Patient Experience of Kneeling Ability Following Knee Arthroplasty - A Preliminary Study of a Kneeling-Specific Questionnaire.

Peter Craig, Peter Gallacher, Andrew Barnett

Abstract

**Background:** Kneeling after knee replacement is an underemphasized functional outcome and one that can be significantly altered by surgery. To better understand patient experience of kneeling, we set out to create a novel questionnaire. **Materials and Methods:** We identified 162 sequential patients (80 Total, 82 Partial knee replacements). All had a minimum follow up of 12 months. **Results:** 84 questionnaires were returned (45 TKR, 39 PKR). 60% TKR and 69% PKR patients reported some form of kneeling ability. If achieved, kneeling was rarely possible before 7 months. 65% of all patients who could kneel reported comfortable kneeling on hard surfaces such as concrete. 10% of all patients completely lost ability to kneel. Lost kneeling significantly impacted on employment opportunities and quality life. **Conclusion:** Patients are concerned about kneeling and the potential impacts on quality of life and employment should be discussed during the consent process along with the approximate time scales for re-achieving kneeling and surfaces upon which this may be possible.

Keywords: Total Knee Replacement; Partial Knee Replacement; Kneeling Ability; Knee Scores; Questionnaire.

Introduction

Patient reported outcome measures (PROMs) have been collected on patients undergoing elective knee arthroplasty in the UK since 2009. The Oxford Knee Score (OKS) is used as the procedure specific questionnaire to record knee function both pre and post-operatively. The latest PROMs report covering the 12 months to April 2015 demonstrates that for most measures, the OKS improved significantly when pre and postoperative scores were compared. For example, nearly 95% of all patients reported their preoperative pain to be moderate to severe whilst only 21.9% reported similar pain post-operatively. This improvement was not seen on kneeling ability. Over 75% found it difficult or impossible to kneel preoperatively and this figure was only improved by 28% following surgery.

Kneeling after knee replacement has been documented in the literature. The impact of surgical technique such as implant position and extensor mechanism tension (1,2) have been evaluated with regard to achievement of adequate flexion. The impact of differing surgical incision type and length (1,3) demonstrated an associated improvement in kneeling when smaller paramedical and central incisions were used. Postoperative rehabilitation with intensive physiotherapy (4) and patient education (5) have also been reported to improve postoperative kneeling. The best method employed to capture patient data following knee arthroplasty is open to debate. In addition to the Oxford knee score, multiple other tools exist to capture information including; The Knee Society Score (KSS), The Western Ontario...
and McMaster Universities Arthritis Score (WOMAC) and the Knee Injury and Osteoarthritis Score (KOOS). Of these scores, only the OKS and KOOS document kneeling ability. The limitations of subjective quantitative questionnaires to reflect a clinical outcome was demonstrated by a report that suggested patients were twice as likely to kneel when asked than the OKS would imply (6).

This was a pilot study that set out to better understand the kneeling experiences of patients undergoing either partial or total knee replacement in our unit through the use of a novel questionnaire.

**Materials and Methods**

The questionnaire used in our study is outlined in Table (1). Each question attempted to expand upon areas of kneeling to gain an improved understanding. With regard to ability to kneel pre or post operatively, it became apparent from review of many OKS scores during a pilot clinical note review, that the number of allowed responses in the OKS were too numerous and so often led to patients ticking multiple boxes. It was felt more pragmatic to assess kneeling as a binary outcome for the individual concerned and so a simple “yes or no” was used.

Reasons for inability to kneel preoperatively were assessed to ensure that other painful joints or general frailties were accounted for and not just recorded as solely due to knee pain. Time to achieve kneeling and surfaces upon which kneeling was possible were felt to be of equal pragmatic importance as achieving kneeling. This was assessed in a timescale of months and through delineating common surfaces that might be encountered. Inability to kneel postoperatively was assessed in question 7 and expanded in with question 8. Although difficult to fully quantify, it was hoped that this would produce a range of answers that could be used in the future to describe the consequences of losing kneeling ability to patients in an effort to better tailor the consent process.

All patient records who had undergone either Total or partial knee replacement in 2014 in our unit were obtained. These criteria were; first ever arthroplasty for isolated knee osteoarthritis with no other painful lower limb joints, performed by or directly supervised by a consultant (PG or AB), and no reported postoperative wound problems.

All TKR implants were rotating platform cruciate retaining prostheses, all PKR were uncemented mobile bearing medial prostheses. All patients underwent the same physiotherapy regimen. All patients received the same clinical follow up (6 weeks, 12 weeks, 12 months). No patients were lost to follow up. All patients had had uneventful surgery and recovery. A mail merge was performed to match patient details with postal addresses. All questionnaires were sent out on the same day. A response window of 4 weeks was allowed.

A patient information letter and patient information sheet were created. This set out the nature of the study, explained the reasons for it as well as signposting patients to sources of further information should they require it. Operation date was taken from the departmental database, and date of questionnaire was recorded by the patient. If more than 12 months had elapsed from surgery the patient were additionally asked to comment on their function at 12 months as well as currently. Ethical approval was granted via proportionate review.

