Physical and mental health in young adults operated on for idiopathic scoliosis

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Abstract In this study, physical and mental health were investigated in 30 young adults who were operated on for idiopathic scoliosis, 2–3 years after surgery, and the results compared to an age- and sex-matched control group of 40 individuals. We used the short form of the 36 health survey (SF-36 version 1.2), which is a 36-item questionnaire measuring health functioning on eight scales: physical functioning, role limitations due to physical functioning, bodily pain, general health perceptions, vitality, social functioning, emotional role limitation, and general mental health. The patient scores indicated lower than the controls in physical health but higher in mental health. Otherwise, there were no significant differences between the two groups. Overall, this study showed that young adults operated on for idiopathic scoliosis were satisfied, and that their mental health was even better than the normal group, but their physical health was somewhat poorer. Thus, the surgical procedure was well tolerated and had not traumatized the patient.

Key words Health measures · Operation · Scoliosis · Self-image

Introduction

Idiopathic scoliosis often coincides with the onset of puberty. This period of life is characterized by emotional instability and variation as well as bodily changes. Spinal fusion surgery with instrumentation successfully reduces severe scoliotic curves and minimizes the risk for curve progression. However, the results of treatment also depend on the patient’s ability to cope with stress of chronic disability, and the surgical outcome may be unrelated to patient satisfaction. The psychological impact of spinal fusion surgery, then, is of special concern. Any conclusion about treatment effects on health and self-image should also be based on age- and sex-matched control groups.

The aim of this study was to evaluate the effects of spinal fusion surgery on health outcomes and self-image in young adults with progressive severe curves of idiopathic scoliosis. We used a revalidated standardized questionnaire and compared the answers with an age- and sex-matched control group.

Patients and methods

The study included 26 young women and 4 men who were operated on for idiopathic scoliosis during 1996–1998 at Rikshospitalet University Clinic. All of them were admitted for surgical correction of verified severe curves with progression. They were otherwise healthy students at high school or university level. At the time of surgery, the age of the patients ranged from 17 to 24 (mean, 20) years. The Cobb angle ranged from 50° to 57° (mean, 54°). By means of surgery, the Cobb angle was reduced to 13° to 21° (mean, 18°).

At 2–3 years after surgery, the patients were contacted and asked to fill in a questionnaire. We used the short form of the 36 health survey (SF-36 version 1.2), which is a 36-item questionnaire measuring health functioning on eight scales: physical functioning; role limitations due to physical functioning; bodily pain; general health perceptions; vitality; social functioning; emotional role limitation; and general mental health (Table 1). The scales have different numbers of items, and the items have different numbers of response choices. Every scale score, therefore, has a raw score with a different absolute value. To standardize this, we used the formula from the manual to calculate a transformed scale from 0 (lowest) to 100 (highest):
Table 1. The SF-36 scale

<table>
<thead>
<tr>
<th>Summary measurement</th>
<th>SF-36 scales</th>
<th>No. of items</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical health</td>
<td>Physical functioning</td>
<td>10</td>
<td>Limitation in physical activities</td>
</tr>
<tr>
<td></td>
<td>Physical role limitations</td>
<td>4</td>
<td>Problems in daily activities due to physical health</td>
</tr>
<tr>
<td></td>
<td>Bodily pain</td>
<td>2</td>
<td>Pain and its interference in life</td>
</tr>
<tr>
<td></td>
<td>General health</td>
<td>5</td>
<td>Feeling of being well or ill</td>
</tr>
<tr>
<td>Mental health</td>
<td>Vitality</td>
<td>4</td>
<td>Energy level</td>
</tr>
<tr>
<td></td>
<td>Social functioning</td>
<td>2</td>
<td>Mental health interference with social activities</td>
</tr>
<tr>
<td></td>
<td>Emotional role limitation</td>
<td>3</td>
<td>Problems in daily activities due to mental health</td>
</tr>
<tr>
<td></td>
<td>Mental health</td>
<td>5</td>
<td>General affective condition; well-being</td>
</tr>
</tbody>
</table>

