



## Return to work after arthroscopic subacromial decompression

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The incidence of arthroscopic subacromial decompression has been increasing over the last few years. Little is known about the duration of sick leave after such a procedure. The aim of this study was to determine the time till return to full duty and to explore the various influencing factors.

We retrospectively evaluated a group of 166 patients who consecutively underwent arthroscopic subacromial decompression for subacromial impingement syndrome.

One hundred patients were professionally active at the time of surgery ; the mean duration till return to full duty was 11.1 weeks.

Self-employed workers had the shortest sick leave period (median time of 1 week). No statistically significant difference was seen between the group with a financial compensation from the national health insurance system (median time of 12 weeks) and the group with income replacement by a private insurance company (median time of 8 weeks).

Patients performing manual labour typically had a longer period of sick leave than other employees (12 versus 8 weeks). A longer absence from work was also observed in individuals who underwent a concomitant arthroscopic AC resection and patients with a higher BMI.

**Keywords :** arthroscopic subacromial decompression ; sick leave ; return to work.

### INTRODUCTION

Shoulder pain has been reported as the second most common musculoskeletal disorder and sub-

acromial impingement syndrome (SIS) has been identified as one of the most frequent causes of shoulder pain (2,24,25,28). It has been shown that SIS has a substantial impact on quality of life and ability to perform work (4). The concept of impingement syndrome was introduced by Neer, who described it as impingement of the anterolateral tendinous portion of the rotator cuff by the coracoacromial ligament and the anterior third of the acromion (19). Arthroscopic subacromial decompression has become a widely used technique for the treatment of SIS and it has been shown to be efficient, durable and to provide a high patient satisfaction (1,8,14,17, 18,22).

Little is known about time till return to full-duty work after arthroscopic subacromial decompression.

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The purpose of the present study is to examine the duration of sickness absence and the correlation with workers' compensation status after arthroscopic subacromial decompression. We also attempted to identify other factors influencing sick leave.

## MATERIALS AND METHODS

All 272 patients who underwent arthroscopic subacromial decompression between January 2005 and October 2009 in our unit, were asked to complete a questionnaire at least one year postoperatively. The questionnaire contained questions about age, gender, body mass index (BMI), smoking behaviour, working situation, type of work, operated side, time till return to work, complications, compensation status and satisfaction. In addition, all patient files and operation reports were reviewed.

First, a statistical data analysis on the whole group was performed with special attention to complication rates. A statistical analysis was subsequently performed on the subgroup of 100 patients who were professionally active at the time of surgery, to study the effect of the different variables on time to return to full duty.

Fisher Exact tests were used to compare the rates of postoperative complications. Age and BMI of patients with and without complications were compared using a Mann-Whitney U test. Relations with age and BMI were evaluated using a Spearman correlation.

On the subset of patients who were employed at the time of operation, Kaplan-Meier estimates were used to obtain the percentage of subjects having resumed work during various time intervals after the operation. All patients still incapable to work at the time of the questionnaire were considered censored. Log-rank tests were used to compare the time till work resumption between groups. A Cox regression was used to verify the relation with age and BMI. The proportional hazards assumption and the functional form of the continuous predictors were verified by applying graphical and numerical methods. Restricted cubic splines and quadratic functions were used to allow deviations from linearity. P-values smaller than 0.05 were considered significant. All analyses were performed using SAS software, version 9.2 of the SAS System for Windows.

