



International Journal of Orthopaedics Sciences

ISSN: 2395-1958
IJOS 2017; 3(1): 225-229
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www.orthopaper.com
Received: 06-11-2016
Accepted: 07-12-2016

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To resurface the patella or not, in primary total knee arthroplasty? A prospective study

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DOI: <http://dx.doi.org/10.22271/ortho.2017.v3.i1d.36>

Abstract;

Background: Knee arthritis is tricompartmental. In TKR patellofemoral arthritis can't be neglected. However, one group of surgeons always replace patellar surface, other group never touch patella, some replace it in only selected cases. This study was undertaken to see if any difference in functional outcome between two groups Objective; Compare the functional outcome between the patellar resurfaced and non-resurfaced groups and to find out the overall Patient satisfaction in both the groups in total knee arthroplasty.

Methods: A clinical perspective study from two hospitals 20 cases in each group totalling 40 cases of tricompartmental osteoarthritis knees. For pain VAS score, for function KSS, HSS scores used. The data was analyzed using the Student t test and Mann-Whitney U test.

Results: 57.5% of the overall patients being females and 42.5% being men. 75% of the resurfaced cases were male and 90% of the non-resurfaced cases were female. The mean age of patients was 64.8 years. The mean body mass index was 28.1. The measured intraoperative patellar thickness using a caliper is statistically significant with a mean thickness of 19.7mm in unsurfaced and 23.6 mm in resurfaced group.

Conclusion: There is no difference in the overall satisfaction or quality of life between the two groups.

Keywords: TKA, KSS, osteoarthritis, HSS, VAS, resurfacing, patella

1. Introduction

Total knee arthroplasty is undoubtedly one of the surgical success stories of modern times [1]. It is being done in large numbers in the specialty of orthopedic surgery. This is owing to better understanding of the joint and the evolution of the implants. The functional outcome following replacement arthroplasty is dependent on a multitude of factors including preoperative functional status, quality of bone, severity of deformity, type of deformity, implant alignment [2, 3].

For a long time, the patella was wrongfully marginalized and merely considered as an afterthought during total knee arthroplasty (TKA). Even today, patella resurfacing is often thrown in for good measure without proper understanding of the functional interplay among arthroplasty components. The patella should be recognized as an integral part of any TKA. The clinician must be aware that judicious surgical management of the patella will not only affect patient satisfaction but occupies a pivotal role in the success or failure of TKA [4].

Some surgeons always resurface the patella, some never use a patellar implant, and some only do it in selected cases depending on patient factors, implant design factors, surgical techniques and material properties. Patella resurfacing or non-resurfacing in primary total knee arthroplasty is still a debatable question [5].

2. Aims and Objectives

1. Compare the functional outcome between the patellar resurfaced and non-resurfaced groups in total knee arthroplasty.
2. This observational study was undertaken to see what difference it makes between the two groups when the constituents of the American Knee Society Scoring (KSS) and modified Hospital for Special Surgery score (HSS) were analyzed statistically pre- and post-operatively in both the groups and therefore help to recommend which is the better technique.
3. To find out the overall Patient satisfaction in both the groups.

3. Materials and Methods

3.1 Source of Data

A dual center study with patients from either sex with features of tricompartmental degenerative osteoarthritis of knee.

The study design is a clinical prospective comparative study done during the study period from October 2013 to November 2015.

The hospital based study was done on 40 patients undergoing a primary total knee arthroplasty fulfilling the inclusion and exclusion criterion with 20 patients assigned to each group of patellar non resurfacing and resurfacing respectively.

3.2 Inclusion Criteria

1. Patients of either sex with tricompartmental degenerative osteoarthritis of knee
2. Patients who are medically fit to undergo a total knee arthroplasty
3. Patients who have given informed written consent for the procedure and the complications associated with it.

3.3 Exclusion Criteria

1. Inflammatory arthritis
2. Neuropathic joints
3. Paralytic joints
4. Neuromuscular disorders

3.4 Methodology

A prospective comparative study of 40 patients undergoing primary total knee arthroplasty for degenerative tricompartmental osteoarthritis. Patient's demographic details and Body Mass Index were recorded. All patients were evaluated clinically with a thorough history and clinical examination. All patients underwent investigations like complete haemogram, urine routine, liver function tests, and renal function tests. Patients underwent specific investigations like plain radiography of involved knee joint (weight bearing anteroposterior, lateral and skyline views), urine culture and sensitivity, bilateral lower limb venous and arterial Doppler. Complete cardiac evaluation was performed including a 2D-echocardiography. Informed written consent was taken from all the patients.

