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**Reliability and Validity Study of the Finnish Adaptation of Scoliosis Research Society Questionnaire  
Version SRS-30**

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## Abstract

**Study Design.** A prospective clinical study to test and adapt a Finnish version of the Scoliosis Research Society 30 (SRS-30) questionnaire.

**Objective.** To perform cross-cultural adaptation and evaluate the validity of the adapted Finnish version of the SRS-30 questionnaire.

**Summary of Background Data:** The SRS-30 questionnaire has proved to be a valid instrument in evaluating health-related quality of life (HRQoL) in adolescent and adult population with spine deformities in the United States. Multinational availability requires cross-cultural and linguistic adaptation and validation of the instrument.

**Methods.** The SRS-30 was translated into Finnish using accepted methods for translation of quality-of-life questionnaires. A total of 274 adult patients with degenerative radiographic sagittal spinal disorder answered the questionnaire with sociodemographic data, RAND-36, Oswestry disability index, DEPS depression scale, and Visual Analog Scale (VAS) back and leg pain scales within 2 weeks' interval. The cohort included patients with and without previous spine surgery. Internal consistency and validity were tested with Cronbach $\alpha$ , intraclass correlation (ICC), standard error of measurement, and Spearman's correlation coefficient with 95% confidence intervals (CI).

**Results.** The internal consistency of SRS-30 was good in both surgery and nonsurgery groups, with Cronbach $\alpha$  0.853 (95% CI, 0.670 to 0.960) and 0.885 (95% CI, 0.854 to 0.911), respectively. The test-retest reproducibility ICC of the SRS-30 total and subscore domains of patients with stable symptoms was 0.905 (95% CI, 0.870 to 0.930) and 0.904 (95% CI, 0.871 to 0.929), respectively. The questionnaire had discriminative validity in the pain, self-image, and satisfaction with management domains compared with other questionnaires.

**Conclusions.** The SRS-30 questionnaire proved to be valid and applicable in evaluating HRQoL in Finnish adult spinal deformity patients. It has 2 domains related to deformity that are not covered by other generally used questionnaires.

**Key Words:**adult spinal deformity; cross-cultural adaptation; Finnish; HRQoL; patient outcome instrument; RAND-36; reliability; Scoliosis Research Society; SRS-30; Oswestry disability index; translation; validity

**Level of Evidence:** 3

ACCEPTED

## INTRODUCTION

Patient-reported health-related quality of life (HRQoL) questionnaires have gained popularity as an objective method of assessing baseline pathology and measuring the effectiveness of an intervention. Adult deformities are common, and in previous reports, prevalence in elderly population was 60%.<sup>1</sup> Unlike adolescent idiopathic scoliosis (AIS), adult spine deformity consists of sagittal imbalance and other degenerative problems such as spinal stenosis and nerve compression, causing pain and disability. The Scoliosis Research Society's (SRS) patient outcome instruments have originally been introduced to evaluate AIS in American English language.<sup>2</sup> The English version of SRS-22 has been validated on adult spinal deformity population.<sup>3,4</sup> Glassman *et al*<sup>5</sup> used the SRS-29 version to verify linear increase in disability with increasing sagittal imbalance. Later, SRS-30, which encompasses the earlier SRS-22, has been used when operative treatment of adult spinal deformity is analyzed. None of the SRS scores have been translated or cross-culturally adapted to Finnish language and culture. The original SRS-30 has not been translated or cross-culturally validated in an adult spine deformity cohort. To achieve reproducible data for research and clinical work, the questionnaire must be translated and validated for the specific language and cultural environment. SRS-30 was chosen for validation because it is applicable to both nonoperative and operative treatments.

## MATERIALS AND METHODS

### Patients

A total of 290 adult patients were recruited to the study. They were collected consecutively among patients who were referred to Jyväskylä Central Hospital's spine clinic from basic health care because of current spinal disorder with or without radicular symptoms. Some of the patients have had previous lumbar spine surgery. Patients 18 years or older, who can communicate in written Finnish language, and with + grades in any of the sagittal modifiers of SRS-Schwab adult spine deformity classification<sup>6</sup> (sagittal vertical axis, pelvic incidence minus lumbar lordosis, or pelvic tilt) were included. During patient selection, sagittal modifiers were used to divide patients into no, moderate, or severe deformities. In all 3 sagittal modifiers, grade 0 was regarded as no deformity. The presence of positive modifiers ranging from 1 to 3 is considered

moderate, and 4 or more, marked deformity. The study had no particular exclusion criteria. This study was approved by the Research Ethics Committee of the Central Finland Health Care District, and volunteer patients signed written consent.

