INTRODUCTION: Worldwide estimates indicate that 9.6% of men and 18% of women ≥ 60 years have symptomatic OA.\(^1\)

Joint replacement is the gold standard surgical treatment for patients with advanced osteoarthritis of the knee. TKR aims at addressing the tibiofemoral joint which is the major weight bearing joint involved more commonly in arthritis. However management of patellofemoral joint remains debatable issue.\(^2\) Up to 20% of patients are not satisfied with the outcome following total knee replacement surgery and kept blinded to which side patella resurfacing was done. Patella resurfacing was done always on side operated second. In follow up, patients were examined for anterior knee pain, range of motion, Standard radiographs, KSS, VAS score, and Feller patellar scores were calculated. There was no significant difference between both groups in terms of scores, function and radiographic alignment. The results of patelloplasty were as good as resurfacing & in case of persistent anterior knee pain it offers option of secondary resurfacing, also avoiding complications associated with resurfacing.

AIMS AND OBJECTIVES:
1. To study and compare the outcomes of patella resurfacing and modified patelloplasty in controlled matched group of patients.
2. To study and compare the incidence of complications between two technique and management strategies.

MATERIALS AND METHODS:
This is a prospective study of 40 patients operated for primary bilateral total knee replacement from 03/09/2012 to 02/12/13.

All Patients had staged bilateral total knee replacement surgery after being examined for alignment, deformity, mediolateral/ anteroposterior instability, scars and distal neuro-vascular status. Patients were evaluated with preoperative Knee society Score, VAS score, Feller Patella scores for anterior knee pain. Radiographs of antero-posterior weight bearing, lateral, and skyline views were taken and also looked for alignment. Patients were kept blinded to which side patella resurfacing was done.

Indication of operation: osteoarthritis of knee severe enough to warrant total knee arthroplasty after an adequate trial of nonoperative therapy.

Exclusion criteria:
- previous patellar realignment operation or any other major knee surgery such as high tibial osteotomy,
- previous patellectomy
- patellar fracture
- patellar instability
- previous extensor mechanism procedures
- previous unicondylar knee replacement
- history of septic arthritis or osteomyelitis

Selection of implant: High flexion metal backed joint was used in all. Patella resurfacing was done always on side operated second. Patella component used are a dome shaped 3 peg UHMWP component fixed with simplex bone cement using on lay technique.

Approach: The medial para-patellar approach was used in all cases. We used the measured resection technique.

Tibial Cut: We used the extra-medullary referencing jig. The cut was made perpendicular to axis of the tibia in the coronal plane with an anteroposterior slope of 3 deg.
Femoral Cut: Intra-medullary referencing was used. Using appropriate jigs and instrumentations distal femoral cut at 6-9 deg valgus to the knee and 3 deg external rotation was made.

Soft-tissue balancing: Final balancing of the soft tissue was done. Flexion-extension gaps were matched and varus-valgus alignment achieved.

Patella resurfacing: Patella was everted and its thickness was measured with calipers. Standard 8 mm cut was taken and appropriate implants size was chosen according to the diameter. 3 drill holes were made for pegs. Component was implanted by onlay cementing technique. Compression was applied till the cement set.

Modified Patelloplasty:

(Fig 1) Any marginal osteophytes from the periphery were removed up to the articular cartilage. Partial rim cautery was performed for partial neurectomy up to a depth of only 1 mm circularly within 5 mm of the edge of the patella. Subchondral decompression was done by using a 2.7mm drill bit to a depth of 2-2.5cm to encourage fibrocartilage ingrowth.

Lateral Release: After placement of all implants, the patella tracking was checked using "no thumb technique" and lateral release was done when required. After pulsed lavage wash closure was done in layers and drain was kept.

In the immediate postoperative period, drain output was watched for and drain removed the next day during dressing. All patients' knee mobilization was done and patient allowed full weight bearing on next day with support. Within 5 days pt were allowed walking with stick. Patients were discharged after 2 dressings and followed up at 1, 3, 6, 12 months. In followup, patients were examined for peripatellar pain, pain with sitting, climbing stairs, walking, range of motion, extension lag, quadriceps power, laxity, etc. Standard radiographs were taken, and Knee society score (KSS), VAS score, and Feller patellar scores were calculated. Xrays were assessed for loosening, implant positioning and alignment as shown in figure 2.

RESULTS AND OBSERVATIONS:

A total of 40 patients, 29 females (mean age 62.42 years) and 11 males(mean age 65.90years) were selected randomly for the study. Out of 40 patients in 28 patients both sides were operated on a single hospitalisation. In remaining patients 7%(3) were operated on the other side within 1-5 months; 15%(n=6) within 5-10 months and in 8%(n=3) patients were operated after >1 year.

Most commonly used size of patellar component was 29 mm in 45% of patients, 32 mm in 22.5% and 26 mm in 32.5% patients. None of the female required 32 mm patella and none of the male required 26 mm patella.

Rest of the outcomes are given in the table below: (Table 1)

There was a one patient who had patella # preoperatively while doing resurfacing. One patient had persistent anterior knee pain on patelloplasty side. The patient was advised resurfacing for the same but did not undergone resurgery.

