Return to work after lumbar disc surgery is related to the length of preoperative sick leave

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return to work after lumbar disc surgery is related to the length of preoperative sick leave

Mikkel Ø. Andersen¹, Carsten Ernst¹, Jesper Rasmussen², Søren Dahl² & Leah Y. Carreon¹

ABSTRACT

INTRODUCTION: Lumbar disc herniation (LDH) is associated with high morbidity and significant socio-economic impact as the majority of the patients are of working age. The purpose of this study was to determine the impact of length of sick leave on the return-to-work rate after lumbar disc herniation surgery.

METHODS: This was a single-centre study of LDH patients who underwent surgery from 18 May 2009 through 28 November 2014. Data were collected prospectively from the DaneSpine database. Questions in DaneSpine include preoperative length of sick leave and working status one year post-operatively.

RESULTS: A total of 678 patients were included and 72% of the patients had returned to work one year after their surgery. The rate of patients returning to work decreases significantly with the length of preoperative sick leave. Among the patients who were on sick leave prior to their surgery, 83% returned to work if surgically treated within three months. In contrast, only 50% of those whose sick leave exceeded three months returned to work.

CONCLUSION: The present analysis suggests that the return-to-work rate after lumbar disc herniation surgery is affected by the length of sick leave.

FUNDING: none.

TRIAL REGISTRATION: This study was registered with the Danish Data Protection Agency.
more than one year. At one year after surgery, the same data collected at baseline are collected once more. In addition, the patient is asked if he or she has returned to work.

Included were patients who underwent decompression and/or discectomy for LDH from 1 May 2009 through 30 November 2014, aged 18-59 years. Patients who had surgery within a week of being placed on sick leave were excluded as these patients were emergent cases with neurological deficits. All patients had magnetic resonance imaging concordant findings demonstrating lumbar disc herniation at the level and side corresponding to their symptoms.

**Statistical analyses**

All statistical analyses were performed using Stata Ver 14.0 (StataCorp, College Station, Texas).

A threshold p-value of 0.05 was considered significant. For comparisons between the patients who returned to work one year after surgery and those who did not, unpaired t-tests were used to compare continuous variables, and Fisher’s exact test was used to compare categorical variables. Binary logistic regression analysis was used to control for known confounders such as smoking status, gender and age alongside length of sick leave.

**Trial registration:** This study was registered with the Danish Data Protection Agency.

### RESULTS

A total of 1,374 patients enrolled in the registry met the inclusion criteria. Of these, 382 patients did not respond to the return to work question one year after surgery, 261 did not respond to the preoperative length of sick leave question, 53 patients reported that they did not work prior to the operation, and 44 patients had neurological deficits requiring emergent surgery, leaving 678 patients in the analysis. The demographic characteristics of the cohort are summarised in Table 1.

The cross-tabulation of return-to-work status and length of sick leave prior to surgery are shown in Table 2. Overall, the majority of patients (n = 456, 72%) had

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**TABLE 1**

Summary of demographic data.

<table>
<thead>
<tr>
<th></th>
<th>Not working</th>
<th>Working</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>178</td>
<td>456</td>
<td>–</td>
</tr>
<tr>
<td>Age, yrs, mean (± SD)</td>
<td>41.6 (± 9.8)</td>
<td>43.4 (± 9.5)</td>
<td>0.033</td>
</tr>
<tr>
<td>Males, n (%)</td>
<td>88 (49.4)</td>
<td>259 (56.8)</td>
<td>0.032</td>
</tr>
<tr>
<td>Smokers, n (%)</td>
<td>85 (47.8)</td>
<td>142 (31.3)</td>
<td>&lt; 0.000</td>
</tr>
<tr>
<td>Body mass index, kg/m², mean (± SD)</td>
<td>27.3 (± 4.7)</td>
<td>26.3 (± 4.1)</td>
<td>0.003</td>
</tr>
</tbody>
</table>

