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Should the patella be replaced in total knee replacement?

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Abstract In 170 total knee arthroplasties for osteoarthritis 71 did not receive a patellar replacement (group A), while 99 knees had a cemented polyethylene patella (group B). The mean follow-up time was 36 months (30–50 months). In group A 10 patients underwent second-stage patellar resurfacing and in group B 2 knees underwent revision of the patellar component. Radiologically the average patellar congruency was similar. In both groups there were 21 non-congruent knees. In group A 8 were symptomatic and had low scores compared to 2 in group B ($P<0.05$). The mean HSS score and patellar score were higher in group B than in group A ($P<0.05$).

Résumé Parmi 170 prothèses totales du genou pour arthrose, 71 n'avaient pas de remplacement rotulien (groupe A) et 99 genoux (groupe B) avaient un implant rotulien cimenté en polyéthylène. La moyenne de suivi était de 36 mois (30 à 50 mois). Dans le groupe A dix malades ont eu secondairement un remplacement rotulien et, dans le groupe B, deux genoux ont eu une révision du composant rotulien. Radiologiquement la congruence rotulienne moyenne était semblable. Dans les deux groupes il y avait 21 genoux non congruents. Dans le groupe A, 8 étaient symptomatiques et avaient de bas scores en comparaison de 2 dans le groupe B ($P<0.05$). Le score moyen HSS et le Score Rotulien étaient plus élevés dans le groupe B que dans le groupe A ($P<0.05$).

Introduction

Controversy surrounds the subject of patellar resurfacing in total knee arthroplasty. Early generations of total knee prosthetic designs did not include patello-femoral resurfacing, resulting in residual patello-femoral symptoms in 16 to 30% of patients [11, 12]. The incidence of patellar pain has led to the recommendation that the patellar must be resurfaced as a component of the operation [9, 10, 11].

Comparisons of the results in resurfaced and non-resurfaced arthroplasties have found no significant differences between the two groups [1, 19]. However, others have argued that resurfacing of the patella should be performed routinely [2, 15]. This study attempts to evaluate the role of patellar resurfacing in standard knee arthroplasty performed for osteoarthritis.

Patients and methods

A consecutive series of 118 patients underwent 170 total knee arthroplasties for osteoarthritis between October 1993 and December 1997. In 71 arthroplasties performed during the initial 2 years – October 1993 to September 1995 – the patella was retained (group A). In 99 arthroplasties performed during the remaining period the patella was resurfaced (group B).

The senior author (P.J.L.) operated on all the patients with an AGC knee (Biomet) with a cemented polyethylene patellar component. Patients who had previously undergone a patellar realignment procedure or any other major surgery on the knee such as a high tibial osteotomy prior to knee arthroplasty were excluded from the study.

Groups A and B were comparable in age and sex (Table 1). For all operations a standard surgical procedure was used. Soft tissue releases varied according to specific needs. Lateral releases were required primarily in 17 cases. In group A the patella did not undergo any form of patelloplasty procedure.

All the patients were reviewed and clinically evaluated by using the Hospital for Special Surgery (HSS) knee score system [13] and patellar score [7] by a single independent observer. Radiological evaluation included a standing antero-posterior view, a lateral view and 45° skyline view of the knee. The radiological assessment of patellar function after knee arthroplasty was carried out as advocated by Keblish et al. [14]. The mean follow up was 36 (30–50) months.

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Table 1 Demographic details of 118 patients (divided into two groups) who underwent 170 total knee arthroplasties

	Group A Without patellar resurfacing	Group B With patellar resurfacing
Males	24	41
Females	22	31
Age (years) (SD)	68.7 (\pm 7.6)	69.1 (\pm 8.2)

Table 2 Details of the patellar retention and patellar replacement groups

	Group A Without patellar resurfacing	Group B With patellar resurfacing
No. of arthroplasties	71	99
Mean follow-up	42 months (36–50)	33 months (30–48)
Range of movement (flexion of knee)	100° (70–105)	105° (70–105)
Secondary procedure	10 resurfaced patellas	2 patellar revisions 2 lateral releases
Patellar congruency	96.8% (82–100) 100% in 50 knees	98% (84–100) 100% in 78 knees

Results

All knees achieved a satisfactory alignment and function of the tibio-femoral joint. The mean postoperative range of motion was 95° in group A and 100° in group B (Table 2).

