# Electrocautery of the patellar rim in primary total knee replacement: beneficial or unnecessary?

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**The management of the patella during total knee replacement is controversial. In some studies the absence of patellar resurfacing results in residual anterior knee pain in over 10% of patients. One form of treatment which may be used in an endeavour to reduce this is circumferential patellar rim electrocautery. This is believed to partially denervate the patella. However, there is no evidence of the efficacy of this procedure, nor do we know if it results in harm.**

**A retrospective comparative cohort study was performed of 192 patients who had undergone a primary total knee replacement with the porous coated Low Contact Stress rotating platform prosthesis without patellar resurfacing between 2003 and 2007. In 98 patients circumferential electrocautery of the patellar rim was performed and in 94 patients it was not. The two groups were matched for gender and age. The general Oxford Knee Score and the more specific patellar score for anterior knee pain were used to assess patient outcomes a minimum of two years post-operatively.**

**No statistically significant differences were noted between the groups for either scoring system ($p = 0.41$ and $p = 0.87$, respectively). Electrocautery of the patella rim did not improve the outcome scores after primary total knee replacement in our patients.**

Anterior knee pain following primary total knee replacement (TKR) occurs in 10% to 15% of replacements[1-4] with the symptoms frequently attributed to the patellofemoral joint. The treatment of the patella during TKR has been examined with the role of primary, and more recently secondary resurfacing described with mixed results.[5-9]

Electrocautery of the patellar rim is employed by some surgeons as a denervation technique during TKR. We are aware of only two studies that mention the technique,[4,10] with neither providing evidence to support its use.

A comparative cohort study was performed to assess if cauterising around the patella during TKR affected the outcome and reduced the incidence of post-operative anterior knee pain. Our hypothesis was that no difference existed in the self-reported outcome scores between the groups.

## Patients and Methods

Patients who had undergone a primary TKR between 2003 and 2007 were identified from the unit's arthroplasty database. Two cohorts, who were age and gender matched, were established. There were 94 patients who had undergone patelloplasty only (group 1), and 98 patients who received supplementary circumferential cautery of the patellar rim during primary TKR (group 2) (Table I). All the patients had their operations performed by two surgeons (MGH, AM) under tourniquet control, through a midline skin incision with a medial parapatellar approach. None had their patella resurfaced or released but all had a patelloplasty, removing osteophytes to allow better seating of the patella on the trochlea of the femoral component. The patellofemoral arthritis was not graded but no gross abnormality were present, otherwise patellar resurfacing would have been performed. The porous coated rotating-platform, mobile-bearing prosthesis, the Low Contact Stress TKR (LCS, DePuy International, Leeds, United Kingdom) was used in all cases. The selective nature of the electrocautery was based on surgeon preference. The effect of this extra step on the Oxford Knee Score (OKS)[11] and the more specific score for anterior knee pain, the patellar score,[12] at a minimum of two years post-operatively was evaluated from our prospectively collected database. The OKS 12-item questionnaire has been extensively validated by the original authors,[11] and the score out of 48 (0 worst score, 48 best)[13] is one of the principal tools used by

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**Table I.** Patient demographics for the two groups, comparing means and ranges as appropriate

| | Group 1 (no rim cautery (n = 94) | Group 2 (rim cautery) (n = 98) | |
|---|---|---|---|
| **Variable** | **Mean** | **Mean** | **p-value (test-statistic)** |
| Age (yrs) | 67.41 (45 to 89) | 67.43 (43 to 90) | 0.99* |
| Post-operative time (yrs) | 3.14 (2 to 4.5) | 4.29 (2 to 6.6) | < 0.001* |
| Gender (M:F) | 30:64 | 30:68 | 0.84† |
| Side (R:L) | 45:49 | 50:48 | 0.66† |

* *t*-test

† chi-squared test

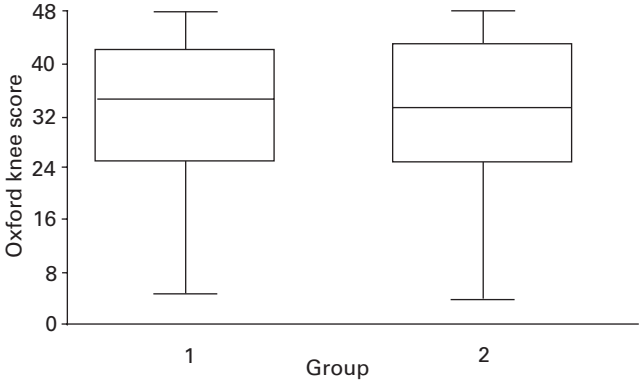


Fig. 1

Mean (range) Oxford knee score by group. Group 1, no electrocautery, Group 2, electrocautery. Box, interquartile range.