## **Questionnaires**

The patients received 2 sets of questionnaires with an interval of 2 weeks. First, they answered the SRS-30, Oswestry disability index (ODI) 2.0, RAND-36, DEPS, and clinical and sociodemographic data sheet; **second, they answered the SRS-30 by replying to the title question whether their spinal symptoms are stable, worsened, or improved in the period after answering the first questionnaire.** The patients who had undergone previous spine surgery were asked to answer the postsurgery part of SRS-30 as well.

## **Scoliosis Research Society Questionnaire Version 30**

The SRS-30 questionnaire is composed of 30 questions, of which the last 7 (24-30) are for postsurgery patients only. The questionnaire is available in English on the SRS webpage ([www.srs.com](http://www.srs.com)). Each question is divided into 5 choices, except postsurgery questions 25, 26, 27, 28, and 30, which only have 3 choices. Questions with 5 choices have 1-5 points, and those with 3 choices have 1, 3, or 5 points. The patients are advised to choose the best answer to each question unless otherwise indicated. Question 11 is about medication usage for the patient's back, and it has a choice "other" wherein the patient is asked to specify in the medications other than the preset choices. Question 23 asks to rate the patient's own self-image on a scale of 1-9, but in the score sheet, the answers are divided to 5 categories in numerical order.

The score sheet gathers the questions into 5 domains: function/activity, pain, self-image/appearance, mental health, and satisfaction with management. Mental health questions are adopted with permission from the 36-item Short Form (SF-36). Scoring allows the calculation of different combinations. The subtotal of 4 domains without satisfaction with management can be calculated with or without postsurgery questions. Equally, for the total score, the satisfaction with management domain can be added with or without postsurgery question. The total score without 7 postsurgery questions ranges from 23 to 115 points, and for postsurgery patients, from 30 to 150 points. A domain cannot be scored if fewer than 3 questions are

answered, except the satisfaction domain, which contains only 2 questions for patients who did not undergo operation.

### **Translation and Cross-Cultural Adaptation**

The translation and cross-cultural adaptation of the SRS-30 score was performed following guidelines.<sup>7,8</sup> The SRS was contacted, and approval of the translation-validation study was granted by the copyright owners. Two independent forward translations were made from English to Finnish by health-care professionals. Both translators were bilingual, with Finnish as their first language. They produced a written report and highlighted phrases and cultural features that could be misinterpreted or have more than 1 potential translation. A consensus of these 2 translations, resulting in version 1, was made by the translators through a discussion of the discrepancies in the translations. Back-translation was made by a bilingual translator with English as first language and no health-care background. This phase was done to ensure that the translated version has the same content as the original score. Differences in translations and back-translation were analyzed and debated to reveal whether the translations had equal linguistic and cultural content. A professional linguist cross-checked the Finnish language with the original English version, Finnish translation, and backward translation with a written report of the philologue. The final consensus version was prepared by an expert committee of 2 translators and 2 English and Finnish language professionals. **This version was pilot-tested with 20 Finnish-speaking patients with low-back pain who filled in the questionnaire and gave written notifications if the event of any offending content or difficulty in answering or understanding the questions. The testing demonstrated no concerns or reasons to change the content, and the final version of the Finnish SRS-30 was introduced (digital supplement).**

### **Oswestry Disability Index 2.0**

The ODI<sup>9,10</sup> is a self-administered and validated questionnaire. The Finnish validated ODI 2.0 version<sup>11</sup> was used to capture back-specific disability. Each of the 10 statements about pain severity, self-management, lifting, walking, sitting, standing, sleeping, sex life, social life, and traveling are scored from 0 to 5 points (no

disability to maximal disability). The index is calculated as the percentage of the maximum of the answered statements.

