Patellar resurfacing compared with non-resurfacing in total knee arthroplasty: A 5-year follow-up study

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Abstract

Introduction
Patellofemoral arthritis is a contentious issue. This study compares the clinical outcomes of total knee arthroplasties performed with and without the patella resurfaced.

Materials and methods
One Hundred-Five patients (135 knees) underwent primary total knee replacement and were randomized into two groups: those treated with and those treated without resurfacing of the patella. Preoperatively, Knee Society Knee and Function Scores were calculated.

Results
After a minimum of 5 years postoperatively Knee Society Knee and Function Scores as well as the Clinical Anterior Knee Pain Rating were calculated. Outcomes included the scores according to the Knee Society clinical rating system, patient satisfaction, global and anterior knee pain scores, radiographic findings, and complications and revisions.

Conclusion
On the basis of these findings, we concluded that, with the type of total knee arthroplasty used in our patients, similar results may be achieved with and without patellar resurfacing.

Introduction
Total knee replacement (TKR) is a common, cost-effective procedure performed by most orthopaedic surgeons. Ideally, TKR provides excellent pain relief and adequate functional capability in patients suffering from various musculoskeletal disorders such as osteoarthritis and rheumatoid arthritis.

Although the designs and operative procedures have undergone many changes, the essence of TKR is replacement of the tibial and femoral components. Controversy surrounds the subject of patellar resurfacing in total knee arthroplasty. When the original total knee prostheses were designed, the patellofemoral articulation was not taken into consideration as a potential source of pain, and the results were complicated by patellofemoral symptoms. The incidence of patellar pain has led to the recommendation that the patellar must be resurfaced as a component of the operation.

Comparisons of the results in resurfaced and nonresurfaced arthroplasties have found no significant differences between the two groups. However, others have argued that resurfacing of the patella should be performed routinely. Numerous clinical trials have been done to help clarify the indications for patellar resurfacing. Unfortunately, there is little consensus, and surgeon preference remains the primary variable. This study attempts to evaluate the role of patellar resurfacing in standard knee arthroplasty performed for osteoarthritis.

Materials and methods
This work conforms to the values laid down in the Declaration of Helsinki (1964). The protocol of this study has been approved by the relevant ethical committee related to our institution in which it was performed. All subjects gave full informed consent to participate in this study.

This is a randomized controlled study that involved 105 patients in each arm – patellar resurfacing and nonresurfacing – who underwent primary TKA at our institute. One hundred and five consecutive patients underwent TKR between 2009 and 2014 at our institute. No patients who had primary TKR were excluded from the study. The information was collected prospectively but reviewed retrospectively.

For inclusion into the study, each patient was required to attend a preoperative office visit followed by periodic yearly assessments. Only primary TKR performed on patients for osteoarthritis was included in the study. The patients were not randomized and the patellofemoral disease treated was of the same severity in both groups. Allocation to a group was by surgeon preference not the degree of arthritis of the patellofemoral joint. All patients had Kelgren and Lawrence grade 3–4 of osteoarthritis on plain radiographs.

Exclusion criteria include previous patellectomy, inflammatory arthritis, patellar fracture, patellar instability, previous extensor mechanism procedures, high tibial osteotomy, severe valgus or varus instability (15°), previous unicompartmental knee replacement, and a history of septic arthritis and osteomyelitis.

All patients admitted to the orthopaedic ward with osteoarthritis for TKA during the study period were identified and assigned to the relevant arm of the study. Those patients who had medical record numbers ending in even numbers were assigned to the resurfacing group.

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Those patients with medical record numbers ending in odd numbers were assigned to the nonresurfacing group. A total of 105 patients were recruited; with 60 patients in Group 1 and 75 patients in Group 2. No power analysis was done, but this sample size is within those of other studies done on this topic. A thorough history and physical examination was carried out. All those patients fitting the exclusion criteria were withdrawn from the study. The study was explained to each patient and informed consent obtained. The preoperative Knee Society Knee and Function Scores were calculated. Postoperative rehabilitation protocol for all patients included institution of a regimen of continuous passive motion (CPM) on the first postoperative day with a gradually progressive range of motion. Patients were also ambulated from the first postoperative day with the help of a walker. All patients were taught a quadriceps strengthening regimen in the form of straight leg raising exercises which were started in the hospital and continued for 6 weeks postoperatively. We did not use a knee brace in any of our patients.

At a minimum of 5 years postoperatively, patients were called to a free clinic and a proforma was filled out by detailing post-operative Knee Society Knee and Function scores. Patients also were assessed for Clinical Anterior Knee Pain Rating as used by Waters. For bilateral knee arthroplasty patients a single data sheet was filled encompassing the patient’s feelings about both knees.

Results

Demographics

We studied a total of 105 patients, 75 in the resurfacing group and 60 in the nonresurfacing group. Analysis indicated that the groups were similar for age, duration of follow-up, gender, and weight (Table 1).

