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# A Prospective Study of Functional Outcome of Patelloplasty in total Knee Arthroplasty

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**ABSTRACT**
Osteoarthritis (OA) is a common painful and non-inflammatory condition, found in 80% population. The Gold Standard in the management of advanced osteoarthritis of the knee is Total Knee Arthroplasty (TKR). However, the anterior knee pain of the Patellofemoral joint is not decreased or eliminated. To approach the Patellofemoral joint, two schools of thought have existed. One is Patellar Resurfacing where in the articular surface of the patella is fixed with a poly (implant) and the other one is Patelloplasty in which the articular surface is kept intact. In Patelloplasty, the patella articular surface is smoothened and the osteophytes are entirely removed. In this study, we describe a technique in Patelloplasty by using electrocautery to denervate the outer margin removing the osteophytes with the power saw, posterior surface of the patella has been smoothened. The patella is intact in this technique.

## INTRODUCTION

Osteoarthritis is a degenerative and non-inflammatory joint condition, which causes articular cartilage destruction and new bone formation near the joint surfaces and margins[1]. Osteoarthritis is characterized by wearing off articular cartilage and affects the synovial membrane bones and meniscus. Osteoarthritis causes joint pain, chronic effusion and osteophytes formation in the joint surface and margin, subchondral sclerosis, subchondral cyst formation and meniscal tears also occur[2]. Osteoarthritis is a clinical syndrome wherein-patient has joint pain accompanied by varying degrees of functional limitation that in turn leads to the reduction in quality of life[3].

Osteoarthritis affects several aspects of a patient's life including, social activities, functional activity and relationships, body image and emotional good being[4]. The Management of Osteoarthritis patient can be done conservatively by life style modification, analgesics, physiotherapy or surgically according to the severity of the joint[5]. The Gold Standard in the management of advanced osteoarthritis of the knee is Total Knee Arthroplasty (TKR). Also, various modifications and approaches have been attempted in order to give better prognostic value to the patient[6]. However, the anterior knee pain of the Patellofemoral joint is not decreased or eliminated from the study[7]. To approach the Patellofemoral joint, two schools of thought have existed Patellar Resurfacing where in the articular surface of the patella is fixed with a poly (implant) and Patelloplasty where the articular surface is kept intact[8]. The patella articular surface is smoothened and the osteophytes are entirely removed.

There has been significant progress and many changes in surgical design and technique, which has led to improving functional outcome in patients undergone total knee arthroplasty (TKA). The problems related to the patellofemoral joint a unresurfaced patella and the progressive degenerative changes on the lateral facet occurred in about 85% of patellae and the increased incidence of anterior knee pain has not been decreased and eliminated.These lead to reduce the quality life of the patient due to continuous symptom[9]. In Patelloplasty various techniques are described in literature ranging from the use of electocautery, bone nibblers, the surgical knife, drills, facetectomy, etc. alone or in combination[10]. We describe a technique for Patelloplasty using electrocautery and power saw[11].

**Aim:** To assess functional outcome following patelloplasty in total knee arthroplasty.

**Objective:** To determine the effect of Patelloplasty in total knee Arthroplasty assess the outcome in terms of **knee society score:** (knee score, functional score, patella score).

## MATERIALS AND METHODS

- The prospective study was conducted in 30 patients attending the Orthopaedics department in a tertiary care centre Puducherry, India
- Patients of age groups 60-80 years and both sex groups, admitted for Total knee Arthroplasty procedure in Puducherry during the study period. follow up at 6 week, 3 months, 6 months in postoperative period
- Patellofemoral osteoarthritis is classified according to Outer bridge classification in patients.
- All knees were rated according to the Knee Society score and knee Function Scores, patella score, preoperative and post operatively
- The patella score was evaluated according to Kujala score
- The pain was rated according to universal pain Assessment Tool
- Record both examiner record and patients Performa

**Inclusion criteria:**

- Patients with Primary osteoarthritis of knee taken up for Total knee Arthroplasty
- Patients willing to give consent for surgery
- Age between 60-80 years

**Exclusion criteria:**

- Rheumatoid arthritis
- Septic arthritis
- Osteomyelitis
- Neurological disorders limiting walking ability
- Age below 60 years and above 80 years

**Data collection:** Preoperative and postoperative assessment of the knee will be analyzed on the basis of Knee Society Score.

