

## Functional outcome of Total Knee replacement using traditional Patelloplasty

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**Introduction:** To evaluate the function of Patella following Patelloplasty in Total Knee Replacement using the Hospital for Special Surgery Patella score. **Materials and methods:** This is a prospective study done on patients who have undergone Total Knee Replacement from March 2018 to March 2019. The study was done in Sri Ramachandra Medical College, Chennai, and Velammal Medical College, Madurai. **Result:** In the present study Pre-op Knee, Scoring System scores were 40.92 and Functional Scores were 42.87. Postoperatively Scores increased to 87.66 and 88.24 respectively. Patella Score is 86.29. No patient had anterior knee pain and functional limitation at the end of one year. 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. **Conclusion:** In the present study, Patelloplasty has shown good functional results and an early pain-free range of movement.

**Keywords:** Total knee replacement, Patelloplasty, Tricompartmental osteoarthritis

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## Introduction

The 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 the 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 electrocautery with the removal of osteophyte around the 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]. This study aims 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. The study was done at Sri Ramachandra Medical College, Chennai, and Velammal Medical College, Madurai.

Ethics committee approval was obtained from the institutional ethics committee.

**Inclusion criteria:** The inclusion criteria were patients who underwent Total Knee Arthroplasty with Patelloplasty with a minimum of one year follow up.

**Exclusion criteria:** 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 the remaining were females.

The current study had seventy-nine patients diagnosed to have osteoarthritis while twenty-nine were rheumatoid. All patients underwent a cruciate substituting implant (Exatech).

All patients were operated on under epidural anesthesia with the patient in a supine position on a routine operating table. A standard medial parapatellar approach was used. Appropriate soft tissue releases and cuts 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 Parapatellar 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 a knee brace. Patients were mobilized from day 2 and quadriceps-strengthening exercise was taught. The suture was removed on the 14th pod. All patients were followed up at 6 weeks, 3 months, 6 months, and 12 months.

Pre-operative clinical and radiological evaluation and postoperative clinical and radiological (AP, Lateral, and Merchant view) evaluation were compared. Patients were followed up using the Knee Society score, Knee Function score, and Hospital for Special Surgery Patella Score [5,6]. The factors constant in the present 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 the 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.

**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

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 a 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 months, 6 months, and one-year Hospital for special surgery patella scores were tabulated in Table 2.

**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

The present study evaluated the function of the patella in patients who have undergone patelloplasty in total knee replacement. The current study has evaluated knee performance using existing clinical scoring systems to assess the outcome. In the present study, all the patients were operated on 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.

The present study is similar to the results obtained by Farahini et al in which there was no correlation between the postoperative range of motion and sex of the patient [10]. Post-op Knee Society Score in the present study was 87.66, which improved from 40.92. Post-op Function Score (walking distance, walking aids used) in the present study was 88.24.

Post-op Hospital for Special Surgery Patella Score in the present study was 86.29. In the present 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 the present 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 limitations at the end of one year.

In the present 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 the present 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 the present 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 a year follows up no patient had decreased quadriceps strength in the present study. Post-operative lateral patellar tilt greater than 5° on the Merchant view was present in 12 knees in the present study.

Postoperative lateral patellar subluxation less than -16° on the Merchant view was present in 10 knees in the present 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 follow up in the present study. In our short-term study, none of our patients had their patella resurfaced. Most of our patients have a very thin patella and patellar replacement may carry the risk of patella fracture and disruption of the extensor mechanism. The use of Deep dished polyethylene may prevent anterior translation of femur and impingement against patella and may have contributed to good results in the present 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 the lateral patella in some patients could create a 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 smaller sample sizes.

## Conclusion

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

## What does the study add to the existing knowledge

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.

## Author's contribution

**Dr. Muthukumar Subramanian:** Concept, study design

**Dr. Ganesan G. Ram:** Manuscript preparation

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