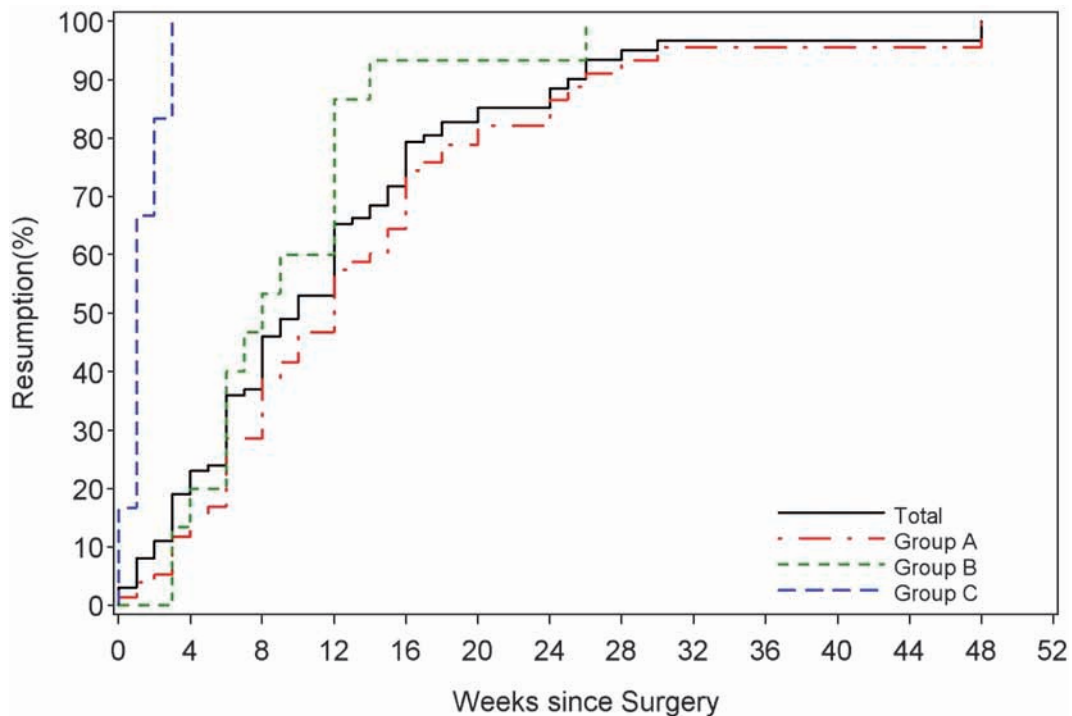
## RESULTS

Two hundred seventy-two patients were included in this study. One hundred sixty six returned the questionnaire, a response rate of 61%. There was a

mean follow-up of 15 months and a minimum follow-up of one year. The average age of the responders was 54 years (SD : 9.75 range : 22-82). There were 65 men (39%) and 101 women (61 %). Sixty-six were operated on the left side (40%), 97 on the right side (58%), and 3 had a bilateral operation (2%). The affected side was the dominant side in 106 patients (64%). Thirty nine of them were smokers (23%). Fourteen patients (8.4%) had diabetes. The mean BMI was 26.8 (SD : 4.45 range : 19-42). One hundred twenty three patient had an isolated arthroscopic decompression (74%), 43 had an additional arthroscopic AC resection (26%).

Sixty-six patients were either unemployed (5), retired (28), on sick leave (20) or housewives (13). This left us with 100 patients (60%) who were professionally active at the time of surgery. Their mean age was 50 years (SD : 8.18 range : 22-72). There were 45 men (45%) and 55 women (55%). Characteristics concerning operated side, dominant side, BMI, smoking behaviour, diabetes and complication rates were comparable to the entire group. Forty-four of them (44%) had an occupation requiring manual labour. Seventy-five (75%) underwent an isolated subacromial decompression, 25 (25%) had an additional arthroscopic AC resection. At the last follow-up, nine patients were still not at work. Of the 91 patients who did resume work, the mean time till work resumption was 11.1 weeks (SD : 8.26 range : 0-48) (Fig. 1).

Of the 100 patients who were employed 79 received compensation from the national health care institution and benefit insurance, which is a part of the Belgian social security system (group A). Fifteen patients received compensation from a private insurance company (group B) and 6 patients were self-employed and thus received no or minimal compensation (group C). There was a statistically significant difference in time till work resumption between the different compensation groups : self-employed workers (group C) had the shortest time till work resumption with a median time of 1 week, compared to 8 weeks in group A and 12 weeks in group B (Fig. 1). No statistically significant difference was seen between group A and group B. Correction for different factors by a Cox regression analysis led to the same result.



