Chapter 4

Preoperative or postoperative self-efficacy: which is a better predictor of outcome after total hip or knee arthroplasty?
Abstract

Objective: Self-efficacy is considered an important determinant of outcome after total hip or knee arthroplasty. Aim of this study is to evaluate the contributions of preoperative and short-term postoperative self-efficacy in predicting long-term outcome.

Methods: Self-efficacy was determined in 103 total hip and knee arthroplasty patients preoperatively and 6 weeks postoperatively with the Self-Efficacy for Rehabilitation Outcome Scale. The 6-month outcome was assessed with a disease-specific and a generic self-report questionnaire and an objective measure of function (walking speed). Multiple linear regression analyses were used to examine the value of preoperative and short-term postoperative self-efficacy in predicting 6-month outcomes.

Results: Preoperative self-efficacy was only a significant predictor of long-term postoperative walking speed, with higher self-efficacy resulting in faster walking speed at the long-term measurement ($R^2 = 0.47$). Short-term postoperative self-efficacy was a significant predictor of the long-term postoperative generic outcome measure (physical functioning: $R^2 = 0.30$; mental health: $R^2 = 0.53$) and of walking speed ($R^2 = 0.66$), with higher self-efficacy resulting in a better long-term outcome.

Conclusion: Short-term postoperative self-efficacy seems a better predictor of long-term outcome after total hip or knee arthroplasty than preoperative self-efficacy.

Practice implications: Interventions should focus on enhancing short-term postoperative rather than preoperative self-efficacy.
Introduction
Total hip and knee replacement surgery are the most performed and successful interventions within the field of orthopedics. However, there is great variance in outcome after total joint replacement. Several studies have been performed into determinants explaining the variability in outcome. Determinants mentioned include preoperative status, age, sex, BMI and number of comorbidities. A major proportion of the variability in outcome remains unexplained though. Understanding the determinants of outcome could aid the development of interventions aiming to change the outcome behavior by influencing the relevant determinants. Self-efficacy is considered to be one of the important determinants in the context of total joint replacement. Bandura defined self-efficacy as ‘the conviction that one can successfully execute the behavior required to produce the desired outcome’. Self-efficacy reduces anticipatory fears and inhibitions, therefore determining whether people try to cope with difficult situations. Through expectations of eventual success, self-efficacy also determines how much effort people make and how long they persist when obstacles and adverse situations are encountered. In the context of total joint replacement, a number of studies address the relation between self-efficacy and outcome. The studies differ in the used measurement scale for self-efficacy, type of outcome measure(s) and moment(s) of assessment, among other things. As for moment of assessment, a distinction can be made between studies using preoperatively-determined self-efficacy as predictor and those assessing self-efficacy postoperatively.

Preoperatively-assessed self-efficacy was used in a study of Engel et al., in which preoperative coping self-efficacy and expectancies explained on average 10% of the variance in outcome assessed with the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and Short From-36 (SF-36) after controlling for preoperative status in total knee arthroplasty (TKA) patients. Dohnke et al. also assessed self-efficacy preoperatively: the effect of self-efficacy for pain as well as for disabilities (Arthritis Self-Efficacy Scale (ASES)) on the changes in pain, disabilities and depressive symptoms from admission to discharge and from discharge to 6-month follow-up was determined in total hip arthroplasty (THA) patients. Self-efficacy at admission and the change in self-efficacy from admission to discharge appeared to be significant predictors. Two other studies determined self-efficacy postoperatively. Kurlowicz et al. assessed the effect of self-efficacy determined four days after surgery on 6-week functional ability (Functional Status Index (FSI)) in THA patients with the Self-efficacy Expectation Scale (SES). Adjusted $R^2$ was 0.16. Moon and Backer assessed self-efficacy and outcome expectancy (Preoperative Self-Efficacy & Outcome Expectancy Scale (P-SES & P-OES)) on the first day postoperatively, and determined the effect of these determinants on ambulation distance and frequency of certain exercises performed in bed on the second day postoperatively in both THA and TKA patients. Contrary to outcome expectancy, self-efficacy appeared to be a significant predictor of the outcome variables, explaining 8–33% of the variance. Only one study determined self-efficacy preoperatively as well as postoperatively:
Orbell et al. determined the effect of self-efficacy and goal importance on disability preoperatively and 3 and 9 months postoperatively in THA and TKA patients. Preoperatively assessed self-efficacy appeared to be no significant predictor of 3-month disability, but assessed at 3 months it explained 6% of the variance in 9-month disability. From the studies done so far it is not clear why some assess self-efficacy preoperatively and others postoperatively. To determine whether preoperative or short-term postoperative self-efficacy is a better predictor of outcome, self-efficacy should be determined preoperatively as well as postoperatively in the same population, and outcome should be determined with the recommended outcome measures after total hip and knee arthroplasty.