Of the 40 patients 20 patients were assigned to patellar resurfacing group and 20 to non-resurfacing group. Preoperatively pain was evaluated and documented using Visual Analogue Score (VAS) and functional scores were evaluated and documented using the Modified Hospital for Special Surgery (HSS) and the Knee Society Score (KSS). Post operatively the patients were followed up for a mean duration of two years. The pain and functional scoring were evaluated at the time of one month, six months, one year, and two years post operatively. The overall patient satisfaction was documented using the SF-36 questionnaire preoperatively and at 2 years postoperatively. Variables pertaining to the patellofemoral articulation like stair climbing, anterior knee pain and transfers were evaluated and compared.

Intraoperative thickness of native patella was documented. After measuring the intraoperative patellar thickness a minimum of 14-15 mm of patella is ensured to retain after performing the patellar cut. The decision of resurfacing or non-resurfacing was made selectively in our study based on the intraoperative native patellar thickness owing to the prevalence of thin patella in Indian population, patellar degenerative changes and patellar tracking. The patellar tracking was confirmed using, both the trail components and also after cementing the final components. The operative time

required for the surgery was noted in both the non-resurfacing and resurfacing groups. Post operatively plain radiographs were taken to check the alignment, component positioning and tracking of patella.

The data was analyzed using the Student t test and Mann-Whitney U test.

4. Results

Osteoarthritis seems to be more prevalent among the Indian female subjects with 57.5% of the overall patients being females and 42.5% being men. 75% of the resurfaced cases were male and 90% of the non-resurfaced cases were female indicating the fact that the innate patellar thickness was lesser in females and was the single most rate limiting step in resurfacing the patella. Side incidence of osteoarthritis was found to be 45% left knee and 55% right knee. The mean age of patients undergoing TKA was 64.8 years. The mean body mass index was 28.1. The mean operative time for nonresurfacing was 103.9 minutes and for the resurfaced group was 122.5 minutes. The operative time difference between the resurfaced and none resurfaced is statistically significant with a p value of <0.0001. The measured intraoperative patellar thickness using a caliper is statistically significant with a mean thickness of 19.7mm in unsurfaced and 23.6 mm in resurfaced group.

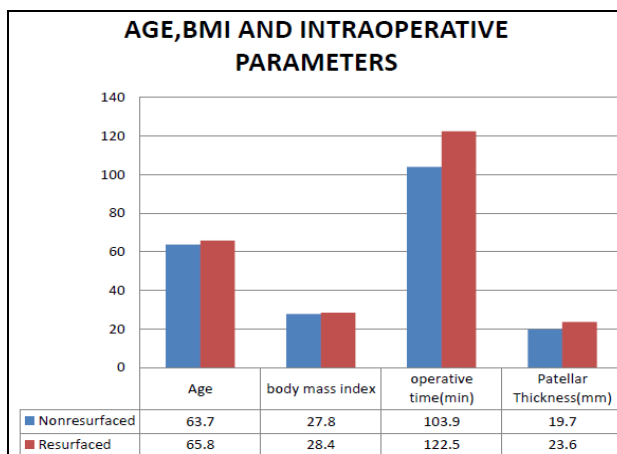


Fig 1: Age, BMI, operative time, patellar thickness

The Visual Analog Scores (VAS), the Modified Hospital for Special Surgery scores (HSS), the knee society scores (KSS) are not statistically significant between the two groups at 1, 6, 12 and 24 months.

