

# Total Knee Arthroplasty: Patellar Replacement's Influence in Patient Quality of Life Postoperatively

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## Abstract

**Objective:** To study the influence of patellar resurfacing on quality of life under a standardised score. The chosen score was the Knee Society Score (KSS), which considers range of motion, pain, contractors, alignment and stability. **Methods:** Retrospective review of 60 patients submitted to total knee arthroplasty (TKA) was divided into two groups: with patellar resurfacing (PR) and without patellar resurfacing (NPR). We reviewed data from these patients containing the KSS, which are routinely used in our service. Data were analysed from 2013 to 2014, with a minimal patient follow-up of 18 months. **Results:** There were no unsatisfactory scores in our study. Total scores (KSS) were similar between the groups (mean KSS: PR =  $88.36 \pm 9.64$ ; NPR =  $84.26 \pm 9.44$  [ $p = 0.1$ ]). While stratifying into groups (poor, fair, good, excellent), we found excellent results in 84.8% of PR versus 59.3% NPR ( $p = 0.056$ ). These data did not reach statistical significance and can therefore be considered a coincidental result. **Conclusion:** Although these results did not show statistical significance ( $p = 0.056$ ), patellar resurfacing patients tend to get more “excellent” results after 18 months of follow-up in quality of life when evaluated by KSS. Perhaps a larger amount of patients would suffice to acquire statistical significance in a future study.

## Keywords

Knee Arthroplasty, Patella, Joint Instability, Quality of Life

## 1. Introduction

The increased elderly population is a worldwide reality that directly reflects the

longer life expectancy. This phenomenon makes the study of quality of life in the aged population a very interesting matter for scientific research. Quality of life is directly linked to the presence of aged-related diseases, known as chronic non-transmissible diseases. The prevalence of articular degenerative diseases is increasing, and the knee joint is the most susceptible to osteoarthritis (OA) [1] [2].

OA is considered a public health issue as it is the most common articular disease and a major cause of functional incapacity, with an emphasis in women and the elderly. More than 80% of people with OA present limitations in their activities of daily living (ADL), such as mobility at home and outside and the execution of domestic and professional tasks, therefore compromising the quality of life and enhancing the risk of morbidity and mortality.

The treatment of OA must be directed to symptom relief, improved functionality and increased quality of life. Among the therapeutic alternatives there are non-drug, pharmacological and surgical treatments. When the success of non-surgical treatment is no longer sufficient, one can opt for a Total Knee Arthroplasty (TKA).

TKA consists of replacing all three of the articular components of the knee (lateral femorotibial, medial femorotibial and patellofemoral) for a prosthetic joint in order to control the pain, realign the member and improve function. TKA and Total Hip Arthroplasty are the most successful procedures in the history of orthopaedics and one of the two most frequently performed ones because of the dramatic results in re-establishing joint function and symptom control. Nowadays, there are more anatomical designs of implants, allowing a greater duration of the “new joint” [3].

Patellar resurfacing in TKA is a controversial matter and has been discussed since its introduction. Conclusions in many studies were limited, with methodological failures and biases, meaning that the true value of the procedure is still constantly debated [4] [5].

Studies evaluating patient satisfaction after TKA estimate that 75% - 89% of patients are satisfied postoperatively, while 11% - 25% are not [6].

The main goal of this study was to evaluate the influence of patellar resurfacing versus non-resurfacing during TKA on quality of life in our patients.

## 2. Materials and Methods

In total, 60 patients submitted to Total Knee Arthroplasty in the Orthopaedics and Traumatology Service of Santa Casa de Misericórdia de Porto Alegre, Brazil, between 2013 and 2014, with a minimal patient follow-up of 18 months were included in this study. A retrospective cohort was formed by reviewing patient files randomly in the hospital; patients were divided into two groups: patellar resurfacing (n = 33) and non-resurfacing (n = 27). Sample size was calculated considering a significance level of 0.05, standard deviation of 9.6, and power of 95%, with a minimum of 24 patients.