Table 2. Subscale item scores (SF-36 and general health visual score) in patients and controls

<table>
<thead>
<tr>
<th>Item</th>
<th>Patients</th>
<th>Control</th>
<th>Difference</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical functioning</td>
<td>84.2 (79.0–89.4)</td>
<td>94.9 (91.9–97.9)</td>
<td>10.7 (8.7–12.7)</td>
<td>P = 0.001</td>
</tr>
<tr>
<td>Physical role limitations</td>
<td>71.0 (56.5–85.5)</td>
<td>83.3 (74.0–92.6)</td>
<td>12.3 (6.4–18.2)</td>
<td>P = 0.15</td>
</tr>
<tr>
<td>Bodily pain</td>
<td>58.5 (50.9–66.1)</td>
<td>68.4 (60.2–76.6)</td>
<td>9.9 (5.8–14.0)</td>
<td>P = 0.1</td>
</tr>
<tr>
<td>General health</td>
<td>69.0 (59.7–78.3)</td>
<td>72.5 (65.3–79.7)</td>
<td>3.5 (0.6–7.6)</td>
<td>P = 0.53</td>
</tr>
<tr>
<td>Vitality</td>
<td>60.4 (52.0–68.8)</td>
<td>57.8 (49.7–65.9)</td>
<td>-2.6 (−6.8–1.6)</td>
<td>P = 0.65</td>
</tr>
<tr>
<td>Social functioning</td>
<td>86.0 (76.5–95.5)</td>
<td>85.9 (80.4–91.4)</td>
<td>-0.1 (−3.8–3.6)</td>
<td>P = 0.99</td>
</tr>
<tr>
<td>Emotional role limitation</td>
<td>76.0 (60.9–91.1)</td>
<td>70.1 (57.3–82.9)</td>
<td>-5.9 (−12.9–1.1)</td>
<td>P = 0.54</td>
</tr>
<tr>
<td>Mental health</td>
<td>81.9 (75.4–88.4)</td>
<td>72.4 (66.0–78.8)</td>
<td>-9.5 (−12.8 to −6.2)</td>
<td>P = 0.01</td>
</tr>
<tr>
<td>General health visual score</td>
<td>71.4 (63.7–79.1)</td>
<td>71.6 (65.9–77.3)</td>
<td>0.2 (−3.2–3.6)</td>
<td>P = 0.96</td>
</tr>
</tbody>
</table>

Data are mean and 95% confidence intervals (in parentheses)

Transformed scale = 

\[
\left( \frac{\text{Actual raw score} - \text{lowest possible raw score}}{\text{Possible raw score range}} \right) \times 100
\]

Higher scores reflect better self-reported health status. After transforming all the raw scores to a transformed scale, mean and 95% confidence interval were calculated. Correlations were tested with Pearson's correlation coefficient and differences with the t test. A significance level of 0.05 was chosen.

In addition, we asked the patients to rate their quality of health on a visual scale from 0 (worst) to 100 (best), with 50 for neutral, and also to answer five specific questions:

1. How satisfied are you with the overall treatment (0–100)?
2. As compared to before the operation; how is your general health (0–100)?
3. As compared to before the operation; how satisfied are you with the cosmetic effect (0–100)?
4. How many days during the last 4 weeks have you reduced your activity due to back pain?
5. How many days during the last 4 weeks have you been absent from work/school?

To evaluate the results, comparisons were made between the patients and an age- and sex-matched control group of normal individuals, 6 males and 34 females. The age of these persons ranged from 17 to 25 (mean, 20) years. These controls were also students at high school or university level.

Results

During follow-up, one patient dropped out from this study because she had an infection that deteriorated the surgical result. All others answered the questionnaire after some period of time.

Physical health

The patients scored significantly (P = 0.001) lower for physical functioning than the control group (Table 2). We found no significant differences in physical role limitations, bodily pain, or general health. Also, when scoring general health on a visual scale, there were no significant differences between the patients and the control group (P = 0.96). Thus, the two methods for mea-