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## RESEARCH ARTICLE

## PATELLOPLASTY AND PATELLAR DENERVATION IN TOTAL KNEE ARTHROPLASTY: A PROSPECTIVE STUDY.

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### Abstract

**Background:-** Anterior knee pain is still a major problem in total knee arthroplasty (TKA). Although the most widely accepted opinion is that anterior knee pain is often associated with a patellofemoral etiology, there is no clear consensus as to etiology or treatment. Disabling pain receptors by electrocautery can achieve denervation of the anterior knee region. The present prospective randomized controlled study aimed to evaluate results after patelloplasty and patellar denervation with electrocautery in TKA at a minimum follow-up of one year.

**Patients and methods:** Clinical and radiological results for 27 patients who successfully completed the study (30 knees) 10 males(37%) and 17 females(63%) with 14 patients(52%) had the right knee replaced, 10 patients(37%) had the left one, while 3patients(11%) had bilateral total knee replacement . Removal of all osteophytes and patellar denervation by electrocautery were performed in all cases. KSS,KFS and patellar score were used to assess pre- and postoperative anterior knee pain.

**Results:** All patients were systematically followed up for an average of 15 months ranging between 12 and 18 months. No revisions or re-operations were performed. On all parameters, there was significant improving concerning the total knee score,patellar score and anterior knee pain.

**Conclusion :** Patellar denervation with electrocautery can reduce anterior knee pain, with satisfactory clinical and radiological outcome, in TKA.

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### Introduction:-

The Golden Standard in the management of advanced osteoarthritis of the knee is total joint replacement. Over the past couple of decades the knee replacement procedures have undergone many revisions. Also various modifications & approaches have been attempted in order to give better prognostic value to the patient [1] .

Options for the management of an arthritic patellofemoral joint during TKR include patellar resurfacing, patelloplasty or benign neglect[2].

Resurfacing the patella created a whole series of new complications, including loosening, fracture, wear, maltracking and extensor mechanism disruptions, so comparison between resurfacing versus nonresurfacing became important [3].

Some surgeons contend that nonresurfacing procedure is quick and economical as compared with routine resurfacing; the clinical results show no difference [4].

Given the significant cost of patellar resurfacing and the well-known complications associated, some doctors attempt to avoid systematic resurfacing of the patella during TKA. Some surgeons prefer patelloplasty for nonresurfacing [5]

Anterior knee pain was reported in 4 to 49% of patients after primary TKA [6—8]. In some studies, both the peripatellar soft tissue, such as retinaculum and synovium, and the infrapatellar fat pad were implicated as the source of anterior knee pain [9,10].

Several studies on innervations of the anterior knee found substance-P nociceptive afferent fibers in the peripatellar soft tissue [11]. Disabling these pain receptors by electrocautery could theoretically achieve desensitization or denervation of the anterior knee region [12—14].

In general, denervation of the patella by electrocautery and patelloplasty with removal of osteophytes have been used for treatment of anterior knee pain in TKA. This attitude also has the advantage of easy implementation and fewer additional surgical procedures [15—18].

### **Patients and methods:-**

The study was performed, from June 2012 to December 2013. All patients were systematically followed up for an average of 15 months ranging between 12 and 18 months.

Written informed consent was obtained from all patients, and approval to use their medical records.

### **Inclusion criteria & basis of case selection:-**

The indications for the operations were advance osteoarthritis that was severe enough to warrant total knee arthroplasty after an adequate trial of non operative therapy.

### **Exclusion criteria:-**

Infection in the affected joint, skeletal immaturity, previous joint replacement surgery in the affected joint, neuropathic arthropathies, severe knee instability due to loss of musculo-ligamentous support, severe muscle weakness, e.g. post poliomyelitis and grossly insufficient femoral or tibial bone stock.

### **Surgical procedure:-**

The prosthesis used was either a posterior cruciate retaining or posterior stabilized cemented prosthesis. Most of surgery (27 cases) were done using a standard medial parapatellar approach with few exceptions using sub vastus approach (3 cases).

In all patients the patella was managed using the technique of patelloplasty with removal of all osteophytes and patellar denervation with electrocautery performed to a depth of 2 to 3 mm around the patella .

### **Clinical assessment:-**

Preoperative data regarding age, sex and body mass index were recorded. Patients were followed up postoperatively at 6 weeks, 3 months, 6 months and annually thereafter. At all preoperative and postoperative visits, a clinical score was determined using the Knee Society Score , Knee Function Score and Patellar Score [19].

### **Radiological assessment [20]:-**

**Standing A-P view:-** to assess limb alignment, component size, position (medio-lateral), inclination (A-P, Varus-Valgus) and cementation.

**Lateral view:-** to assess femoral notching, component size, posterior tibial slope, femoral component flexion-extension and patellar position in relation to the joint line.

### **Results:-**

In our study 33 knees were planned to be subjected to the study in 30 patients with advanced osteoarthritic knees who were to undergo total knee replacement. The study was performed from June 2012 to December 2013. All patients were systematically followed up for an average of 15 months ranging between 12 and 18 months.

Three patients, (3 knees) were excluded from the study. one patient, (1 knee) died from unrelated conditions. Two patients, (2 knees) had been lost to follow up. Thus, the final number of the patients who successfully completed the study were 27 patients, (30 knees) .