Within the scope of offering interventions in order to influence the level of self-efficacy, it would be desirable to determine self-efficacy preoperatively. However, the predictability of self-efficacy can be underestimated if the initial efficacy beliefs used as predictors are no longer the ones operating at the time the outcome is assessed. The surgery and the first weeks of rehabilitation can change self-efficacy, as experiences of quick success may improve it. From that perspective, postoperatively assessed self-efficacy may be a better predictor for outcome of THA and TKA in the long term. Aim of this study is to evaluate the contributions of preoperatively-determined and short-term postoperatively-determined self-efficacy in predicting long-term outcome, assessed with a disease-specific and a generic self-report outcome measure as well as a performance-based outcome measure for total hip and knee replacement surgery.

**Methods**

**Patients and Data collection**

Participants of the study were a consecutive sample of patients scheduled for primary total hip or knee arthroplasty and participating in the short-stay program of the Orthopedic Department of University Medical Center Groningen. All patients were allowed to start walking with aids on the first postoperative day and were discharged on the fifth postoperative day, unless there were complications. No physical therapy was prescribed.

Data were collected at three moments. The preoperative measurement was done upon admission to the hospital. The short-term postoperative measurement took place at the first visit to the outpatient clinic 6 weeks after the surgery, when the initial stage of the rehabilitation is completed. The long-term postoperative measurement was taken 6 months after surgery, as at that moment no large improvements can be expected. The present study was executed in accordance with the regulations of the Medical Ethical Committee of University Medical Center Groningen.

**Measures**

**Self-Efficacy**

Self-efficacy was measured with a Dutch translation of the Self-Efficacy for Rehabilitation Outcome Scale (SER). The SER assesses patients’ beliefs about
their ability to perform activities typical of physical rehabilitation. The scale consists of 12 items that are summed and recoded into a 100-point scale, with a higher score indicating more self-efficacy. The items all start with ‘During my rehabilitation, I believe I can do…’ and increase in difficulty, from ‘Therapy that requires me to stretch my leg’ to ‘Therapy that requires me to walk’. There are items assessing patients’ beliefs about performing activities in varying therapy situations, such as ‘During my rehabilitation, I believe I can do my therapy regardless of the amount of pain I am feeling’. Factor analysis revealed 2 subscales which can be characterized as task self-efficacy and coping self-efficacy, according to the distinction proposed by Maddux. All items are rated on an 11-point Likert scale ranging from 0 (I cannot do) to 10 (certain I can do). The scale is considered a reliable and valid questionnaire to assess self-efficacy in THA and TKA patients. Internal consistency was 0.94 for the entire scale. The total amount of variance explained by the two factors yielded by factor analysis was 72.7%.

Self-report outcome measures
The Dutch version of the Western Ontario and McMaster Universities (WOMAC) Osteoarthritis Index was used as disease-specific outcome measure. This scale consists of 3 subscales: pain (5 items), stiffness (2 items) and physical functioning (17 items). Responses are given on a 5-point Likert scale. The scores are recoded into a 100-point scale, with a higher score representing a better score. The Dutch-language version of the Short-Form 36 Health Survey (SF-36) was used as generic outcome measure. Of the 9 subscales, physical functioning and mental health were used in this study. Each scale is transformed into a 100-point scale, with a higher score representing a higher quality of life.

Performance-based outcome measure
Walking speed was determined with an ambulatory measuring device that uses body-fixed sensors. Patients were instructed to walk at their preferred speed over 20 meters in a normal hospital corridor. Walking speed could be determined by using lower trunk accelerations.