Knee scores and function scores

The pre-operative and post-operative knee and function score was calculated for both groups – resurfacing and nonresurfacing (Table 2). No difference was found in the two groups (Table 3).

Discussion

Patello-femoral problems are the most common reason for re-operation following knee arthroplasty. The complications of resurfacing include polyethylene wear or fracture and prosthetic loosening. Previously published reports suggest that patients with resurfaced patella experience better pain relief and better functional performance including ability to climb stairs. Clayton and Ramaya reported 9% patella complications during the first 3 years of their series, whereas there was none thereafter. They noted that complications were more common if lateral release was carried out. They therefore recommend the use of an anatomical component to reduce the risk of dislocation. Leval et al. found that the incidence of complications was the same whether the patella was resurfaced or not. Some authors feel that routine use of patellar resurfacing is unnecessary; however, they stress that it is important to maintain patellar height by appropriate positioning of the tibial and femoral components and the necessary soft tissue release in order to obtain stability of the patellar component.13,14,15,16,17,18 The reason given is a significant complication rate associated with patella resurfacing that is not encountered in the group without resurfacing. However, the incidence of anterior knee pain in the absence of resurfacing has been reported to be as high as 19%. Keblash et al. recommend resurfacing for the large and thick patella, the deformed non-conforming patella, severe pre-operative patella pain, the multiple operated knee, when reflex sympathetic dystrophy is anticipated and poor patient compliance.6 A relative indication for patellar resurfacing includes rheumatoid arthritis and the well-informed patient. Conversely, indications for patellar retention included a small patella, poor bone quality including rheumatoid arthritis, vascular compromise, extensive release, complex quadriceps-patelapatellar tendon tracking, minimal pre-operative patellar pain and patella alta/baja.19,20 A relative indication for patellar retention includes a young patient with good compliance and high demands. Soft tissue balancing is important, as

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Table 3: Results of clinical scores.

<table>
<thead>
<tr>
<th></th>
<th>Nonresurfacing group</th>
<th>Resurfacing group</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preoperative Knee Society knee score results</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range of motion</td>
<td>15.13</td>
<td>15.10</td>
<td>0.40</td>
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<tr>
<td>Total Knee Society score</td>
<td>40.60</td>
<td>40.40</td>
<td>0.33</td>
</tr>
<tr>
<td><strong>Postoperative Knee Society knee score results</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Range of motion</td>
<td>21.63</td>
<td>21.53</td>
<td>0.26</td>
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<tr>
<td>Total Knee Society score</td>
<td>94.23</td>
<td>93.67</td>
<td>0.64</td>
</tr>
<tr>
<td><strong>Knee Society function score results</strong></td>
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<tr>
<td>Pre-op Knee Society Function score</td>
<td>45.83</td>
<td>45.50</td>
<td>0.38</td>
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<tr>
<td>Post-op Knee Society Function score</td>
<td>90.50</td>
<td>89.67</td>
<td>0.51</td>
</tr>
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</table>

Patellar resurfacing alone will not prevent the occurrence of anterior knee pain. We recognize that the present study was of medium duration (minimum 5-year follow-up) and that accelerated failure may occur in either group with longer follow-up. The results of the present study may be specific to the type of prosthesis used, and different results may be reported for different designs (Table 3). At 5 years follow-up there is no difference in improvement of Knee Society Knee Scores or Function Scores of patients undergoing patellar resurfacing versus nonresurfacing in TKA. There is no difference in postoperative clinical anterior knee rating of patients undergoing patellar resurfacing versus nonresurfacing in TKA. Patients who underwent bilateral total knee replacement had higher incidence of anterior knee pain irrespective of whether the patellar was resurfaced or not. In our experience we do not think that patellar resurfacing is required in TKA procedures for osteoarthritis. Our indications for patellar resurfacing are inflammatory arthropathy, previous patellar fracture or dislocation, severe patellar maltracking, previous unicompartmental knee arthroplasty or high tibial osteotomy, and non-anatomic trochlear groove on femoral component.

Conclusion

At 5 years follow-up: 1) There is no difference in improvement of Knee Society Knee Scores or Function Scores of patients undergoing patellar resurfacing versus nonresurfacing in TKA. 2) There is no difference in postoperative clinical anterior knee rating of patients undergoing patellar resurfacing versus nonresurfacing in TKA. 3) Patients who underwent bilateral total knee replacement had higher incidence of anterior knee pain irrespective of whether the patellar was resurfaced or not. In our experience we do not think that patellar resurfacing is required in TKA procedures for osteoarthritis. Our indications for patellar resurfacing are inflammatory arthropathy, previous patellar fracture or dislocation, severe patellar maltracking, previous unicompartmental knee arthroplasty or high tibial osteotomy, and non-anatomic trochlear groove on femoral component.

References


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