We analysed the quality of life using the Knee Society Score (KSS) postoperatively. This questionnaire is routinely applied in our service, as it is a standardised method, which has been validated in Portuguese [7]. The objective knee score, completed by the surgeon, includes a VAS score of pain walking on level ground and on stairs or inclines, as well as an assessment of alignment, ligament stability, and ROM, along with deductions for flexion contracture or extensor lag.

Only patients aged between 60 and 80 years, with primary knee osteoarthritis and a body mass index less than 30 were included; their procedures occurred in 2013 and 2014. Exclusion criteria included patients with follow-up <18 months, patients with systemic diseases with articular commitment (such as lupus, rheumatoid arthritis, etc.), previous knee surgery, contralateral knee arthroplasty and patients unable to adequately answer the questions due to neurological/psychiatric diseases or other restrictions. All of the patients were submitted to spinal anaesthesia and a pneumatic tourniquet was used in every case. In all cases, an anterior approach was used, with articular transvastus access.

The decision of patellar resurfacing was based on the Outerbridge classification [8]. The patellar component was placed only in Grade IV cases (exposed subchondral bone). In the non-resurfacing group, osteophytes were removed and denervation of the patellar borders was routinely performed with electrocauterisation.

After cementation of the implants (Baumer<sup>®</sup>), the tourniquet was deflated and we proceeded to haemostasis.

After surgery, a Robert Jones bandage was used in every case, and a vacuum drainage system was removed 48 h after surgery.

Physiotherapy started on day 1 post-op and patients were encouraged to undertake gait training on day 2. All patients were prescribed at least 20 physiotherapy sessions.

Final KSS was acquired in all patients after 18 months. This score evaluates pain, contractures, range of motion, alignment and stability of the joint. The result is considered excellent if it reaches 80 points. As for the statistical analysis, continuous variables were presented as mean and standard deviation, and compared using the Student T test. Categorical variables were presented as numbers and percentages. The differences between the groups were evaluated by applying the chi-squared test or Fisher's exact test. The software used for all statistical analysis was SPSS 18.0. Those analyses with type  $\alpha$  error < 10% were considered significant.

This project was accepted by the Research Ethics Committee of Irmadade Santa Casa de Misericórdia de Porto Alegre and was financed by the researchers, with no conflict of interests.

### 3. Results

Both study groups were similar, but the higher mean age in the NPR group must be mentioned, as it is relevant, despite not being statistically significant ( $69.56 \pm$

6.5 versus  $72.52 \pm 5.2$ ;  $p = 0.064$ ).

Of the 60 patients evaluated in the study, none had a KSS < 60, which could characterise the surgery as unsatisfactory. Patients in both groups presented similar KSS values, with no statistical significance (RP =  $88.36 \pm 9.64$ ; NRP =  $84.26 \pm 9.44$ ;  $p = 0.103$ ).

When stratifying the patients into subgroups of results using KSS (poor, fair, good, excellent), we found 84.8% excellent results in the RP group, versus 59.3% in the NRP group ( $p = 0.056$ ). These findings have shown no statistical significance ( $p < 0.05$ ), and could have occurred by chance (**Table 1**).

#### 4. Discussion

The ideal management of the patella in TKA is not yet clear. Much controversy surrounds the subject, despite the procedure having been performed for more than 3 decades. The most common complications of patellar resurfacing are: malalignment, instability, fracture of the patella, extensor apparatus lesion, polyethylene erosion and osteolysis.

Loosening of the patellar component can occur in 0.6% to 4.8% of cases. Meding *et al.* reviewed 8531 cases of TKA and found radiographic evidence of loosening in 409 (4.8%) [9] [10].