Statistical analysis
Mean values and standard deviations of the patient characteristics and preoperative and postoperative scores on the WOMAC, SF-36 and walking speed values were calculated. Pearson’s correlation coefficients were calculated between the preoperative and 6-week postoperative self-efficacy scores and the 6-month score on the WOMAC, SF-36 and walking speed. Multiple linear regression analysis was used to examine the value of self-efficacy in predicting the 6-month value of the different measures used. First, preoperatively-assessed self-efficacy was analyzed. In step 1 the relation between baseline WOMAC total score and the 6-month postoperative value of the WOMAC was determined, adjusted for patient characteristics (sex, hip or knee
arthroplasty, previous arthroplasty (yes or no), BMI, age). Unstandardized coefficients B and amount of explained variance ($R^2$) were calculated. In step 2 preoperative self-efficacy was added to the regression. The same procedure was done for the SF-36 subscales physical functioning and mental health and for walking speed. Second, the predictive value of the 6-week scores on the 6 month-score was analyzed. In step 1 the 6-week score of the WOMAC was entered into the regression, again adjusting for patient characteristics. In step 2 the 6-week self-efficacy score was added to the regression. The same procedure was performed on the other measures.

Statistical analyses were carried out with SPSS version 12.0. A $p$-value lower than 0.05 was considered statistically significant.

**Results**

**Patients**

A total of 124 patients participated in the short-stay program between September 2002 and August 2004. One patient refused to participate due to personal circumstances. Of the 123 remaining patients, 103 completed all three measurements. Figures and reasons for drop-out at the two follow-up measurements are displayed in Figure 1.

Mann-Whitney or Fisher’s Exact tests were done to determine if the patients who were lost to follow-up differed from those who had completed follow-up on the determined measures and patient characteristics. The 103 patients with completed follow-up did not differ significantly from the patients who were lost to follow-up (N=20) on sex, hip or knee arthroplasty, previous arthroplasty (yes or no), age, WOMAC score, SF-36 physical functioning, SF-36 mental health, walking speed or self-efficacy. There was a difference in BMI: the patients lost to follow-up had higher BMI compared to those with completed follow-up (29.3 versus 27.0 kg · m$^{-2}$; Mann-

**Figure 1: Flow chart.**
Whitney $U=691.5$, $p=0.02$). The same was seen when the group of patients who were lost to follow-up after the second measurement ($N=13$) and the group of patients with completed follow-up ($N=103$) were compared on the 6-week postoperative data (BMI: 30.0 versus 27.0 kg · m$^{-2}$; Mann-Whitney $U=501.0$, $p=0.02$). Between the patients who only completed the initial measurement ($N=7$) and those who completed the first as well as the second measurement ($N=116$), no differences were seen on the initial measurement data or patient characteristics. This drop-out analysis indicates that, besides the BMI value, the patients with completed follow-up are representative of the initially enrolled patients. The subsequent analyses were performed on the patients with completed follow-up ($N=103$). The 103 patients had a mean age of 63.8 (±10.9) years at the time of surgery. The group consisted of 75 THA and 28 TKA patients. Table 1 shows the characteristics at baseline.

### Table 1.
Patient characteristics (n = 103) at baseline.

<table>
<thead>
<tr>
<th>THA (%)</th>
<th>75 (72.8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TKA (%)</td>
<td>28 (27.2)</td>
</tr>
<tr>
<td>Male (%)</td>
<td>28 (27.2)</td>
</tr>
<tr>
<td>Female (%)</td>
<td>75 (72.8)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>63.8 (10.9)</td>
</tr>
<tr>
<td>BMI (kg · m$^{-2}$)</td>
<td>27.0 (3.4)</td>
</tr>
</tbody>
</table>

*NOTE: Displayed values are means (SD) unless otherwise specified.*

*Abbreviations: BMI = Body Mass Index.*

**Pearson’s correlation coefficients**

Table 2 shows the mean values and standard deviations of the patients on self-efficacy, WOMAC, SF-36 physical functioning and mental health subscales and walking speed, as determined preoperatively and 6 weeks and 6 months postoperatively. Over 6 months, patients improved on all outcome measures except for SF-36 mental health.