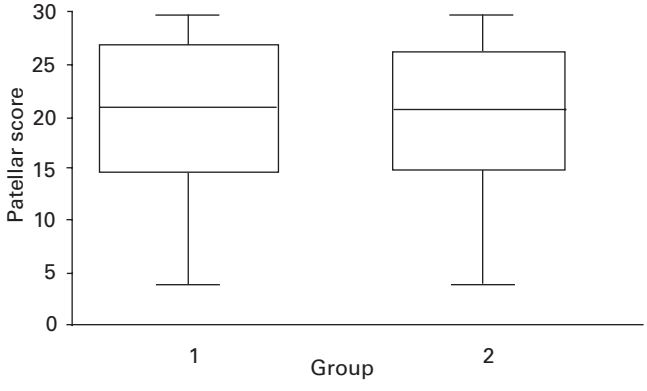


Fig. 2

Mean (range) patellar scores by group. Group 1, no electrocautery, Group 2, electrocautery. Box, interquartile range.

our arthroplasty outcome team. There is, however, no widely accepted or validated tool to assess anterior knee pain. The patellar score[12] (0 worst score, 30 best) gives an indication of these symptoms.

A power calculation was performed to calculate the sample size. It has previously been suggested by Liow et al[14] that a change of five points in the OKS represents a clinical difference. In order to demonstrate an effect size of five points with 80% power at a statistical significance of 0.05 would require a minimum of 76 patients in each group. A *post hoc* calculation revealed our achieved power was 87%.

**Statistical analysis**. All analyses of the data were performed using R: A Language and Environment for Statistical Computing (R Foundation for Statistical Computing, Vienna, Austria). Differences between the groups were analysed using two-tailed Student's *t*-tests and Pearson's chi-squared tests. Statistical significance was set at a p-value of 0.05.

## Results

The demographics of each group were not significantly different in terms of mean age, gender distribution or side of surgery (Table I). The mean follow-up of the group 2 patients was significantly longer (*t*-test, $p < 0.001$), however, all patients were a minimum of two years post surgery after which time it has been reported that results from questionnaires are thought not to improve.[15,16]

The mean OKS for group 1 was 34.61 (5 to 48) and for group 2 was 33.29 (4 to 48), this difference was not statistically significant ($p = 0.41$). The mean patellar score for group 1 was 21.03 (4 to 30) and 20.87 (4 to 30) for group 2; this difference also failed to reach statistical significance ($p = 0.87$). The similarities in the distribution of scores between the two groups is shown in Figures 1 and 2.

## Discussion

The patella was previously thought to be innervated by the medial patellar nerve travelling within vastus medialis.[17] More recently a supplementary supply from the lateral patellar nerve within vastus lateralis has been reported.[18] We suspect that in an attempt to interrupt these potential pain pathways, and in turn to reduce anterior knee pain following TKR, patellar denervation in the form of rim cauterisation was popularised. In our series of patients this step made no statistically significant difference to the post-operative patient rated outcome scores used.

Whether cauterisation around the patella results in harm is not known. The additional soft-tissue disruption, albeit minimal compared with the overall procedure, cannot be desirable if no benefit can be demonstrated. Furthermore, the possibility of disturbance to proprioception from the patella might produce abnormal load bearing and cause increased pain.

We recognise a weakness in our study was patient selection was subject to bias from the practice of different consultant orthopaedic surgeons. In addition we accept that we have only assessed outcome using two scoring systems and have no further information about the functional levels of these groups. Nevertheless, the self-administered scoring systems report that patellar rim electrocautery made no significant difference to the pain scores after primary TKR. On this basis we find no evidence to support this practice.

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