**Preoperative, mean (± SD)**

<table>
<thead>
<tr>
<th></th>
<th>Not working</th>
<th>Working</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oswestry Disability Index</td>
<td>50.1 (± 15.8)</td>
<td>47.9 (± 18.6)</td>
<td>–</td>
</tr>
<tr>
<td>EQ-5D</td>
<td>0.25 (± 0.32)</td>
<td>0.27 (± 0.34)</td>
<td>0.117</td>
</tr>
<tr>
<td>SF-36 MC</td>
<td>27.0 (± 6.2)</td>
<td>27.2 (± 6.9)</td>
<td>0.651</td>
</tr>
<tr>
<td>SF-36 PCS</td>
<td>35.8 (± 11.6)</td>
<td>41.7 (± 11.8)</td>
<td>&lt; 0.000</td>
</tr>
<tr>
<td>Leg pain, VAS</td>
<td>60.6 (± 30.8)</td>
<td>60.1 (± 30.7)</td>
<td>0.857</td>
</tr>
<tr>
<td>Back pain, VAS</td>
<td>51.7 (± 30.6)</td>
<td>39.3 (± 30.0)</td>
<td>&lt; 0.000</td>
</tr>
</tbody>
</table>

**Length of preoperative sick leave, n**

<table>
<thead>
<tr>
<th></th>
<th>Not working</th>
<th>Working</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 mo.</td>
<td>21</td>
<td>137</td>
<td>&lt; 0.000</td>
</tr>
<tr>
<td>1-2 mo.s</td>
<td>48</td>
<td>211</td>
<td></td>
</tr>
<tr>
<td>3-5 mo.s</td>
<td>46</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>6-8 mo.s</td>
<td>23</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>9-12 mo.s</td>
<td>9</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>&gt; 1 yr</td>
<td>31</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

**EQ-5D = EuroQuality-of-Life-SD; SD = standard deviation; SF-36 MC = Short Form-36 Mental Components; SF-36 PCS = Short Form-36 Physical Component Summary; VAS = visual analogue scale: 0-100.**

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**TABLE 3**

Preoperative duration of sick leave and smoking status were associated with return-to-work rate.

<table>
<thead>
<tr>
<th></th>
<th>Odds ratio (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of sick leave</td>
<td>0.52 (0.45-0.60)</td>
<td>&lt; 0.000</td>
</tr>
<tr>
<td>Smoking</td>
<td>0.64 (0.43-0.94)</td>
<td>&lt; 0.000</td>
</tr>
</tbody>
</table>

CI = confidence interval.

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**Figure 1**

Working status one year post-operatively versus duration of preoperative sick leave.
returned to work one year after surgery. A statistically significantly larger proportion of patients who had surgery within the first three months of sick leave was back at work one year after surgery than among patients who had a longer period of preoperative sick leave (p < 0.000) Table 2 and Figure 1.

After controlling for known confounders, stepwise binary regression showed that the preoperative duration of sick leave and smoking status were significantly associated with return to work at one year (Table 3). Specifically, patients with a shorter duration of sick leave and non-smokers were more likely to be back at work one year post-operatively.

CONCLUSIONS

In a society with free and equal access to public health services, providing care and treatment in the most cost-effective manner possible is essential. To this end, health authorities increasingly require healthcare providers to document treatment outcomes. This need for documentation has led to an increased use of registries or databases that contain patient demographics, treatments received and clinical outcomes after treatment. In patients with lumbar degenerative conditions, validated health-related quality-of-life (HRQoL) measures are used to determine treatment effects.

For patients of working age, the most important socioeconomic endpoint is the ability to return to work. The present analysis based on data from DaneSpine suggests that the return to work rate after LDH surgery is affected by the length of preoperative sick leave.

The main drawback of this study is the large proportion of non-responders, especially post-operatively. From a previously published study from this registry [15], the replies from the non-responders reflected those of the responders, indicating the validity of the data in the present study.

Some of the difference in the proportion of patients that return to work within a year may be explained by the tradition in the Danish society to lay off employees if they have been on sick leave for more than 3-4 months. Furthermore, if patients have lost contact with their workplace due to prolonged sick leave, it is probably harder to find a new job. Another explanation may be that an entrapped nerve root suffers permanent damage if not decompressed in due time as our data indicate that there is a correlation between the length of the preoperative and post-operative sick leave.

The strength of the current study is that data were collected prospectively from consecutive patients before and after surgery from a single site with robust enrollment and follow-up data [15]. In addition, treatments are provided for free in Denmark; thus, the patients in this study reflect LDH patients irrespective of income, education or social class. This study is limited by the categorical responses to the length of preoperative sick-leave question, and the inequality of length of time within each of the six categories. That is, our data do not permit testing of the significance of length of sick leave as a continuous variable, and therefore we can only conclude that there is greater likelihood of being back at work one year after surgery with shorter length of sick leave prior to surgery, based on the comparison of the six length-categories in this study.

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CONFLICTS OF INTEREST: Disclosure forms provided by the authors are available with the full text of this article at www.danmedj.dk

LITERATURE