In group A 10 knees required a second-stage resurfacing procedure because of pain. All the patients were relieved of pain following the revision procedure. Two knees in group B required revision of the patellar component, one for a polyethylene peg fracture and one for a change of the patellar component from large to medium, both were relieved of their symptoms. In addition, 2 knees required a second-stage lateral release for mal-tracking of the patella.

Radiologically the average patellar congruency in group A was 96.8% and 50 of 71 knees had 100% congruency. In group B the mean congruence was 98% and 78 of 99 knees had 100% congruency.

To evaluate the HSS and patellar scores separately in the congruent and non-congruent knees groups A and B were combined. In this series, 128 of the knees were congruent (patello-femoral joint), while 42 were non-congruent knees. The mean HSS scores were 89.8 and 75.6, while the mean patellar scores were 28.8 and 20.6, respectively ($P < 0.05$). However, of the 21 non-congruent knees in group A, 8 were symptomatic and had low HSS and patellar scores as compared to only 2 of the 21 non-congruent knees in group B ($P < 0.05$) (Table 2). Hence, it appears that patients with a resurfaced patella tend to tolerate incongruency better than patients without.

Table 3 The values of HSS and patellar score in patella retention (group A) and patella replacement (group B) groups pre-operatively and post-operatively expressed as mean \pm SD

	Group A Without patellar resurfacing	Group B With patellar resurfacing
HSS (Pre-op score)	63.7 (9.8)	61.8 (10.3)
HSS (Post-op score)	76.8 (5.6)	87.6 (5.8)
Patellar score (Pre-op)	18.4 (3.6)	19.8 (3.4)
Patellar score (Post-op)	22.4 (4.6)	28.2 (3.0)

* $P < 0.01$ for HSS scores; $P < 0.05$ for patellar scores

Postoperatively both the HSS score and the patellar score were higher in the group of patients with resurfaced patella (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 [23, 24]. Previously published reports suggest that patients with resurfaced patella experience better pain relief and better functional performance including ability to climb stairs [4, 16, 20]. Clayton and Ramaya [5] 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. Levai et al. [15] 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 [1, 8, 18]; 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. The reason given is a significant complication rate associated with patella resurfacing that is not encountered in the group without resurfacing [21]. However, the incidence of anterior knee pain in the absence of resurfacing has been reported to be as high as 19% [16].

Keblish et al. [14] 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. 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-patella-patellar tendon tracking, minimal pre-operative patellar pain and patella alta/baja. A relative indication for patel-

lar retention includes a young patient with good compliance and high demands. Soft tissue balancing is important, as patellar resurfacing alone will not prevent the occurrence of anterior knee pain [5, 8].

A prospective trial comparing patella retention with patella resurfacing in a study of 32 patients with bilateral knee replacements found no difference [3]. However, a number of criticisms have been made about the analysis of the data in this study. Enis et al. [6] reported on 25 patients with bilateral total knee replacement. The left knee underwent a patelloplasty, while the right knee had a patella resurfacing. The patients were reviewed at 2–5 years. Ten patients preferred the resurfaced knee, 12 were undecided, whereas none preferred the unresurfaced knee. After 5 years 20 of the patients were reviewed again; 9 chose the resurfaced knee, 3 the unresurfaced knee and 8 were undecided. Strength testing showed better function in the resurfaced knee. Despite this the authors concluded that there was no need to resurface the patella in total knee arthroplasty.

In our series, the preoperative HSS and patellar scores were identical and there was no difference between the groups prior to surgery. In the resurfaced group B a significant improvement was seen postoperatively as compared to the unresurfaced group.

Boyd et al. [4] in their series reported increased complications and chronic peri-patellar pain in the unresurfaced group and revision to resurfacing was required in 51 of 495 knees. Our results were similar to this as 10 of 71 knees required a patellar resurfacing at a later stage for persistent anterior knee pain. Ranawat et al. [17] reported a 95% success rate in patients with patellar replacement in total knee replacements.

Two patella components were revised in our series. This is in contrast to 10 knees that required second-stage patellar resurfacing. We also found that the non-congruent knees did better with resurfacing than without. A possible explanation might be that an apparently normal patello-femoral articular cartilage does not guarantee a perfect function of the patello-femoral joint and hence these patients could still be symptomatic. However, incongruency of the patello-femoral articulation in a joint with resurfaced patella can lead to increased eccentric wear of the polyethylene. Hence, long-term follow-up of these patients is essential.

Based on our results, we now replace the patella routinely unless there is an absolute contra-indication as described by Keblish et al. [14].

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