**Fig. 1.** — The percentage of patients who resumed work in the weeks after surgery for the total group and the different compensation groups.

Manual labour was associated with a significantly longer period till work resumption. Fifty percent of this group resumed work at 12 weeks compared to 8 weeks in the group who did not perform manual labour.

A statistically significant difference was seen between the patients undergoing an isolated subacromial decompression (group 1) and patients who had an additional AC-resection (group 2). The 50<sup>th</sup> percentile was 8 weeks in group 1 versus 16 weeks in group 2 (Table I).

A complication occurred in 20 of the 166 patients (12.1%). Fifteen had a frozen shoulder, 5 had an episode of prolonged pain lasting more than 6 months. Patients with complications had a longer period till work resumption. A correlation between age and complications was observed: the patients with a complication had a mean age of 49.7 years (SD : 9.22 range : 33-70) compared to 54.5 years in patients (SD : 9.53 range : 22-82) without complications, which was a statistically significant difference ( $p < 0.05$ ). There was a tendency toward more

complications in the patient group that was performing manual labour: 20% had a complication compared to 8% in the group that was not performing manual labour, but the difference was not significant ( $p = 0.059$ ).

A quadratic correlation between chance on work resumption and BMI was observed, meaning that individuals with a higher BMI take a longer time till work resumption (Fig. 2). There was no association between the duration of sick leave and smoking behaviour, gender or diabetes.

## DISCUSSION

In the last few years there has been a substantial increase in the incidence of arthroscopic acromioplasties. In 1996 there was an incidence of 30 arthroscopic subacromial decompressions per 100 000 people in New York State. In 2006 the incidence increased to 101.9 per 100 000. This represents an increase in the volume of acromioplasties of 254% over eleven years (29). Ketola

Table I. — Variables associated with the time till return to work

	Number of patients	Percentage	Median time till work resumption
Employed	100	100%	10 weeks
Manual labour	44	44%	12 weeks
No manual labour	66	66%	8 weeks
Isolated decompression	75	75%	8 weeks
Additional AC resection	25	25%	16 weeks

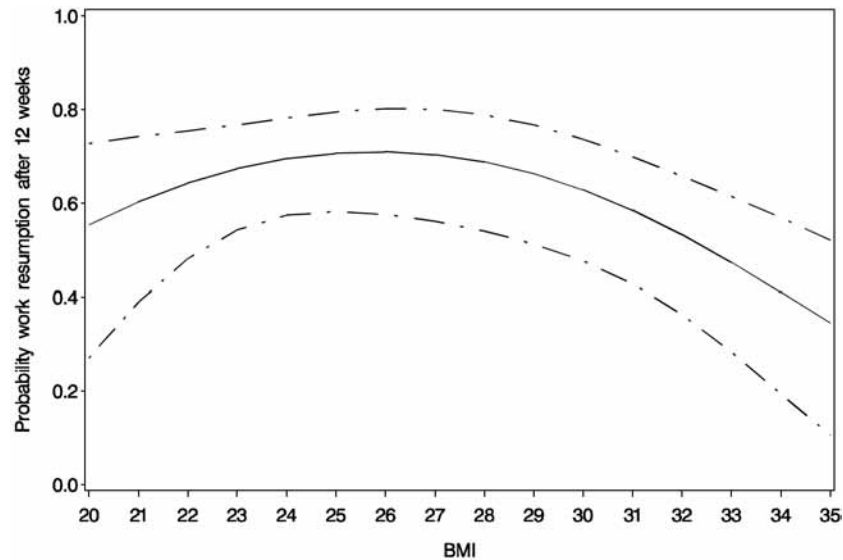


Fig. 2. — Probability of work resumption at 12 weeks after surgery and the BMI

showed that the mean cost of an arthroscopic sub-acromial decompression was € 2961. This included the cost of the operative procedure, visits to a physiotherapist, travel costs, hospitalization costs, medication and visits to a masseur. However, they did not take sick leave into account (16). To determine the total impact and costs of this procedure it is important to know the time till return to full occupation as sick leave might cause a great deal of the overall costs, as most people are employed at the time of the operation (60% in our study).