Correlations between preoperatively-assessed and short-term postoperatively-assessed self-efficacy and the different outcome measures determined 6 months postoperatively are displayed in Table 3. For preoperative self-efficacy, only the correlations with SF-36 mental health and walking speed were significant. All correlations between preoperatively determined self-efficacy and the 6-month outcome were low ($r<0.4$). Self-efficacy determined short-term postoperatively correlated significantly with all four outcome measures. The correlation coefficient between preoperatively determined self-efficacy and short-term postoperative self-efficacy was 0.32 ($p<0.01$).
Table 2.
Preoperative and 6-week and 6-month postoperative means (SD) values of self-efficacy and the four outcome measures.

<table>
<thead>
<tr>
<th></th>
<th>Preoperative</th>
<th>6-week postoperative</th>
<th>6-month postoperative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy (N=102-103)</td>
<td>67.4 (16.6)</td>
<td>68.4 (16.7)</td>
<td>72.5 (18.2)</td>
</tr>
<tr>
<td>WOMAC (N=99-103)</td>
<td>48.4 (15.3)</td>
<td>73.6 (15.0)</td>
<td>78.2 (14.5)</td>
</tr>
<tr>
<td>SF-36 physical functioning (N=102-103)</td>
<td>36.7 (18.0)</td>
<td>48.5 (20.2)</td>
<td>63.4 (22.6)</td>
</tr>
<tr>
<td>SF-36 mental health (N=100-103)</td>
<td>75.7 (14.7)</td>
<td>77.9 (14.6)</td>
<td>76.4 (16.9)</td>
</tr>
<tr>
<td>Walking speed (N=95-102)</td>
<td>0.89 (0.19)</td>
<td>0.89 (0.20)</td>
<td>1.07 (0.21)</td>
</tr>
</tbody>
</table>

Table 3.
Pearson’s correlations between preoperative and short-term postoperative self-efficacy and the outcome measures assessed 6 months postoperatively.

<table>
<thead>
<tr>
<th></th>
<th>WOMAC</th>
<th>SF-36 PF</th>
<th>SF-36 MH</th>
<th>Walking speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy preoperatively</td>
<td>0.13</td>
<td>0.19</td>
<td>0.24*</td>
<td>0.30**</td>
</tr>
<tr>
<td>Self-efficacy 6 weeks postoperatively</td>
<td>0.34**</td>
<td>0.35**</td>
<td>0.51**</td>
<td>0.29**</td>
</tr>
</tbody>
</table>

NOTE. * p < 0.05 ** p < 0.01

Multiple linear regression analyses

Table 4 displays the results of the multiple linear regressions of the preoperatively-assessed values on the 6-month determined value of the different measures. The equations were all significant (p<0.05) and accounted for 16–47% of the variance in outcome, with the least explained variance in the WOMAC equation. The preoperatively-assessed score was the single most important predictor of the 6-month score on that same outcome measure. Preoperative self-efficacy had only a significant contribution to the walking speed equation, with higher self-efficacy resulting in higher walking speed. Including self-efficacy in the equation explains 4% more variability than the model with only preoperative walking speed adjusted for patient characteristics.

Table 5 shows the results with the 6-week postoperatively determined values added to the regression equations. The equations were all significant (p<0.05) and accounted for 26–66% of the variance in the 6-month postoperative outcome, with the least explained variance in the SF-36 physical functioning equation. The 6-week postoperative score was the most important variable in predicting the 6-month outcome. Self-efficacy assessed at 6 weeks after surgery was a significant predictor of the 6-month score of the two SF-36 subscales and walking speed; higher self-efficacy at 6 weeks after surgery was associated with a better outcome at 6 months. Six-week self-efficacy contributed to 2–6% (step 2 vs. step 1) explained variance in outcome.
### Table 4.
Multiple linear regression analysis of the preoperative values on the 6-month postoperative values of the different measures.

