost in follow up due to various reasons we had 28 patients to study. The mean post-operative Knee clinical score & knee function scores in the present study were 89.56 and 72.22, respectively, with mean follow up period of 11.6 months (range,3-18months), whereas, Rodriguez et al; with Total Condylar prosthesis reported 88 and 58 respectively at 20 years. [11] Walldius B reported the medium American Knee Society score of 93/100 at 5 years. [12] In a similar study by Rahul VK et al; found the mean KCS and KFS post operatively to be 84.43±9.59 and 32.75±11.79 respectively agreeing with our results. [6] Considering the classification of result, Knee score is within the range of excellent (85-100 points), however the

overall Functional Score is graded as good in this study. The lesser functional scores may be because of the relatively more number of patients in categories B. In this study we found the average post operative Knee Flexion was between 92.5° - 108 °. Insall et al; reported average post operative flexion of 98° and Ranawat et al; reported average post operative flexion of 95°. [13]

In this study no knee had more than 10 mm of antero-posterior instability and Post-operatively, no knee had flexion deformity more than 10°. Ranawat et al; reported 79% of patients had no pain post operatively. [13] Pain is an important parameter not only as an indication for TKA, but also for the evaluation of the results. In this series, we found excellent pain relief in 24 knees, mild or occasional pain 3 knees, and in one patient mild pain during walking and stair climbing. 14 patients were able to walk farther than 10 blocks and 100% used no assistive devices for ambulation. In this study, the average post-operative alignment as 4.3° valgus (range, 3° varus, 10° valgus), the mean posterior slope of tibia(s) was 3.5° (range, 0-8°) and the average femoral flexion angle 7.6° Rose RM et al; reported re-operation rate of 3% in their study of hybrid fixation with uncemented femoral component in a 2-4 year period of cruciate sparing condylar TKA. [14]

The definition of failure of a total joint arthroplasty has not been consistent in the literature, but revision of arthroplasty has been the most commonly used criterion. [15-17] In this study included all reoperations for any indication, to comment about the survivorship in our study. In this study series, the survival rate of implants without revision or a need for reoperation was 100%. However, the sample size of our study (28 knees) and the duration of follow up 15 months (3-16 months) are too small to compare with other studies. Important issues related to survivorship analysis include the number and outcome of patients lost of follow up and the number of subjects followed each year. Ranawat et al; reported a prosthetic survivorship of 94% at 15-year follow-up. [13] Kumar et al; had 11 year survival of 85% with total condylar knee prosthesis. In this study results show good-to-excellent clinical outcome comparable with other studies. However, as the results are short term, further follow-up studies

are required to see if this performance is maintained in the long term.

Conclusion

Total Knee Arthroplasty improves the functional outcome of the patient and the ability of the patient to get back to pre-disease state, which is to have a pain free mobile joint, as reflected by the improvement in the post-op Knee Clinical Score and Knee Functional Score. The Knee Society Score is an effective scoring system as it incorporates clinical and functional outcome following Total Knee Arthroplasty. There was significant association between the Knee Clinical Score and Knee Functional Score at one year follow up.

Conflict of Interest: None declared

Source of Support: Nil

Ethical Permission: Obtained

References

1. Carr AJ, Robertsson O, Graves S, Price AJ, Arden NK, Judge A, Beard DJ. Knee replacement. *Lancet* 2012; 379(9823):1331- 40.
2. Vail TP, Lang JE. Insall and Scott surgery of the knee. 4th ed. Philadelphia: Churchill Livingstone, Elsevier; 2006: 1455-21.
3. Insall J, Ranawat CS, Scott WN, Walker P. Total condylar knee replacement. Preliminary report. *Clin Orthop Relat Res*. 1976;120:149-54.
4. Kim RH, Scott WN. Operative techniques: Total Knee Replacement. Philadelphia: Saunders-Elsevier; 2009: 91-03.
5. Kurtz S, Ong K, Lau E, Mowat F, Halpern M. Projections of primary and revision hip and knee arthroplasty in the United States from 2005 to 2030. *J Bone Joint Surg Am* 2007; 89: 780-85.
6. Rahul V.K, Sunil Y, Abhay C, Chinmoy S. Prospective study of clinical and functional outcome of total knee replacement in osteoarthritic knee. *Int J Orthop* 2016;2(4):240-44.
7. Losina E, Walensky RP, Kessler CL, Emrani PS, Reichmann WM, Wright EA, et al. Cost effectiveness of total knee arthroplasty in the United States: patient

- risk and hospital volume. *Arch Intern Med* 2009;169:1113–21.
8. Quintana JM, Escobar A, Arostegui I, Bilbao A, Azkarate J, Goenaga JI, et al. Health-related quality of life and appropriateness of knee or hip joint replacement. *Arch Intern Med*. 2006;166:220–26.
 9. Bruyere O, Ethgen O, Neuprez A, Zegels B, Gillet P, Huskin JP, et al. Health-related quality of life after total knee or hip replacement for osteoarthritis: a 7-year prospective study. *Arch Orthop Trauma Surg*. 2012;132:1583–87.
 10. John N Insall, Lawrence D Dorr, Richard D Scott, W. Norman Scott. Rationale of The Knee Society Clinical Rating System. *Clin Orthop* 1989;248:13-14.
 11. Laskin RS. The Genesis total knee prosthesis: a 10-year follow up study. *Clin Orthop Relat Res* 2001;388:95.
 12. Walldius B. Arthroplasty of the knee joint using endoprosthesis. *Acta Orthop Scand* 1957;24:19.
 13. Ranawat CS. Long term results of total condylar knee arthroplasty: a fifteen years survivorship study. *Clin Orthop* 1993;286:94.
 14. Rose RM, Crugnola A, Ries M. On origins of high in vivo wear rates in polyethylene components of total joint prostheses. *Clin Orthop Relat Res* 1979;145:277 *Trans* 1986;10:441.
 15. Hozack WJ, Rothman RH, Booth Jr RE. The patellar clunk syndrome: a complication of posterior stabilized total knee arthroplasty. *Clin Orthop Relat Res* 1989;241:203.
 16. Jones RE, Barrack RL, Skedros J. Modular, mobile-bearing hinge total knee arthroplasty. *Clin Orthop Relat Res* 2001;392:06.
 17. Shiers LGP. Hinge arthroplasty of the knee. *J Bone Joint Surg* 1965;47:86.
 18. Kumar M, Battepathi P, Bangalore P. Expectation fulfillment and satisfaction in total knee arthroplasty patients using ‘PROFEX’ questionnaire. *Othrop Traumatol Surg Res* 2015;101(3):325-30.