**Results**

A total of 84 completed (45 TKR, 39 UKR) questionnaires were returned for analysis. All patients had had a minimum of 12 months elapsed after surgery [TKR mean 33.2 months (15 - 52), UKR mean 23.6 months (12 - 39)]. Owing to the innate differences in the patient groups who routinely receive these different implants, direct comparison between TKR and PKR groups was not explicitly intended.

The reported postoperative ability to kneel (figure 1) was over 70% in both groups; 15 of 21 TKR (71.4%) 17 of 22 (77.2%) PKR. A “new” ability to kneel was gained in 12 of 24 TKR (50%) and 10 of 16 (62.5%) PKR patients. Kneeling ability was lost in 6 TKR (28.5%) and 5 UKR (22.7%) patients. The reported reasons for inability to kneel (figure 2) post operatively was due to anterior knee pain in 12 cases and altered skin sensation at the front of the knee in 8 cases. Four patients stated they hadn’t realized they were allowed to kneel. 1 patient, was unable to kneel to due to painful upper limb joints preventing her from being able to lower herself to the floor.

**Kneeling surfaces**

The modal hardest surface for both implant types was “Hard” (9 TKR, 12 UKR). 51 % (14 of 27) of TKR patients were able to kneel on either “Hard or Very Hard” surfaces whilst 64.2% (18 of 28) of UKR patients were able to kneel on equivalent.
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<table>
<thead>
<tr>
<th>1. Could you kneel before surgery?</th>
<th>□ Yes □ No</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. If you could NOT kneel before surgery please list the reasons why not</td>
<td>□ Pain in knee □ Pain in other joints □ No requirement to kneel. □ Other (please specify)</td>
</tr>
<tr>
<td>3. Can you kneel now after surgery?</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>4. How long (in months) after surgery could you first kneel?</td>
<td></td>
</tr>
<tr>
<td>5. Do you require kneeling for your employment or hobbies?</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>6. If you are unable to kneel NOW please indicate reasons</td>
<td>□ I didn’t know I was allowed to □ Pain at front of knee □ Pain inside knee □ Skin over front of knee feels numb/strange unable to kneel before and □ nothing has changed □ Other reasons (please specify)</td>
</tr>
<tr>
<td>7. Which of the following surfaces are you able to kneel on?</td>
<td>□ Soft e.g. cushion □ Soft-Firm e.g. carpet □ Grass □ Hard e.g. linoleum floor Very hard e.g. concrete</td>
</tr>
<tr>
<td>8. Please describe impact of being unable to kneel on your quality of life or any other comments you would like to make</td>
<td></td>
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Table (1): Questionnaire used in the study

Time taken to achieve kneeling

Those with a TKR who retained kneeling did so by 7 (1-12) months. TKR patients who gained "new" kneeling did so by 10 (5-14) months. In the UKR group, kneeling was retained at 7.1 (2-24) months and gained at 7 (2-12) months in those previously unable.

Impact of lost kneeling ability on quality of life (both groups combined responses)

Twenty six percent (6 of 23) stated that their ability to perform normal household chores was significantly impaired. Gardening and satisfactory participation in hobbies was affected in 43.4% (10 of 23). 8.6% (2 of 23) reported an inability to retrieve items from low cupboards or from the floor and an equal number reported a loss of being able to fully interact with others - namely grandchildren - as they had done before surgery. One patient stated he had taken early retirement as a direct consequence of losing his ability to kneel.

Discussion

In an increasingly demanding population it is no longer reliably acceptable to believe that pain relief alone is of sufficient benefit to warrant surgery. This is particularly true of those patients who kneel to work, to play with their grandchildren or simply tidy their houses. Only 51% of TKR and 64% PKR patients who could kneel were able to do so on either hard (e.g. linoleum kitchen flooring) or very hard (e.g. concrete) surfaces whilst of the remaining stated they were only able to kneel on soft (e.g. Cushion) or soft-firm (e.g. carpet) surfaces.

Kneeling was not immediately possible after surgery. Those who regained previous kneeling ability did so at an average of 7 and 7.1 months post surgery in TKR and UKR respectively. Those who gained a new ability to kneel did so at 10 (TKR) and 7 (UKR) months. These results suggest that regardless of implant and soft tissue dissection appears to be an unknown factor that initially deters kneeling.
There were multiple reasons given by both groups of patients as to why kneeling was not possible after surgery. The highest proportion of respondents (64.7% of TKR patients and 75% of UKR) cited either intolerable anterior knee pain or altered skin sensation that prevented kneeling. This finding is supported by work by Hassaballa et al (3,6) who demonstrated significant changes to skin sensibility in the kneeling triangle (7) with differing surgical incisions. The free text responses regarding quality of life revolved around the inability to perform routine household chores, gardening, DIY and caring for...
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grandchildren. One patient stated that early retirement was enforced due to a loss of kneeling ability. Categorizing these results was not without difficulty because of aforementioned differences in individual lifestyle however the results were clear in demonstrating that in most of these patients, a desire to kneel still existed and many remained unsatisfied and frustrated with this aspect of their knee function.

Patients clearly differ in their expectations and requirements of their knee replacement. It is likely, but certainly not universal that TKR patients will place a lower demand on their knees than UKR patients. Kneeling is a key body position and the impact of its postoperative maintenance, loss or gain on the quality of life of all patients is significant.

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References