From our results we concluded that there is no difference between total knee replacement with/without patellar resurfacing concerning the total knee score, anterior knee pain, and the overall patient satisfaction rating.

#### **Complications:-**

No revisions or re-operations were performed. There were no deep infections or patellar fractures.

#### **Clinical results:-**

##### **Knee score:-**

##### **Pre-operative knee score:-**

The mean pre-operative knee score was 33 (with a range of 15-45), the functional score had an average of 37.83 (with a range of 20-50) and the patellar score was 13.53 (with a range of 11-19).

Post-operative knee score :

The knee score was 78.97 post-operatively ranging from 70-87, the functional score was 78.67 ranging from 70-85 and the patellar score was 22.57 ranging from 20-27.

##### **Anterior knee pain rating:-**

The anterior knee pain rating improved also from 3 in all patients pre-operatively to average of 1 in 14 patients and 0 in 15 patients and to 2 in one patient postoperatively.

#### **Statistical analysis:-**

Knee society score: Mean  $\pm$  S.D. Pre-operatively  $33.00 \pm 8.80$  Post-operatively  $78.97 \pm 5.14$ . P value between groups using Paired Samples T-Test. P value  $< 0.01$

Highly significant improvement of the total knee society scoring postoperatively.

Functional score: Mean  $\pm$  S.D. Pre-operatively  $34.50 \pm 8.65$  Post-operatively  $79.17 \pm 3.96$ . P value between groups using Paired Samples T-Test. P value  $< 0.01$

Highly significant improvement of the total knee society scoring postoperatively.

Patellar score: Mean  $\pm$  S.D. Pre-operatively  $13.53 \pm 2.00$  Post-operatively  $22.57 \pm 3.43$ . P value between groups using Paired Samples T-Test. P value  $< 0.01$

Highly significant improvement of the total knee society scoring postoperatively.

#### **Discussion:-**

The treatment of the patella during primary total knee replacement (TKR) continues to be debated. There are many different approaches to patellar management, such as traditional treatment, patellar resurfacing or patelloplasty with circumferential electrocautery. [21]

Determining the best way to improve the outcome of primary TKR is a significant clinical problem. One of the most important problems after the surgery is anterior knee pain (AKP). Many measures have been used to solve this problem, including resurfacing; however, certain studies have indicated that patellar resurfacing does not improve outcomes after primary TKR so many orthopaedic surgeons perform primary TKR surgery without patellar replacement avoiding serious complications (component failure, instability, fracture and tendon rupture) which may be associated with resurfacing. [22]

With increasing numbers of TKRs and the importance of patient expectations, addressing the problem of AKP after TKR is of special significance. Whether circumferential electrocautery is useful for improving outcomes after primary TKR is controversial. [21]

In comparing our results with other studies, we found that: the majority of the studies, which operated at the same basis as ours, found that patelloplasty with circumferential electrocautery significantly improves patients' knee function and pain after surgery.

**Alty et al.[23]** in a prospective randomized study with data collected from 35 patients who were followed up for an average of 3 years. The average of the preoperative Knee Society Score was 46,88, Knee Function Score was 47,14 and Patellar Score was 17,85. The average of the postoperative Knee Society Score at the time of final follow up was 92,74, Knee Function Score was 92,88 and Patellar Score was 27,82. He concluded that patelloplasty and patellar denervation with electrocautery can reduce anterior knee pain, with satisfactory clinical and radiological outcome, in TKA. Although long term follow up is desirable, these early results support the use of patelloplasty and patellar denervation as a good option for the management of the patella in TKA.

**Cemil et al, [24]** did a prospective study on 46 patients (49 knees) with follow up for an average of 41,1 months. The average of the preoperative Knee Society Score was 48,6, Knee Function Score was 48,4 and Patellar Score was 18,1. The average of the postoperative Knee Society Score at the time of final follow up was 87,7, Knee Function Score was 81,4 and Patellar Score was 25,7. This study concluded that, patelloplasty in TKA is an option for the reduction of anterior knee pain. Comparing our results with the results of this study shows no significant difference.

**Wang et al. [25]** conduct a retrospective study with 132 patients who were followed up for a mean of 7.8 years. The average of the preoperative Knee Society Score and Knee Function Score collectively was 97 and Patellar Score was 17. The average of the postoperative Knee Society Score at the time of final follow up was 96, Knee Function Score was 79,88 and Patellar Score was 28. He concluded that, the patellar retention with a patelloplasty may be viable as a routine procedure, even in knees with advanced patellofemoral arthritis. These results are superior to our own results which may be due to worse preoperative scores and more comorbidities of our patients.

**Burnett et al, [26]** in a prospective randomized clinical trial of patelloplasty and patellar denervation and patellar resurfacing in bilateral TKA. Data were collected from 32 patients (64 knees) and patients were followed up for an average of 10 years. The average of the postoperative Knee Society Score and Knee Function Score collectively at the time of final follow up was 148 and the prevalence of anterior knee pain was 17.3 %. This study concluded that, patelloplasty in TKA is a good option for the management of the patella. Our own results are superior to the results of this study which may be due to the very long duration of follow up period (average 10 years).

### Conclusion:-

Based on the clinical and radiological results of what is, to our knowledge, patellar denervation by electrocautery in TKA 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.

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