There was one case of superficial wound gaping from lower stitches which was treated with continued dressing.

There was no case of post-operative patella #, extensor mechanism failure, component loosening, component fracture or wear out. Longer follow up are required for detecting this complications.

There were no resurgeries performed in both groups.

DISCUSSION:

Peng et al in 2003, and later Burnett et al21,Smith et al22, found no difference between the two strategies.

In 2006 A. Baco, G. Bentley and H. Alyawer23 suggested that patelloplasty gives improved results which included removal of osteophytes.

In 2011, Cemil ERTÜRK et al24, Patelloplasty with patellar decompression relieved anterior knee pain in total knee arthroplasty.

In 2012 van Jonbergen HP et al25, in a randomized controlled trial established effectiveness of circumpatellarelectrocautery in total knee replacement without patellar resurfacing.

In 2012A meta-analysis of 14 randomized controlled trials (RCTs) revealed a total of 855 knees that were treated with patellar resurfacing at the time of TKA, compared with 910 knees in which the patella was left unresurfaced. The average follow-up period was 5 years (range, 1 to 10.8 years)seven studies were unable to define a clinically significant difference between resurfacing and nonresurfacing in patients' function and their perception of pain,

○ two studies showed slight preference toward non-resurfacing
The outcomes of our study were comparable with Peng, Burnett, and Kleiblish. The number of female patients outnumbers the male patients because osteoarthritis is more common in females. Estrogens are protective, and their relative deficiency may correlate with accelerated cartilage loss.

In our study the 26 patients had B.M.I of 25-30 and 14 patients had B.M.I >30. All patients in the study were overweight or obese. Obesity is a known risk factor for OA knee. The biomechanical theory proposes that obesity leads to repetitive application of increased axial loading forces across the joint surface leading to degeneration of the articular cartilage and sclerosis of the subchondral bone.

In our study all patients bilateral TKR was staged. First the more symptomatic side was operated and then the second side. We did not take in to account the radiological stage of the disease but the patient symptoms. If patient had equal symptoms on both side then radiologically more affected side was operated first.

Surgeries were done during single hospitalization or staged. The reason behind operating patients on two different admission was different grade, patient preference or progression in the remaining knee after a period. Also the economical restraints of the patients were contributing factor.

In our study the patella resurfacing was done always on side operated second as a part of a study protocol. The patients were kept blinded regarding which side patella was resurfaced. In the study by Peng et al the always resurfaced patella on right side and left side was not resurfaced. This can be a confounding factor because we always operated side with more symptoms first.

Most commonly used size was 29 mm in 45% of patients. 32 mm size was used in 22.5% patients and 26 mm in 32.5% of patients. None of the female required 32 mm patella and none of the male required 26 mm patella. These difference was due to smaller anatomical dimensions of patella in females. Lateral release was done if the patella showed tendency of lateral tilting after all components were in place. The incidence of lateral release can be as high as 51% in some studies though negative consequences of lateral release are minimal and well recommended that lateral release should to be performed as clinically indicated. (Weber AR et al)

Regarding the duration of the surgery, average 9.42 min more for resurfacing, because on patelloplasty side closure can be started while cement is setting but on resurfacing side we have to wait for cement to be set. The operative time needed was more in Burnett compared to our study where we operated by using measured resection technique.

Difference between average VAS, Feller, and KSS scores of the patients operated with patelloplasty and resurfacing were statistically insignificant at 1.36, and 12 month followup. A surgeon should align total knee prosthesis in neutral or a slight amount of anatomic valgus to give the patient the best chance for long-term survival as shown by Ritter MA26. The femoral and tibia component alignment was not significantly different between the two groups.

There was no major patella-femoral joint related complication between two groups except for one patient who had per operative patella fracture while resurfacing.

The reason for fracture was technical error and osteoporotic bone. In this case while taking patella cut the patella cutting guide moved because of insecure fixation. It was refixed but during slight maneuvering the patella had a fracture which was undisplaced. The component was well fixed and extensor mechanism intact so it was managed conservatively.

The fracture united with broadening of the patella. There was no case of post-operative patella*, extensor mechanism failure. There was no cases of component loosening, component fracture or wear out. There was no resurgeries in either group. Though one patient was advised secondary resurfacing in patelloplasty group due to persistent anterior knee pain but did not undergone the surgeries. Pain decreased with time by conservative treatment.

As per literature the number of revisions for pain is higher if the patella is left unresurfaced and involves the insertion of patellar components in up to 10% of cases. In a significant proportion of these patients, symptoms will remain unchanged despite secondary resurfacing or revision arthroplasty, and satisfactory outcomes are expected in no more than 50% to 60% of cases. Even after successful secondary resurfacing, recurrence of symptoms may be as high as 55%. Conversely, there are fewer options available for the treatment of patients with AKP whose patella has already been resurfaced. Isolated patellar component revision for pain is not generally recommended because the clinical outcome is uncertain.

**CONCLUSION**

The results of patelloplasty were as good as resurfacing & in case of persistent anterior knee pain it offers option of secondary resurfacing. Also avoiding complications associated with resurfacing.