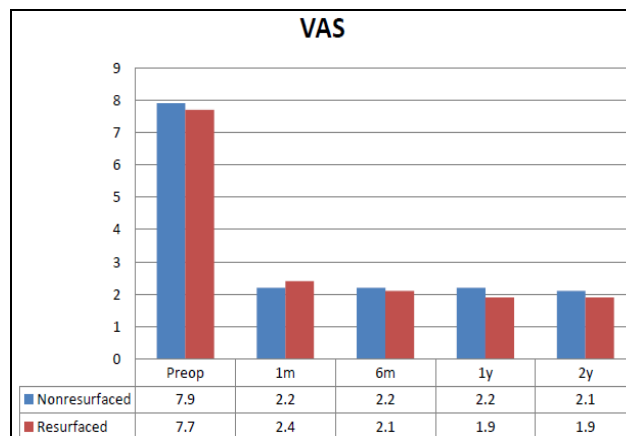


Fig 2: Visual analog score

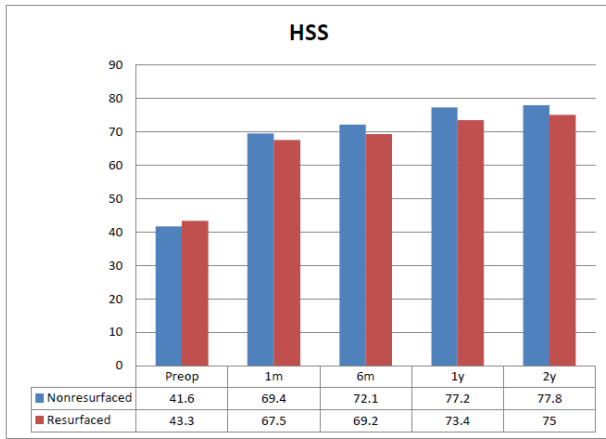


Fig 3: Hospital for Special Surgery Score

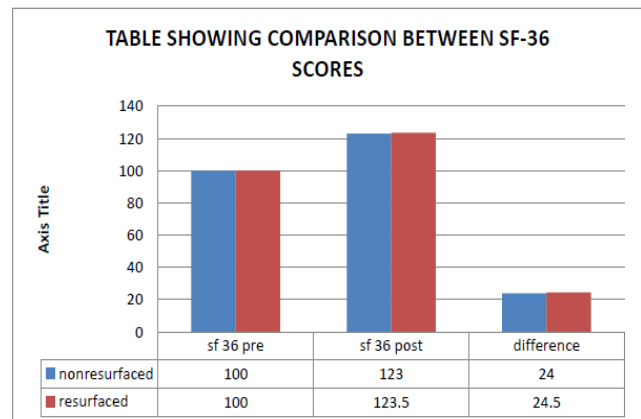


Fig 6: Overall quality of life



Fig 4: Knee Society Score

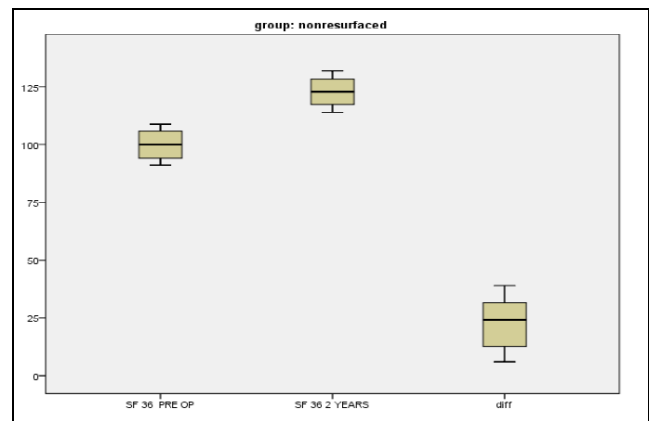


Fig 7: Box plot depicting overall quality of life in non-resurfaced group

Stair climbing (ascent or descent) is not statistically significant but anterior knee pain scores were statistically different between the two groups.

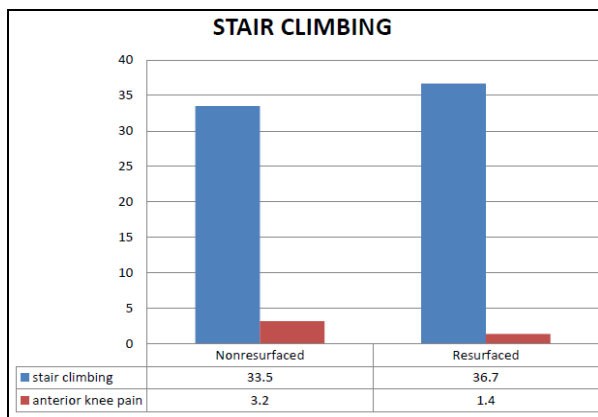


Fig 5: Stair climbing and anterior knee pain

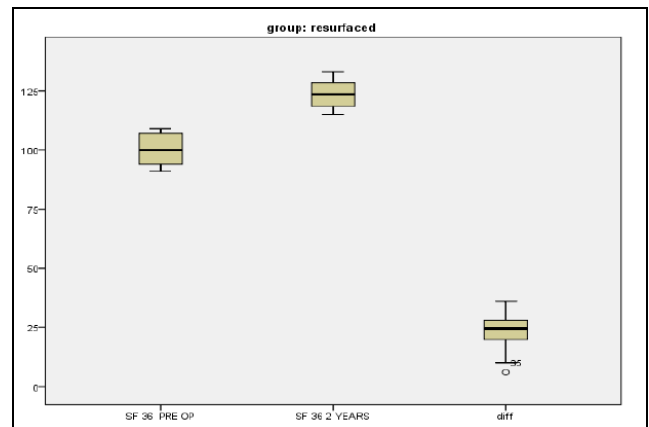


Fig 8: Box plot depicting overall quality of life in resurfaced group

The overall satisfaction and quality of life in patients undergoing TKR was evaluated using the SF-36 questionnaire. Differences between SF-36 scores of all patients undergoing TKR (irrespective of resurfacement or non resurfacement), pre-op and post op was statistically significant and all patients reported much improvement in quality of life after TKA ($p < 0.001$).

