Section: Orthopedics

Original Research Article

FUNCTIONAL OUTCOME OF TOTAL KNEE REPLACEMENT USING TRADITIONAL PATELLOPLASTY

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ABSTRACT

Background: Total knee arthroplasty (TKA) is the gold- standard treatment for tricompartmental knee osteoarthritis. Although patellar resurfacing is often advocated for patellar arthritis, it carries risks such as patellar fracture, polyethylene wear, extensor- mechanism rupture and difficult revisions. As an alternative, traditional patelloplasty – involving circumpatellar denervation and osteophyte removal – preserves the native patella. This bone- preserving approach maintains physiologic patellofemoral kinematics and strength without prosthetic wear.

Materials and Methods: The study aimed to evaluate the functional outcomes of total knee arthroplasty performed with traditional patelloplasty. In this prospective study (March 2018–March 2019), 108 primary TKA cases with traditional patelloplasty (and ≥1 year follow- up) were included from two Indian centers. Patients with patellar resurfacing or revision TKA were excluded. The cohort (mean age 64.5 years) comprised 44 men and 64 women, with 79 knees for osteoarthritis and 29 for rheumatoid arthritis. All surgeries used a standardized medial parapatellar approach under epidural anesthesia; the patella was everted, denervated with cautery, and osteophytes were removed (no patellar implants). Postoperative care was uniform (mobilization from day 2, brace and physiotherapy), with clinical and radiographic assessments preoperatively and at 6 weeks, 3 months, 6 months, and 12 months. Outcomes were measured using the Knee Society Score (KSS), Knee Functional Score, and Hospital for Special Surgery Patellar Score (HSSPS). A single surgeon and technique were used throughout to minimize variability.

Results: Patients showed marked improvements in motion and function. Mean postoperative flexion was 112.9° in ages 50–59, 110.7° in ages 60–69, and 98.6° in ages 70–79. Female patients averaged 115.5° flexion versus 106.8° in males. Mean Knee Society Score rose from 40.9 preoperatively to 87.7 at one year, and mean functional score from 42.9 to 88.2. Mean HSS patellar score similarly improved from 40.8 to 86.3. Subgroup analyses showed slightly higher patellar scores in osteoarthritis (mean 87.1) than rheumatoid knees (82.2) and in women (88.4) than men (83.8). Notably, older age was associated with lower ROM (age 70–79 group averaged ~98.6° flexion) whereas no sex- related ROM difference was found. Postoperative symptom scores improved over time: for example, 11.1% of knees had anterior knee pain at 3 months (0% at 1 year), and 13.0% had functional limitation at 3 months (0% at 1 year). Crepitus was seen in 31.5% of knees at 3 months, declining to 3.7% at one year; patellar tenderness was 7.4% at 3 months (0% at one year); and 27.8% had quadriceps strength 4/5 at 3 months (0% at one year). No serious patellofemoral complications occurred – there were no cases

of prosthetic loosening, patellar clunk, avascular necrosis, subluxation or dislocation during follow-up.
Conclusion: In this series, traditional patelloplasty during TKA yielded excellent functional outcomes. Patients achieved early, pain- free range of motion and high satisfaction, with no observed patellar complications. These results suggest that patellar preservation (via patelloplasty) can be an effective alternative to routine resurfacing in TKA.
Keywords: Total Knee Replacement, Traditional Patelloplasty

INTRODUCTION

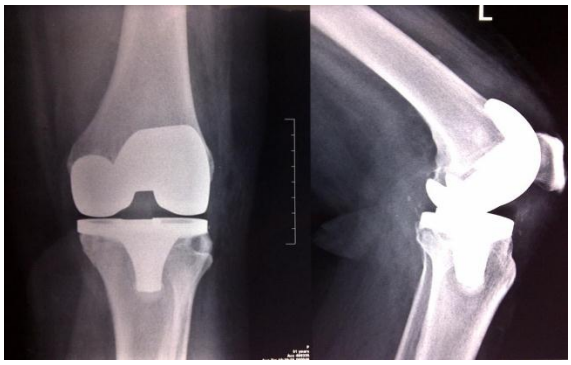
Gold standard in the management of tricompartmental osteoarthritis is Total Knee Arthroplasty.[1] Technically Total knee arthroplasty means replacement of worn out tibial, femoral and patella articular surface with prosthesis. The ideal treatment in the patella arthritic management is the resurfacing of the patella. But due to complication like patella fracture, early wearing of patella polyethylene, patella tendon rupture and difficulty in revision makes resurfacing as the unrealistic one.[2,3] So going back to our traditional patelloplasty is the last expedient. Traditional Patelloplasty is nothing but circumpatellar denervation by electro cautery with removal of osteophyte around patella. Preservation of patella bone diminishes the probability of patella osteonecrosis, maintains physiologic patellofemoral kinematics and its capacity to withstand high patellofemoral power, particularly in more physiologically young and dynamic patients without the worry of prosthetic wear.[4] The aim of this study is to analyze the functional outcome of Total Knee Arthroplasty following Patelloplasty.

