Volume : 3 | Issue : 11 | November 2014 • ISSN No 2277 - 8179

Research Paper

Comparison of Patella Resurfacing and Patelloplasty in Operated Bilateral Total Knee Replacement

Medical Science

KEYWORDS : patelloplasty, patellar resurfacing, knee society score, patellar fracture

Dr. Kevin Rajesh Choksey	Senior Resident, B.J.Medical College, Civil Hospital ,Ahmedabad
Dr. H.P. Bhalodiya	Professor and head of unit, BJ Medical college and Civil Hospital, Ahmedabad.
Dr. Z.M.Patel	Assistant professor, BJ Medical college and Civil Hospital, Ahmedabad.
Dr. Hiren K. Patel	Resident, BJ Medical college and Civil Hospital, Ahmedabad.
Dr. Aditya Banta	Resident, BJ Medical college and Civil Hospital, Ahmedabad.
Dr. Shaival S Dalal	Resident, BJ Medical college and Civil Hospital, Ahmedabad.

ABSTRACT

Up to 20% of patients are not satisfied with the outcome following total knee replacement (TKR), because of many factors, an important one being patellofemoral joint. The aim of this study was to study and compare the outcomes of patella resurfacing and modified patelloplasty in controlled matched group of patients. 40 patients had staged bilateral total knee replacement surgery and kept blinded to which side patella resurfacing was done. Patella resurfacing was done always on side operated second. In followup, 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.

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 the major weight bearing joint involved morecommonly in arthritis. However management of patellofemoral joint remains debatable issue.Up to 20% of patients are not satisfied with the outcome following total knee replacement (TKR). This can be related to multiple factors and the patellofemoral joint remains the important one among this.2

At present three basic strategies are being followed over the time to address PF joint in TKR. Clinicians who prefer patellar resurfacing claim to have advantage of less anterior knee pain, no secondary resurfacing, higher patient satisfaction.3,4,5,6Those in support ofnonresurfacing claim to have advantage of conservation of patellar bone, reduced patellar osteonecrosis, more physiologic kinematics, ability to withstand high patellofemoral forces, no concern of prosthetic wear or failure, and ease of resurfacing in case of persistant AKP7,8,9,10.Selective resurfacingattempts to identify those who are thought to have an improved clinical outcome with patellar resurfacing while avoiding potential complications associated with unnecessary resurfacing11,12,13,14,15. Based on strict selection criteria favorable patient for patella retention include younger patients (<65 years) with reasonably well-preserved retro patellar cartilage, absence of crystalline disease,central patellar tracking, and use of a patella-friendly femoral component.

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 non operative 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.

Volume : 3 | Issue : 11 | November 2014 • ISSN No 2277 - 8179

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.16,17,18Partial rim cautery was performed for partial neurectomyupto a depth of only 1 mm circularly within 5 mm of the edge of the patella.19,20Subchondral 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 patiemts, 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)

NO	PARAMETER		PATELLOPLASTY	PATELLAR RESURFACING	STATISTICAL SIGNIFICANCE
1	LATERAL RELEASE		3(7%)	2(5%)	NIL
2	OPERATING TIME		49.4 min	58.85 min	NIL
3	BLOOD LOSS		316 ml	328 ml	NIL
4	1 MONTH F'UP	VAS	6.27 preop to 2.2	5.85 to 2.3	NIL
		FELLER	8.67 preop to 19.9	9 to 20.5	NIL
		KSS	65.87 to 145.6	69.62 to 148.25	NIL
5	3 MONTH F'UP	VAS	1.8	1.6	NIL
		FELLER	23.6	23.75	NIL
		KSS	161.75	162.18	NIL
6	6 MONTH F'UP	VAS	1.47	1.27	NIL
		FELLER	24.3	23.47	NIL
		KSS	164.5	162.17	NIL
7	12 MONTH F'UP	VAS	1.35	1.17	NIL
		FELLER	24.5	24.62	NIL
		KSS	166.93	167.75	NIL
8	FEMOROTIBIAL ALIGNMENT		4.45 VALGUS	4.55 VALGUS	NIL
9	PATELLOFEMORAL CONGRUENCE		95.82%	96%	NIL
10	PATIENTS WITH 100% CONGRUENCE		52.5%	57.5%	NIL

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[2]0, and later Burnett et al21,Smith et al22 ,found no difference between the two strategies.

In 2006 **A. Baco, G. Bentley and H. Alyawer**23suggested 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 2011van 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

o five studies, resurfacing appeared superior over non-resurfacing.

The outcomes of our study were comparable with Peng, Burnett, and Kleiblsh.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 radiologica;ly more affected side was operated first.

Surgeries were done during single hospitalization or staged. The reason behind operating patients on two different admissionwas different grade, patient preference or progression in the remaining knee after a period. Also the economical restrains 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 dimentions 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 AB 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 1,3,6, and 12 monthfollowup. 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.