<table>
<thead>
<tr>
<th></th>
<th>Preop. score</th>
<th>Sex (M=0, F=1)</th>
<th>Hip/Knee (H=0, K=1)</th>
<th>Previous arthroplasty (N=0, Y=1)</th>
<th>BMI</th>
<th>Age</th>
<th>Self-efficacy</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOMAC</td>
<td>Step 1</td>
<td>0.27*</td>
<td>-3.97</td>
<td>-2.49</td>
<td>-4.09</td>
<td>-0.25</td>
<td>-0.15</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td>Step 2</td>
<td>0.27*</td>
<td>-3.42</td>
<td>-2.96</td>
<td>-3.83</td>
<td>-0.16</td>
<td>-0.13</td>
<td>0.09</td>
</tr>
<tr>
<td>SF-36 PF</td>
<td>Step 1</td>
<td>0.25*</td>
<td>-8.07</td>
<td>-4.94</td>
<td>-13.80*</td>
<td>-0.46</td>
<td>-0.23</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>Step 2</td>
<td>0.24</td>
<td>-7.00</td>
<td>-5.82</td>
<td>-13.15*</td>
<td>-0.32</td>
<td>-0.19</td>
<td>0.22</td>
</tr>
<tr>
<td>SF-36 MH</td>
<td>Step 1</td>
<td>0.65*</td>
<td>-7.70*</td>
<td>-0.73</td>
<td>-3.74</td>
<td>0.10</td>
<td>0.08</td>
<td>0.42</td>
</tr>
<tr>
<td></td>
<td>Step 2</td>
<td>0.63*</td>
<td>-7.42*</td>
<td>-0.99</td>
<td>-3.51</td>
<td>0.15</td>
<td>0.10</td>
<td>0.42</td>
</tr>
<tr>
<td>Walking speed</td>
<td>Step 1</td>
<td>0.268*</td>
<td>-0.078*</td>
<td>-0.133*</td>
<td>-0.054</td>
<td>-0.001</td>
<td>-0.004*</td>
<td>0.43</td>
</tr>
<tr>
<td></td>
<td>Step 2</td>
<td>0.249*</td>
<td>-0.066</td>
<td>-0.147*</td>
<td>-0.044</td>
<td>0.001</td>
<td>-0.004*</td>
<td>0.002*</td>
</tr>
</tbody>
</table>

NOTE. * p < 0.05; † difference is significant (F change=5.46, p=0.02)

### Table 5.
Multiple linear regression analysis of the 6-week postoperative values on the 6-month postoperative values of the different measures.

<table>
<thead>
<tr>
<th></th>
<th>6-week postop. score</th>
<th>Sex (M=0, F=1)</th>
<th>Hip/Knee (H=0, K=1)</th>
<th>Previous arthroplasty (N=0, Y=1)</th>
<th>BMI</th>
<th>Age</th>
<th>Self-efficacy 6-week postop.</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOMAC</td>
<td>Step 1</td>
<td>0.50*</td>
<td>-2.92</td>
<td>1.10</td>
<td>-2.74</td>
<td>-0.60</td>
<td>-0.12</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td>Step 2</td>
<td>0.44*</td>
<td>-2.56</td>
<td>0.64</td>
<td>-2.40</td>
<td>-0.53</td>
<td>-0.08</td>
<td>0.12</td>
</tr>
<tr>
<td>SF-36 PF</td>
<td>Step 1</td>
<td>0.36*</td>
<td>-6.02</td>
<td>-3.20</td>
<td>-10.48*</td>
<td>-0.65</td>
<td>-0.11</td>
<td>0.26</td>
</tr>
<tr>
<td></td>
<td>Step 2</td>
<td>0.31*</td>
<td>-4.32</td>
<td>-3.76</td>
<td>-9.40*</td>
<td>-0.47</td>
<td>-0.08</td>
<td>0.28*</td>
</tr>
<tr>
<td>SF-36 MH</td>
<td>Step 1</td>
<td>0.68*</td>
<td>-8.96*</td>
<td>0.02</td>
<td>-1.74</td>
<td>0.25</td>
<td>0.24*</td>
<td>0.47</td>
</tr>
<tr>
<td></td>
<td>Step 2</td>
<td>0.55*</td>
<td>-7.69*</td>
<td>-0.60</td>
<td>-0.38</td>
<td>0.41</td>
<td>0.28*</td>
<td>0.27*</td>
</tr>
<tr>
<td>Walking speed</td>
<td>Step 1</td>
<td>0.653*</td>
<td>-0.33</td>
<td>-0.070*</td>
<td>-0.048</td>
<td>0.003</td>
<td>-0.004*</td>
<td>0.64</td>
</tr>
<tr>
<td></td>
<td>Step 2</td>
<td>0.628*</td>
<td>-0.025</td>
<td>-0.069*</td>
<td>-0.039</td>
<td>0.005</td>
<td>-0.004*</td>
<td>0.66€</td>
</tr>
</tbody>
</table>