Our data show that the mean time till work resumption is 11.1 weeks. These findings are consistent with the results of Davis *et al*, who showed that mean time till work resumption of a very large group (432 patients) was 65.1 days (9.3 weeks) (6).

Nicholson showed a difference in time to return to full-duty between the workers' compensation

group (13.7 weeks) and the non-workers' compensation group (9.1 weeks). This difference however was explained by the heavier work-demand level in the workers' compensation group. He also showed that the severity of intra-articular pathology had an effect on the return to full duty (20). In our study, all patients with intra-articular pathology were excluded to avoid confounders. Nutton *et al* found a mean duration of absence of work in the manual workers group of 12.8 weeks compared to 7.2 weeks for non-manual workers (21). This is consistent with our data which show a median time till return to work of 12 weeks in the manual labour group, compared to 8 weeks in the group who did not perform manual labour. We also noted a tendency to a higher complication rate in this manual labour group. This probably shows that the work demand level is an important factor.

Nicholson *et al* demonstrated that there was no difference in shoulder scores pre- and post-operatively between workers compensation groups and non-workers compensation groups (20). In contrast Holtby *et al* did notice lower post-operative scores in the workers' compensation group. They explained this by the higher physical work demand in this group. It should also be taken into account that their research group consisted of patients who had a rotator cuff tear repair or a subacromial decompression (13). In Belgium there are three main compensation systems. In work-related injuries, compensation (90% of the lost salary) is paid by a private insurance company of the employer. In all other cases of illness or injury of an employee, the employer pays the sickness absence benefit during the first 2-4 weeks and after that, sick leave wages (60% of the lost income with a maximum level) are granted by the national health care and benefit insurance. These two compensation systems are in contrast with the compensation system of self-employed workers, who can also claim a benefit from the national health care and benefit insurance if they have to cease all activities for more than one month due to sickness or accident. From the second month onwards, the daily benefit amount is a fixed sum which is usually significantly lower than the income related compensation of employees (7). We observed that self-employed workers resumed work much faster than the other compensation groups, with a median sick leave period of only one week. Thus, most self-employed persons resume their activities before they can receive a benefit. This can probably be explained by the fact that self-employed persons organize their work themselves and typically resume a part of their activities as soon as possible. In this case they are not entitled to benefits because a complete cessation of all activities is one of the legal conditions to receive a benefit. Employees on the other hand are often instructed by the employer to only return to work if they are capable to resume full duty. No statistical difference was seen between workers whose compensation is provided by the national health care and benefit insurance (12 weeks) and patients whose compensation was provided by an insurance company (8 weeks).

We documented that people with a higher BMI take a longer time till work resumption. Several studies reported that a higher BMI is associated with longer sickness absence (9,11,12). To our knowledge this has not yet been shown for patients who underwent a specific surgical intervention, such as an arthroscopic decompression.

Several studies reported results of isolated arthroscopic AC resection. Pensak *et al* reported 93% good or excellent results with the indirect approach (23). Others reported similar results (10,27). Less however is known about the time till return to full duty. Charron *et al* reported a return to full sporting activities in 21 days (3). Similar percentages of good and excellent results have been reported in combined procedures (5,23,26); however, little is known about time till return to full duty following combined procedures. Kay *et al* reported an average return to full athletic activity of 8.2 weeks (15); no data about return to work were available. In this study, we found that 50% of the patients who had the combined procedure had returned to work at 16 weeks. This is considerably higher than the 8.2 weeks reported by Kay *et al* and considerably longer than following an isolated decompression ( $p = 0.016$ ).

This study has some limitations. First of all, it was conducted in a retrospective manner based on patients' self report, which is subject to recall bias. We tried to eliminate this bias by matching the self reported data with the patient files and excluded data that were not consistent. Secondly, no pre-operative clinical score was available to document pre-operative complaints. This is however considered as a minor deficit as the primary endpoint of this study was to determine the time till full recovery. Thirdly, some of the subgroups are rather small.

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