Panni *et al.* reviewed 280 cases with 96 months of follow-up, and found patellofemoral complications in 19 resurfaced cases (7%) [11]. Many studies showed advantages in keeping the patella without resurfacing in specific conditions, like in young patients (age < 60), non-obese, in the absence of patellofemoral pain prior to TKA, congruent patellar tracking, absence of systemic disease with articular commitment, normal patellar shape and viable cartilage (Outerbridge I, II or III). Kim *et al.* used these criteria, and found 97.5% satisfactory results in a 10-year follow-up [12].

Not resurfacing the patella can provide the cartilage and subchondral bone a biological adaptation and remodelling process. This process occurs only with the use of a geometrically designed prosthesis for that purpose [13] [14] [15].

**Table 1.** Socio-demographic and KSS score.

	RP	NRP	<i>p</i>
Gender n (%)			0.178
Male n (%)	7 (21.2)	8 (29.6)	
Female n (%)	26 (78.8)	19 (70.4)	
Mean age (years)	$69.59 \pm 6.5$	$72.5 \pm 5.2$	0.064
KSS	$88.36 \pm 9.64$	$84.26 \pm 9.44$	0.103
Score			0.056
Fair	1 (3%)	1 (3.7%)	
Good	4 (12.1%)	10 (37%)	
Excelent	28 (84.8%)	16 (59.3%)	

Rodriguez-Merchan and Gómez-Cardero reviewed 500 TKA cases with and without PR and evaluated the quality of the cartilage (Outerbridge). After 5 years of follow-up, in the group without resurfacing and Outerbridge I, II or III, only one patient (0.6%) needed reoperation for resurfacing. As for the Outerbridge IV cases, 10 needed another surgery [16].

Randomised clinical trials are divergent in defining the benefits of patellar resurfacing. Smith *et al.* found no evidence of benefit of resurfacing in their study [17]. Kahn *et al.* found benefits of the procedure in patients with previous patellofemoral pain, but limitations in follow-up may leave one to question such results [18].

By evaluating quality of life, Robertsson *et al.* reviewed 27,372 patients submitted to TKA and found 15% dissatisfaction in the resurfacing group, compared to 19% in the other [19]. Bourne and Burnett, and Feller *et al.*, using the Stair Climb Test, registered better results in the not-resurfacing group [20] [21]. Myles *et al.* and Smith, in two biomechanics studies, were unable to show relevant differences between the two groups.

Schindler reviewed 16 randomised studies comparing TKA with and without resurfacing, totalling 1587 of PR cases and 1620 of NPR cases. No statistical difference was found between the groups in analysing pain and function in 9 studies. Five studies showed slightly better results in resurfacing, and two for not resurfacing [22].

Schindler published 10 prospective studies with bilateral TKA in which one side was resurfaced. After a mean follow-up of 5 years, 47% of patients referred no preference, 35% preferred the resurfaced side and 18% the other [5].

In our study, we found no significant difference in quality of life (KSS) with or without patellar resurfacing. However, when subdividing into groups with different degrees of satisfaction, we have noticed a tendency for more “excellent” results after resurfacing. We cannot ensure the superiority of resurfacing the patella in our study due to short follow-up and restricted number of patients. These findings are concordant to literature on the subject, but it was not yet possible to define whether resurfacing the patella is advantageous to knee osteoarthritis patients or not.

Differences in the design between implants make this evaluation even more difficult, as well as the decision to alter the patellar component of the joint or not. There are many confusing factors involving this matter, turning decision-making even harder to surgeons. The main limitations of the present study include being a small retrospective cohort, and short follow-up.

## 5. Conclusions

In spite of not being statistically significant, patellar resurfacing generated more “excellent” results (in regard to Knee Society Score) after 18 months of follow-up in Total Knee Arthroplasty patients.

Patellar resurfacing remains a controversial subject. Larger clinical trials are

necessary to define whether the procedure is beneficial to patients with Knee Osteoarthritis.

### Conflicts of Interests

The authors claim that there are no conflicts of interest regarding this paper.

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