NOTE. * p < 0.05; † difference is significant (F change=4.95, p=0.03); ‡ difference is significant (F change=10.87, p<0.01); € difference is significant (F change=5.15, p=0.03)
Discussion

Aim of this study was to evaluate the contributions of preoperatively-determined and short-term postoperatively-determined self-efficacy in predicting long-term outcome. The results of the regression analyses show that preoperatively-determined self-efficacy was a significant predictor of long-term postoperative walking speed, adjusted for preoperative walking speed and patient characteristics, with a higher preoperative self-efficacy score resulting in a faster walking speed. Self-efficacy determined short-term postoperatively was a significant predictor of the long-term postoperative SF-36 subscales physical functioning and mental health as well as walking speed, adjusted for the short-term postoperative score of the outcome measure and patient characteristics, again with a higher preoperative self-efficacy score resulting in a better score in the long-term. Short-term postoperative self-efficacy therefore seems to be a better predictor of long-term outcome.

As mentioned in the introduction, several studies have been conducted into the role of self-efficacy in predicting the outcome after total joint replacement, using different outcome measures. To determine the outcome of a total hip or knee replacement, the WOMAC as a disease-specific self-report measure and the SF-36 as a generic self-report measure are the most widely used and recommended questionnaires. Further, it is advised to use an objective measure, as with performance-based measures a different aspect of outcome is determined than with self-report measures. The effect of self-efficacy on both a disease-specific and a generic self-report outcome measure as well as a performance-based outcome measure was not determined in total joint replacement patients until now. Additionally, different self-efficacy measures and different moments of assessment are used, which makes it even more difficult to compare the results of the mentioned studies with our results.

Despite these restrictions and the fact that the study of Engel et al. only assessed TKA patients, their results can best be used as comparison since they used two of the three outcome measures we used (WOMAC and SF-36) and also adjusted for preoperative score. Moreover, we adjusted for operation joint (hip or knee) in our multiple regression analyses. In the study of Engel et al., preoperative self-efficacy and expectancies explained on average 10% of the variance in outcome, which is more than we found in our results (2% for SF-36 physical functioning). This may be due to the fact that Engel et al. also assessed outcome expectancies. According to Bandura’s theory, people have to possess high self-efficacy as well as a positive outcome expectation in order to execute certain behavior. However, measures of outcome expectancies seem not to add much to the prediction of behaviors beyond the contribution of self-efficacy beliefs.

Another difference between the present study and the study of Engel et al. is that they assessed coping self-efficacy, while we determined task as well as coping self-efficacy. Task self-efficacy refers to the confidence someone has to perform the elemental aspects of a task, coping self-efficacy refers to the confidence one has to perform the task under challenging conditions. The distinction seems to be relevant...
to exercise behaviour. Since the self-efficacy questionnaire we used assessed task as well as coping self-efficacy, more explained variance would be expected compared to the study of Engel et al., who only determined coping self-efficacy. The opposite was the case though. Additionally, when comparing the predictive value of the two subscales determining task and coping self-efficacy, no difference was found in predicting outcome at 6 months. A possible explanation is that we did not measure behavioural intention and that – although the WOMAC is the recommended questionnaire for functional outcome after total hip and knee arthroplasty – quality of function, not quantity, is determined. The predictive value of task and coping self-efficacy on the amount of activity can therefore not be determined, while task self-efficacy has especially shown to be related to exercise frequency.