MATERIALS AND METHODS

This is a prospective study done on patients who have undergone Total Knee Replacement from March 2018 to March 2019. Study was done in Sri Ramachandra Medical College, Chennai and Velammal Medical college, Madurai. Ethics committee approval was obtained from institutional ethics committee. The inclusion criteriae were patient who underwent Total Knee Arthroplasty with Patelloplasty with minimum of one year follow up. Exclusion criteria were patients who underwent Patella resurfacing total knee arthroplasty and revision total knee arthroplasty. A total of 108 total knee replacements were included in the study. Forty eight TKR's done on patients between the age group of 50-59, 46 TKR's done on patients between the age group of 60-69 and 14 TKR's done on patients between the age group of 70-79. Forty-four were male patients while remaining were females. We had seventy-nine patients diagnosed to have osteoarthritis while twenty-nine were rheumatoid. All patients underwent cruciate substituting implant (Exatech).

All patients were operated under epidural anesthesia with the patient in supine position in a routine operating table. Standard medial parapatellar approach was used. Appropriate soft tissue release and cut were done. Femur and tibial implantation were done in the standard manner. Patella is everted and stabilized with a clamp and peri-articular margins were cauterized. In all the cases only patelloplasty was done and no resurfacing was carried out. The tourniquet was deflated and hemostasis was secured. The Para patellar incision is closed with interrupted sutures and overlaid by continuous sutures. The rest of the wound is closed in layers with a suction drain. Sterile dressing and compression bandage are applied with knee brace. Patients were mobilized from day 2 and quadriceps-strengthening exercise were taught. Suture removed on 14th pod. All patients were followed up at 6 weeks, 3 months, 6 months and 12 months. Pre-operative clinical and radiological evaluation and post-operative clinical and radiological (AP, Lateral and Merchant view) evaluation were compared. Patients were followed up using Knee Society score, Knee Function score and Hospital for Special Surgery Patella Score.[5,6] The factors constant in our study were Single Surgeon, Surgical technique and surgical approach-medial parapatellar approach and Post-operative rehabilitation protocol.

RESULTS



The average postoperative Range of Motion (ROM) of patient in the age group 50-59 years was 112.94 degrees, 60-69 years was 110.65 degrees and 70-79 years was 98.57 degrees. The average range of motion in males was 106.8 degrees whereas the average for females was 115.5 degrees. The mean pre operative and post operative Knee society score, Knee functional score and Hospital for special surgery patella score were as per [Table 1]. The post-op HSSPS of patient in the age group of 50-59 years was 87.35, for 60-69 years was 85.21 and for

70-79 years was 82.14. The post op HSS Patella Score for male was 83.8 and for females was 88.44. The post op HSS Patella Score in osteoarthritis was 87.11 and in rheumatoid arthritis was 82.22. The mean 3 month, 6 month and one year Hospital for special surgery patella score were tabulated in [Table 2].