**Patients will be mainly assessed for Knee pain:**

- Total range of movement
- Varus and Valgus alignments
- Stability Anteroposteriorly and Mediolaterally
- Fixed flexion deformity of knee

**Functionally for**

- Walking
- Climbing stairs
- Walking aids used

**Grading for knee society score**

- Excellent score 80-100
- Good score 70-79
- Fair score 60- 69

## RESULTS AND DISCUSSIONS

All patients in the study were systematically followed up for 6 weeks, 3 month, 6 months and one year thereafter.

- All the patients in the study successfully completed the study. And the total number of the patient was 30
- There were no deep infections
- During the postoperative follow-up period there were no reports of significant dislocation, maltracking
- Excellent results in these patients with respect to anterior knee pain. From the study group only 3 patients had complained of anterior knee pain
- Total knee Arthroplasty with patelloplasty provided satisfactory functional out come without significant problems regardless of the preoperative Patellofemoral arthritis
- It proves to be a suitable alternative for patellar resurfacing in Total Knee Arthroplasty. And a definite step forward

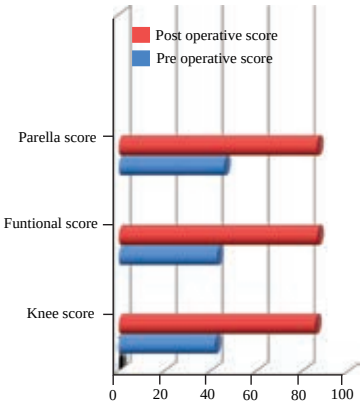


Fig. 1: Pre operative score and Postoperative score comparison

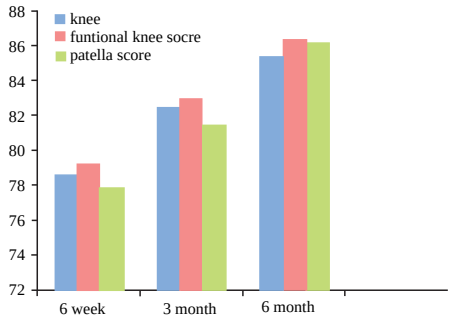


Fig. 2: Postoperative follow-up 6 weeks, 3 months, 6 months

Fig. 3: 69-year-old female. Right OA knee clinical photo

Fig. 4: KNEE showing AP and lateral view

Fig. 5: Postoperative clinical photo

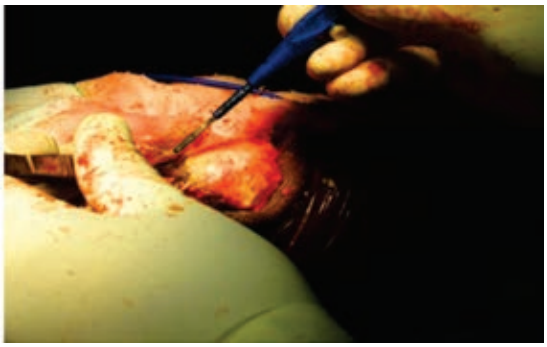

Fig. 6: Peri-patellar soft tissues cauterized with the help of thermal electrocautery to denervate for better demarcation

**Table 1: Knee Society Score**

| Content | Mean | S.D | Standard error difference | T Value | p-value |
|---|---|---|---|---|---|
| Knee Society Score Pre-Operative | 41.80 | 77.38 | 1.597 | 27.5897 | <.0001 |
| Knee Society Score Postoperative (6 months) | 85.37 | 4.51 | | | |
| Functional knee score preoperative | 42.73 | 6.77 | 1.343 | 32.4916 | <.0001 |
| Functional knee score postoperative (6 months) | 86.37 | 5.96 | | | |
| Patella preoperative score | 45.80 | 10.42 | 1.871 | 21.8767 | <.0001 |
| Patella score postoperative (6 months) | 86.23 | 6.61 | | | |

**Table 2: Post Operative Follow-up**

| Post operative | 6week | | 3 month | | 6 month | |
|---|---|---|---|---|---|---|
| Knee society score | Mean | S.D | Mean | S.D | Mean | S.D |
| | 78.6 | 4.58 | 82.5 | 4.43 | 85.37 | 4.51 |
| Knee functional score | 79.2 | 5.81 | 83.0 | 5.24 | 86.37 | 5.96 |
| Patella score | 77.8 | 6.28 | 81.4 | 6.16 | 86.23 | 6.61 |

**Clinical results**

**Statistical analysis**

**Knee society score:** Mean ± S.D.

Pre-operatively 41.8± 7.38, Postoperatively 85.3± 4.51. p<0.0001. Total knee society scoring postoperatively significant improved.