However comparing between the resurfaced and non-resurfaced groups, there was no statistical significance between two groups with regards to overall satisfaction and quality of life.

Patella tracking was satisfactory in all patients regardless of resurfacing or non-resurfacing. However we had one case of maltracking in the non resurfacement group which was tracking adequately after placement of sutures.

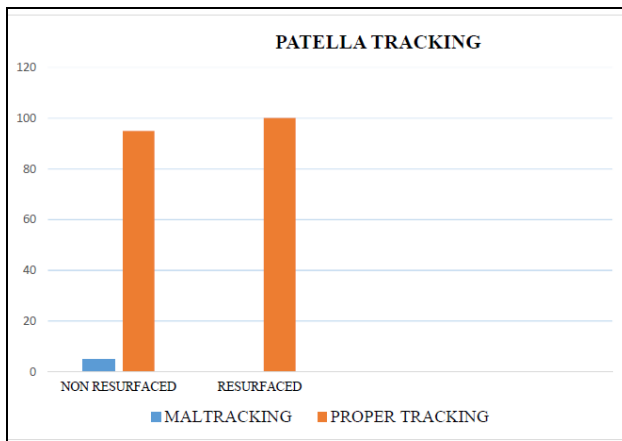


Fig 9: Patellar tracking in both the groups

5. Discussion

Despite meta-analyses [6], systematic reviews [7] and randomized controlled trials [8, 9], the answer to the debate—whether or not the patella should be routinely resurfaced during primary TKA remains unanswered. Three basic strategies have evolved—always to resurface, never to resurface, or to resurface the patella selectively. Our study found, similar to studies by others, patients reported satisfactory long-term outcomes regardless of patellar management approach. The mean KSS score performed by studies by Barrack *et al* [10] is 169-Non-Resurfaced and 162-Resurfaced; Campbell *et al* [11] 136-Non-Resurfaced and 138-Resurfaced; Burnett *et al* [12] 148- Non-Resurfaced and 146-Resurfaced; Smith *et al* [13] 163- Non-Resurfaced and 152-Resurfaced; all these studies show no significant difference between the resurfaced or non-resurfaced groups. Our study also yielded similar results with mean KSS scores being 159-Non-Resurfaced and 157-Resurfaced respectively with no significant difference between the two groups. Some of the studies who found resurfacing better between the two groups were Partio *et al* mean KSS being 169- Non-Resurfaced and 170- Resurfaced, Schroeder *et al* [14] 150- Non-Resurfaced and 163- Resurfaced, Wood *et al* [15] 152- Non-Resurfaced and 157- Resurfaced, Waters and Bentley [16] 162- Non-Resurfaced and 167- Resurfaced. Some studies show non-resurfacing to be better over resurfacing like Feller *et al* [17] 89- Non-Resurfaced and 86- Resurfaced, Fengler *et al* 147- Non-Resurfaced and 138- Resurfaced. After analyzing the available literature we can reinstate Krackows opinion that, the issue for or against patellar resurfacing has become analogous to topics of religion and politics. Studies on the subject of patellar resurfacing have been diverse, we have compared studies with identical study designs. It should also be kept in mind in some of the long term studies available on patellar management strategies, the subjects had difficulty in completing the evaluation due to limited overall physical health status itself and not because of knee related disability. Furthermore in our study variables like anterior knee pain, stair ascent and descent, transfers, secondary resurfacing, patellar related readmissions, overall satisfaction and quality of life were similar and comparable in both the groups. It was also noted in our study that 90% of the patella in the female patients in our Indian subjects were not conducive for resurfacing as the innate thickness of the patella is about 19.7 mm. Thus keeping these limiting factors and the overall results in mind including the increased operative time in mind we routinely do not resurface the patella primarily, unless resurfacement is indicated.

6. Conclusion

On the basis of our study, we can summarize that, with the type of total knee replacement done on our patients, results achieved with and without resurfacing of the patella are similar. No significant difference was found between the two groups with respect to the prevalence of knee-related readmission, or of subsequent patella-related surgery. There seems to be reduced anterior knee pain in the resurfaced group. However, there is no difference in the overall satisfaction or quality of life between the two groups.

1. The Study Was Not Funded

2.
3.

7. **Ethical approval:** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

4.

Informed consent: Informed consent was obtained from all individual participants included in the study.

No Conflict Of Interest - Enclosed

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