Further, Engel et al. concluded that the effect of self-efficacy on the SF-36 mental health scale was lower than on the physical health scale, while we found opposite results. Remarkably, neither in our study nor in that of Engel et al. did the score on mental health really change after surgery compared to the other outcome measures. Their suggestion that the SF-36 mental health scale was not sensitive enough to changes in health status and quality of life in TKA patients seems to be valid for our population consisting of TKA as well as THA patients. The relevance in practice of our finding that self-efficacy has a significant contribution in predicting the long-term outcome as measured with the SF-36 mental health subscale is therefore questionable.

Only one study, by Orbell et al., assessed self-efficacy preoperatively as well as postoperatively. However, whether the 3-month postoperatively-determined self-efficacy in that study can be considered short-term postoperatively and is comparable to our 6-week postoperative self-efficacy assessment is debatable. We chose 6 weeks, as at that point in time the first part of the rehabilitation has passed but there is still time to positively influence recovery. Additionally, Orbell et al. used only disability as outcome measure. Our finding nonetheless seems to be supportive of their results: Orbell et al. found that 3-month postoperatively-determined self-efficacy contributed 6% to the explained variance in 9-month disability, while preoperative self-efficacy did not contribute significantly.

The other studies were very different from ours in measures and assessment times. Overall, amounts of explained variance between zero and 10% are mentioned when using preoperative self-efficacy as predictor, while values between 6 and 33% are mentioned when postoperative when using self-efficacy. Postoperative self-efficacy seems to be more predictive; however, not all studies controlled for baseline status, while our study confirmed the finding of others that the baseline score is the best predictor of the score determined later on that same measure. By including the baseline score in the equation, the additional predictive value of self-efficacy is determined. Hence the percentages mentioned above should be used with caution when comparing.

Our finding that short-term postoperative self-efficacy is a better predictor of long-term postoperative outcome than preoperative self-efficacy is in line with the
statement of Bandura that the predictability of self-efficacy is underestimated when the self-efficacy is no longer the one determined at the time of the outcome assessment. As performance accomplishments are considered the most dependable source of self-efficacy, it can be expected that the surgery and especially the first weeks of rehabilitation would result in a change in the self-efficacy score. When looking at the data, the mean self-efficacy score did not change much from the preoperative to the 6-week postoperative value. Still, the predictive value of the 6-week score seems to be higher. In addition, when exploring the predictive value of a change score, it became clear that this score had less predictive value than the 6-week postoperative score alone (results not presented). It is reasonable for the 6-week self-efficacy score to be more related to the 6-month self-efficacy score and therefore a better predictor of the functional outcome at 6 months, as functional outcome and self-efficacy are closely linked.

It seems hard to make a valid assessment preoperatively, since patients may have expectations but no experiences of success or failure – which they need to make a good evaluation of their capabilities to perform certain rehabilitation activities. Woolhead et al. even experienced that patients were unable to express expectations of outcome 3 months preoperatively, as, before surgery, they framed their responses in terms of hopes and fears. Only postoperatively were patients able to describe their expectations, based on their experiences during the rehabilitation.

Our study had the limitation of a number of drop-outs (17%). No difference was seen between the patients with completed follow-up and the drop-out patients on patient characteristics and baseline scores. Most reasons for drop-out were unrelated to the surgery. However, as some patients dropped out because of complications, it is likely that the results cannot be generalized to this specific category of patients. Another limitation is that we did not measured comorbidity, while it seems to be a significant predictor of long-term functional outcome. Again, only qualitative measures of function were used; amount of activity was not determined.

**Conclusion**

In comparison with preoperatively-determined self-efficacy, short-term postoperative self-efficacy seems to be a better predictor of long-term outcome of total hip and knee arthroplasty whereby outcome is assessed using a disease-specific and a generic self-report outcome measure and an objective outcome measure (walking speed).
Practice implications
As short-term postoperative self-efficacy seems to be a better predictor of long-term outcome of total hip and knee arthroplasty than preoperative self-efficacy, interventions should focus on enhancing short-term postoperative rather than preoperative self-efficacy. Self-efficacy can be influenced by four mechanisms: mastery experience, vicarious experience, social persuasion and interpretations of somatic and emotional states. Mastery experiences are considered to be the most powerful. For example, by advising the patient to start the rehabilitation with easy activities on a low level, his self-efficacy can be enhanced.
Preoperative or postoperative self-efficacy

References