Table 1: Pre operative and Post operative KSS, FS, HSSPS

	Pre op	1 year Post op
KSS	40.92	87.66
Function score	42.87	88.24
HSSPS	40.83	86.29

Table 2: Hospital for Special Surgery Patella Score

	3 months	6 months	One year
Anterior knee pain	12 knees (11.11%)	6 knees (5.55%)	Nil
Functional limitation	14 knees (12.96%)	6 knees (5.55%)	Nil
Crepitus	34 knees (31.48%)	14 knees (12.96%)	4 knees (3.7%)
Tenderness	8 knees (7.40%)	4 knees (3.70%)	Nil
Quadriceps strength (Power)	30 knees - 4/5 (27.77%)	12 knees - 4/5 (11.11%)	All patient having 5/5 power

DISCUSSION

Our study evaluated the function of the patella in patients who have undergone patelloplasty in total knee replacement. We have evaluated knee performance using existing clinical scoring systems to assess the outcome. In our study, all the patient were operated by the same surgeon with a similar surgical technique and approach. The postoperative protocols followed were identical for all the patients including physiotherapy and rehabilitation. The mean age of our patient at the time of surgery was 64.47, which is almost equal when compared to the study done by Michael Tanzer MD et al and B Li, L Bai et al in which the mean age was 67 and 66.4 respectively.[7,8] There was a significant decrease in range of motion in the age group 70-79 years, when compared to the study done by Stathokostas et al in who had a significant decrease in range of motion in patients above 65 years of age.[9] There was no significant difference in the range of motion between the male and female groups. Our study is similar with the results obtained by Farahini et al in which there was no co-relation between postoperative range of motion and sex of the patient.[10] Post op Knee Society Score in our study was 87.66, which improved from 40.92. Post op Function Score (walking distance, walking aids used) in our study was 88.24.

Post op Hospital for Special Surgery Patella Score in our study was 86.29.In our study 11.11 % of the knees had anterior knee pain at 3 months follow up and no patient had anterior knee pain at 1 year follow up .In our study 12.96% of the knees had functional limitations at 3 months follow up, 5.55% of the knees had functional limitations at 6 months follow up. No patient had functional limitation at the end of one year. In our study 31.48% of the knees had Crepitus at 3 months follow up, 12.96% of the knees had Crepitus at 6 months follow up and 3.7% of the knee after 1 year follow up. In our study 7.40% of the knees had patellofemoral tenderness at 3 months follow up and 3.70% of the knees had tenderness at 6 months and no patient had patellofemoral tenderness at one year follow up. In our study 27.77% of the knees had quadriceps strength of 4/5 at 3 months follow up and 11.11% of the knees had quadriceps strength of 4/5 at 6 months follow up. After one year follow up no patient had decreased quadriceps strength in our study. Post-operative lateral patellar tilt greater than 5° on the Merchant view was present in 12 knees in our study. Postoperative lateral patellar subluxation less than -16° on the Merchant view was present in 10 knees in our study. None of the radiographic parameters obtained using the standard Merchant view radiographs correlated with pain and clinical scores.

The mean post-operative range of motion in patients with a pre-operative flexion range of motion of <75 degrees was 102.60 degrees. The mean postoperative range of motion of patients with a pre-operative flexion range of motion between 75-90 degrees was 115.65 degrees. The mean post – operative range of motion in patients with a pre-operative flexion range of motion > 90 degrees was 125 degrees. The above findings confirm that an increased pre-operative flexion range of motion had a better post-operative flexion range of motion.[11] No Prosthesis loosening, patellar clunk syndrome, avascular necrosis of patella, patellar subluxation and dislocation occurred during this short term follows up in our study.

In our short-term study, none of our patient had their patella resurfaced. Most of our patients has a very thin patella and patellar replacement may carry the risk of patella fracture and disruption of extensor mechanism. Use of Deep dished polyethylene may prevent anterior translation of femur and impingement against patella and may have contributed to good results in our study. The fundamental basis of retaining the patella was that the autogenous patella may better meet the physiological and anatomical requirements and avoid complications resulting from patellar resurfacing. In patelloplasty, the removal of the peripheral patellar osteophytes and some articular cartilage, trimming of fibrocartilage, and resection of a small section of lateral patella in some patients could create better adaptation to the anatomical femoral prostheses, optimizing patellar tracking, and decrease dot and linear contacts, thereby reducing the incidence of anterior knee pain and postoperative patellar wear. Patelloplasty preserved the patellar bone mass and the bone strength to the greatest degree, prevented such problems as polyethylene particles caused by the loosening and wear of patella prostheses, and obtained satisfactory results in primary Total knee arthroplasty with Patelloplasty. The limitations of the study were short-term follow up and a smaller sample size.

CONCLUSION

The traditional Patelloplasty in our study has shown good functional results and early pain free range of movements and enhance patients satisfaction without any complication.

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