**Functional score:** Mean ± S.D.

Preoperatively 42.7± 6.77, Postoperatively 86.3±5.96, P value between groups using Paired Samples T-Test. p<0.0001, The functional scoring postoperatively improved

**Patellar score: Mean ± S.D.**

Pre-operatively 45.80 ± 10.42 post-operatively 86.3 ±6.6. P value between groups using Paired Samples T-Test. The p<0.0001 Highly significant improvements of the total knee society scoring postoperatively. There are different approaches given in literature for patellar management during Total Knee Arthroplasty, such as traditional treatment, or patelloplasty with circumferential electrocautery or patellar resurfacing[12].

**Surgical technique:**

- All 30 cases were done using a standard medial Parapatellar approach
- In all patients in the study, the patella was managed using the patelloplasty technique in which all osteophytes are removed and patellar denervation was done with the help of electro cautery, depth range 2-3 mm in the patella. The depth is measured using a vernier calliper

The anterior knee pain (AKP) is found to be the most important problems after the surgery[13]. Many surgical procedures have been used to solve the anterior knee pain, including resurfacing; some studies state patellar resurfacing does not improve the outcomes after primary TKR. Due to this reason, orthopedic surgeons who are performing primary Total knee arthroplasty avoided patella resurfacing to avoiding serious complications[14]. With increasing numbers of TKRs and the importance of patient expectations, addressing the problem of anterior knee pain after Total knee arthroplasty is of special significance. Whether circumferential electrocautery is useful for improving outcomes after primary TKR is controversial. In our study, the mean age was 70 years including both female and male population, ranging from 60-80. In multiple international study studies mean age was around 70.

In Indian study, by Sharma *et al*.[15] mean age group was 70.1, which is similar to our observation. This could be attributed to earlier occurrence of osteoarthritis knee in Indian subcontinent due to Indian culture and habits. In our study, we had 43 % Outer bridge grade 3 patient and 57% grade 4 patients. Prevalence of grade 4 was also observed more in study of L. 1998 Frizzier *et al*.[16]. We didn't observe any adverse effects or complications in our study at short follow-up of 6 months. There are several limitations in our study. It is a case study, there was no control groups and we had short follow-up of 6 months with the sample size of 30. However, the strength of study is that single surgeon performed all procedure and study is prospective study. In our study, there was statistically significant improvement observed in knee society score (p<0.00001), functional knee score (p<0.00001), patella score (p<0.00001) between preoperative and at each follow-up for patellopasty in total knee arthroplasty of osteoarthritis knee. Similar statistically significant improvement in knee society scores was observed study by Smith *et al*. in patelloplasty in total knee arthroplasty.

## CONCLUSION

Based on the clinical and radiological results to our knowledge, patelloplasty by electrocautery in Total Knee Arthroplasty seems to decrease anterior knee pain and to improve clinical and radiological outcome. Further larger long-term prospective comparative series are needed to support these results. Knee pain is a common ailment in the general population and 80% of the adults experience it in some point over time in their life. Osteoarthritis is a common cause for the same. Of the numerous methods of management in

Total Knee Replacement. Patelloplasty is done for better functional outcome and to manage anterior knee pain. This study-analyzed functional outcome of patelloplasty in 30 patients who were followed up for a period of 1 year following this surgery. The pre operative and postoperative score were compared and analyzed. Postoperatively, the patients had significant functional recovery and relief from the anterior knee pain. Also, Knee society score, Functional knee score, Patella score and Range of motion of the knee joint showed significant improvement. A good functional outcome was noted and the postoperative follow up score was found to be satisfactory. Thus, it is clear from the study that patelloplosty is an effective surgery for functional outcome and anterior knee pain management in total knee Arthroplasty.

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