REFERENCE

1. Wolf AD, Pfleger B: Burden of Major Musculoskeletal Conditions. Policy and Practice. Special Theme-Bone and Joint Decade 2000-2010. Bulletin of the World Health Organization 2003, 81 (9): 646-656. | 2. C. E. H. Scott. C. R. Howie,D. MacDonald,L. C. Biant:Predicting dissatisfaction following total knee replacement A PROSPECTIVE STUDY OF 1217 PATIENTS .J Bone Joint Surg Br Sep 2010.vol-92(b).1253-1258 | 3. Ranawat CS, Sculco TP: History and development of the total knee prosthesis at the Hospital of Special Surgery. In: Ranawat CS, ed. Total condylar knee arthroplasty, New York: Springer; 1985:3-6. | 4. Levani J-P, McLeod HC, Freeman MAR: Why not resurface the patella?. J Bone Joint Surg Br 1983; 65:448-451. | 5. Scott RD, Turoff N, Ewald FC: Stress fracture of the patella following duopatellar total knee arthroplasty with patellar resurfacing. ClinOrthopRelatRes 1982; 170:147-151. | 6. Waters TS, Bentley G: Patellar resurfacing in total knee arthroplasty. J Bone Joint Surg Am 2003; 85:212-217. | 7. Abraham W, Buchanan JR, Daubert H, et al: Should the patella be resurfaced in total knee arthroplasty? Efficacy of patellar resurfacing. ClinOrthopRelatRes 1988; 236:128-134. | 8. Cameron HU, Fedorkow DM: The patella in total knee arthroplasty. ClinOrthopRelatRes 1982; 165:197-199. | 9. Feller JA, Bartlett RJ, Lang DM: Patellar resurfacing versus retention in total knee arthroplasty. J Bone Joint Surg Br 1996; 78:226-228. | 10. Keblish PA, Varma AK, Greenwald SA: Patellar resurfacing or retention in total knee arthroplasty: a prospective study of patients with bilateral replacement. J Bone Joint Surg Am 1994; 76:930-937. | 11. Brick GW, Scott RD: The patellofemoral component of total knee arthroplasty. ClinOrthopRelatRes 1988; 231:163-178. | 12. Levitsky KA, Harris WJ, McManus J, Scott RD: Total knee arthroplasty without patellar resurfacing. ClinOrthopRelatRes 1993; 286:116-121. | 13. Pettine KA, Bryan RS: A previously unreported cause of pain after total knee arthroplasty. J Arthroplasty 1986; 1:29-33. | 14. Scott RD: Total knee arthroplasty. Philadelphia, Saunders, 2006. | 15. Soudry M, Mestriner LA, Binazzi R, Insall JN: Total knee arthroplasty without patellar resurfacing. ClinOrthopRelatRes 1986; 205:166-170. | 16. Insall JN: Intra-articular surgery for degenerative arthritis of the knee. A report of the work of the late KH Pridie. J Bone Joint Surg Br 1967; 49:211-228. | 17. Keblish PA, Varma AK, Greenwald SA: Patellar resurfacing or retention in total knee arthroplasty: a prospective study of patients with bilateral replacement. J Bone Joint Surg Am 1994; 76:930-937. | 18. Pridie KH: A method of resurfacing osteoarthritic knee joints. J Bone Joint Surg Br 1959; 41:618. | 19. Altay MA, Ertürk C, Altay N, Akmeşe R, Işıkan UE :Patellar denervation in total knee arthroplasty without patellar resurfacing: a prospective, randomized controlle. OrthopTraumatolSurg Res. 2012 Jun;98(4):421-5. | 20. Peng CW, Tay BK, Lee BPH: Prospective trial of resurfaced patella versus nonresurfaced patella in simultaneous bilateral total knee replacement. Singapore Med J 2003; 44:347-351. | 21. Burnett RSJ, Boone JL, McCarthy KP, et al: A prospective randomised clinical trial of patellar resurfacing and nonresurfacing in bilateral TKA. ClinOrthopRelatRes 2007; 464:65-72. | 22. Smith AJ, Wood DJ, Li M-G: Total knee replacement with and without patellar resurfacing: a prospective randomised trial using the Profix total knee system. J Bone Joint Surg Br 2008; 90:43-49. | 23. A. Baco, G. Bentley and H. Alyawer:PATELLOPLASTY IN KNEE REPLACEMENT :J Bone Joint Surg Br 2006 vol. 88-B. | 24. Cemil ERTÜRK, Mehmet Akif ALTAY, U¤urErdemIfiIKAN :Patelloplasty with patellar decompression to relieve anterior knee pain in total knee arthroplastyActaOrthopTraumatolTurc 2011;45(6):425-430. | 25. H. P. W. van,Jonbergen,V. A. B. Scholtes,A. van Kampen,R. W. Poolman:A randomised, controlled trial of circumpatellarelectrocautery in total knee replacement without patellar resurfacing: J Bone Joint Surg [Br]2011;93-B:1054-9. | 26. Ritter MA, Faris PM, Keating EM, Meding JB: Postoperative alignment of total knee replacement. Its effect on survival. ClinOrthopRelat Res. 1994 Feb;(299):153-6. |