# Patient satisfaction, function and return to work after knee arthroplasty

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We investigated the working status during 2 years before and 2 years after primary knee prosthetic operation for arthrosis in order to identify preoperative factors predicting patient satisfaction, function and working capacity. 162 patients (86 women) younger than 60 years of age when operated on with a knee prosthesis during 1993 were studied. 91% of the patients returned a Nottingham Health Profile (NHP) questionnaire, and the Social Insurance Office could supply data on all patients.

There was a positive association between the duration of pre- and postoperative sick-leave in the patients who returned to work. Preoperative sick-leave longer than 180 days increased the risk of postoperative disability pension, which was not found to be influenced by the grade of the work. Among the 52 patients who returned to work postoperatively, all 6 NHP functional categories were better in the patients with less than 180 days of preoperative sick-leave than in the patients with more than 180 days of preoperative sick-leave. The overall patient satisfaction was greater among patients who went back to work postoperatively.

We conclude that long sick-leave before a knee prosthetic operation increases the risk of long postoperative sick-leave and disability pension and impairs the quality of life.

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Knee prosthetic treatment for arthrosis relieves pain and discomfort and improves quality of life by allowing patients to retain an almost normal life in terms of self-dependence and ambulation (Ranawat et al. 1993, Norman Taylor et al. 1996). As the technique and prosthetic design have developed, so also has the age at arthroplasty widened to include patients below the age of retirement (Robertsson, personal communication 1998).

Considering the outcome of knee prosthetic treatment in the working population, the probability of returning to work—and its impact on perceived quality of life—is of interest. To identify preoperative factors predicting patient satisfaction, function and return to work, we investigated patients younger than 60 years of age at primary knee prosthesis operation for arthrosis.

## Patients and methods

162 patients (86 women) with gonarthrosis and 60 years of age or younger when operated on with a primary knee prosthesis in Sweden during 1993 were identified through the Swedish National Knee Register. 102 patients received a total knee prosthesis, and 60 a unicompartmental medial knee prosthesis. The mean age at surgery of each gender was 56 (39–60) years.

Information regarding the type of work, sick-leave periods, and disability pension from 2 years before until 2 years after surgery was obtained from the Social Insurance Office and from questionnaires sent to all patients 2 years after surgery. The patients were asked to classify the grade of their previous and present work as light, moderate or heavy, and to describe to what extent the operation had met their expectations. Current pain in the operated knee and previous surgery in the contralateral knee or in the hips were also asked about.

The questionnaire was extended with Part I of the Nottingham Health Profile (NHP) (Hunt et al. 1980, Hunt and Wiklund 1987, Jenkinson et al. 1988) quality of life questionnaire. NHP is a self-

Table 1. Working status before and after knee prosthesis operation in 162 patients with gonarthrosis and under 60 years of age at operation

| Preop. working status | | Postop. working status | | |
|---|---|---|---|---|
| Status | No. of pat. | Working | DP 50% | DP 100% |
| Working | 88 | 52 | 12 | 24 |
| DP 50% | 18 | | 9 | 9 |
| DP 100% | 56 | | | 56 |
| Total | 162 | 52 | 21 | 89 |

DP 50% (100%) is 50% (100%) disability pension

Table 2. Association (p = 0.01) between duration of pre- and postoperative sick-leave among 52 patients not retired preoperatively and back to work within 2 years after knee prosthetic treatment

| Preoperative sick-leave | | Postoperative sick-leave | |
|---|---|---|---|
| Sick-leave | No. of pat. | < 180 days | ≥ 180 days |
| < 180 days | 38 | 25 | 13 |
| ≥ 180 days | 14 | 3 | 11 |
| Total | 52 | 28 | 24 |

administered standardized questionnaire reflecting more of the well being of the patients in a general sense (Gartland 1988). Part I consists of 38 yes/no statements that are weighted and grouped in 6 categories: energy, sleep, physical mobility, emotion, pain, and social isolation. The maximum score in each category is 100, indicating presence of all possible problems, while the minimum score is zero, indicating no problems. The answers have been weighted and extensively tested for reliability and validity (McKenna et al. 1981, Hunt 1987). We used the translated Swedish version, which has been tested in a similar manner (Hunt and Wiklund 1987). 147 (91%) patients returned the questionnaire.

### *Statistics*

Data for both genders and both the total knee prosthesis and the unicompartmental medial knee prosthesis were combined. The statistical analysis was initially performed with the chi-square test and Fischer's exact test. The non-parametric Mann-Whitney test was used for the NHP data. The accuracy of these univariate findings was validated by multiple linear and logistic regression analyses evaluating interfactorial influences of gender, previous operation on the contralateral knee or the hips, type of preoperative work, preoperative sick-leave, age at surgery and present pain in the operated knee. $P < 0.05$ (two-tailed tests) was regarded as significant.

## Results

### *Return to work*

74 patients had received partial or complete disability pensions before the knee replacement (Table 1), 37 primarily on account of gonarthrosis. None of these patients had a diminished pension level postoperatively.

There was a positive univariate association between the duration of pre- and postoperative sick-leave among the 52 patients who returned to work postoperatively (p = 0.01; Table 2). Preoperative light workload was also univariately associated with shorter postoperative sick-leave than medium or heavy workload (p = 0.001). Subsequent multiple linear regression analysis confirmed the association between the duration of pre- and postoperative sick-leave (Table 3). The other risk factors were not found to influence the duration of postoperative sick-leave.

Preoperative sick-leave longer than 180 days increased the univariate risk of partial or complete disability pension among the 88 patients who worked preoperatively (p = 0.02; Table 4). Multivariate logistic regression analysis could confirm these findings only for the one-third of the patients who had the longest preoperative sick-leave, i.e., more than 263 days (Relative risk of going back to work: 0.2; 95% CI 0.1–1.0). The other risk factors studied were found not to influence the risk of postoperative disability pension. No patient returned to heavier work than before surgery.

### *Function*

Among the 52 patients who returned to work post-

Table 3. Multiple linear regression analysis of risk factors for long postoperative sick-leave among 48 patients not retired preoperatively and back to work within 2 years after knee prosthetic treatment

| Variable | n | RC | 95% CI | P-value |
|---|---|---|---|---|
| Gender | | | | |
| male | 26 | 0 | ref. | |
| female | 22 | 57 | -53–168 | 0.3 |
| Previous operation in the contralateral knee | | | | |
| no | 39 | 0 | ref. | |
| yes | 9 | 60 | -213–93 | 0.5 |
| in the hips | | | | |
| no | 44 | 0 | ref. | |
| yes | 4 | 17 | -201–235 | 0.5 |
| Type of preoperative work | | | | |
| light | 14 | 0 | ref. | |
| moderate | 20 | 48 | -68–164 | |
| heavy | 14 | 124 | -6–253 | 0.06 |
| Preoperative sick-leave | | | | |
| < 180 days | 26 | 0 | ref. | |
| ≥ 180 days | 22 | 188 | 68–308 | 0.003 |
| Age at surgery | | | | |
| ≤ 56 years | 26 | 0 | ref. | |
| > 57 years | 22 | 1 | -102–103 | 1 |
| Knee pain 2 years postop. | | | | |
| no | 29 | 0 | ref. | |
| yes | 19 | 4 | -127–135 | 0.5 |

n number of patients, RC regression coefficients (effects), CI confidence interval for RC

Table 4. Association (p = 0.02) between duration of preoperative sick-leave and occupational status 2 years after knee prosthetic treatment among 88 patients not retired preoperatively

| Duration of preop. sick-leave | n | Postop. working status | | |
|---|---|---|---|---|
| | | Working | DP 50% | DP 100% |
| < 180 days | 57 | 38 | 9 | 10 |
| ≥ 180 days | 31 | 14 | 3 | 14 |

DP 50% (100%) is 50% (100%) disability pension.

Table 6. Association (p = 0.03) between occupational status 2 years after knee prosthetic treatment and fulfilled patient expectation. 82 patients were not retired preoperatively

| Expectations fulfilled | Postoperative occupational status | |
|---|---|---|
| | Working | Partial or complete disability pension |
| Yes | 42 | 22 |
| No | 6 | 12 |

Table 5. Postoperative NHP score (mean, range) for all 162 patients (147 responders). Association between duration of preoperative sick-leave and postoperative NHP score among 49 patients not retired preoperatively and back to work within 2 years after knee prosthetic treatment

| | All patients | Preoperative sick-leave | | P-value |
|---|---|---|---|---|
| | | < 180 days | ≥ 180 days | |
| No. of pat. | 147 | 35 | 14 | |
| Emotion | 15 (0–100) | 4 (0–75) | 27 (0–88) | 0.001 |
| Energy | 27 (0–100) | 10 (0–100) | 46 (0–100) | 0.001 |
| Pain | 30 (0–100) | 21 (0–82) | 48 (0–100) | 0.01 |
| Physical mobility | 22 (0–100) | 14 (0–50) | 32 (10–53) | 0.001 |
| Sleep | 25 (0–100) | 12 (0–75) | 33 (0–100) | 0.05 |
| Social isolation | 8 (0–100) | 1 (0–24) | 18 (0–18) | 0.001 |

operatively, all 6 NHP categories were better in patients with fewer than 180 days of preoperative sick-leave than in the patients with more than 180 days of preoperative sick-leave (Table 5). Among the 88 patients who worked preoperatively, the NHP score for emotion (p = 0.04) and sleep (p = 0.01) dimensions were better in patients who went back to work postoperatively than in those with a postoperative disability pension.

### *Satisfaction*

The operation fulfilled the expectations of the patients to a larger degree among patients who went back to work postoperatively (Table 6).

## Discussion

The prognosis for returning to work after hip and back surgery is poor for patients with a preoperative disability pension (Jensen et al. 1985, Johnsson and Persson 1986, Jönsson and Strömqvist 1994), and we found the same after knee replacement. This might be explained by progressive impairment in work motivation induced by the disability pension—an explanation in accordance with our results in the NHP part of the investigation, where patients on partial or complete disability pension showed impairment in the psychological categories but not in the physical capacity categories. The overall results from the NHP questionnaire were similar to those of other published studies after knee prosthetic surgery (Rissanen et al. 1995, Hilding et al. 1997; Table 5).

More than 70% of the patients still working preoperatively in our study returned to work within 2 years after surgery. Long sick-leave before surgery increased the risk of long postoperative sick-leave, and of a disability pension, and impaired the quality of life.

During the 10-year period 1986–95, 17% of the patients receiving knee prosthetic treatment in Sweden were under the age of 65 years, and 6% were under the age of 60 years (Robertsson 1998). The maintenance or improvement in working capacity of these patients is important in a comprehensive outcome study. These younger patients are at a higher risk of suffering prosthetic loosening mainly because of their greater physical activity (Lewold et al. 1993, Knutson et al. 1994). To minimize the risk of loosening, the patients should probably avoid going back to strenuous work.

Rehabilitation after knee replacement takes a longer time than after hip replacement (Aarons et al. 1996, Norman Taylor et al. 1996). A gradual improvement up to 1 year after surgery is the rule. Information is sparse about the influence of preoperative working status on social rehabilitation after knee prosthetic treatment. In a previous study of total hip replacement for arthrosis (Johnsson and Persson 1986), the occupations of 118 patients who were below the age of 60 years at surgery was investigated. 69 patients returned to work and, as in our study, the risk of long postoperative sick-leave or postoperative pension increased with the duration of preoperative sick leave. These patients, operated on during the 13-year period 1970–1982, formed the basis of an economic analysis by Hertzman et al. (1988). A considerable economic productive gain was estimated to be achieved if the waiting-time for operation was shortened. This estimate ought to be appropriate even in knee prosthetic surgery, as presented in our study.

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