### **RAND-36**

RAND-36 is a generic HRQoL questionnaire<sup>12,13</sup> including 8 dimensions: physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health. A Finnish validated version of RAND-36 scoring was used.

### **Visual Analogue Scale**

Back and leg pain were separately assessed with a 100-mm line (0 mm, no pain; 100 mm, worst possible pain).<sup>14</sup>

### **DEPS Depression Scale**

The DEPS depression scale<sup>15</sup> has 10 items, each scored from 0 to 3 points (0, “not at all”; 3, “very much”). The threshold value for 50% of the patients having depression is 12 points, and the probability of depression increases as the total score increases.

### **Clinical and Sociodemographic Data**

Sociodemographic data included age, sex, marital status, body mass index (BMI), tobacco and alcohol use, education, profession and occupational history, leisure time sports activity, duration of sick leave, and history of back symptoms.

### **Statistical Methods**

Internal consistency was estimated by calculating the Cronbach $\alpha$  with bootstrapped 95% CIs. **A self-reported change in symptoms within 2 weeks' interval was recorded, and patients with stable or unstable symptoms were analyzed separately. Intraclass correlation (ICC) for was measured by 2-way mixed model with absolute agreement. The reproducibility, i.e. the test-retest reliability under different conditions, was estimated by using intraclass correlation (ICC) and standard error of measurement (SEM).** Standard error of measurement (SEM) was defined as the square root of the sum of the residual variance and the variance in measurements from the corresponding 2-way mixed model.<sup>16</sup>



Confidence intervals for SEM were calculated using asymptotic covariance matrix of variance components obtained using restricted maximum likelihood method and general Satterthwaite approximation for the degrees of freedom.<sup>17</sup> Correlation coefficients with bootstrapped CIs were calculated by the Spearman method.<sup>18</sup> Differences between groups were tested by independent samples *t* test or analysis of variance.

## RESULTS

Forward-backward translation was used to adapt the Finnish version of SRS-30. The translation process was agreeable in other questions, but semantic issues were debated in the translation of questions 11 and 18. It was agreed that Finns know pain medication better with their generic names rather than trade names, and the original spelling of question 11 was altered after negotiation. Question 18 was speculated during the translation process. After deliberation, consensus was reached that the phrase “Do you go out...” represents social activity more than going out for a specific date.

A total of 274 (94.4%) patients filled in all questionnaires completely, except for 21 patients who were unable to comment on satisfaction with management. Fourteen (4.8%) patients had several missing values, and 2 (0.6%) underwent surgery between two sets of questionnaire and thus were excluded. The demographic and clinical characteristics of the included patients are presented in Table 1.

Patients were divided into nonsurgery (n=255, 93%) and previous spine surgery (n=19, 7%) groups, and the descriptive data and internal consistency of the Finnish SRS-30 are given in Table 2.

Symptoms remained stable in 57.7%, worsened in 23.7%, and improved in 18.6% of the patients between answering the 2 sets of SRS-30 questionnaires (Table 3). **Patients with stable symptoms had the best ICC and SEM values in all categories except satisfaction with management. Of all the domains, the SEM was lowest (0.17; 0.15-0.19) in the total SRS domain of patients with stable symptoms. Other ICC and SEM values of the domains are given in Table 3.**

The function, self-image, and mental health domains correlated moderately or strongly, but pain correlated weakly with RAND-36, ODI, DEPS, and VAS pain scales. The subtotal and total score

correlations were good with VAS pain scales but satisfaction with management had poor correlation to all instruments (Table 4). There was a statistically significant difference between moderate and marked deformity groups in the SRS-30 domains of function/activity (mean±SD: moderate, 2.80±0.71; marked, 2.56±0.63; p=0.022) and self-image/appearance (mean±SD: moderate, 2.82±0.65; marked, 2.58±0.61; p=0.016). The differences of SRS-30 domain means between diagnosis groups were insignificant (data not shown).

## DISCUSSION

The aim of this study was cross-cultural translation, adaptation, and psychometric testing of the Finnish version of deformity-specific SRS-30 questionnaire. The results of the study indicate that the development was successful and the expert committee managed to create an applicable questionnaire. Reproducibility and internal consistency proved to be good.

Translation and validation of SRS-30 has been published only in Brazilian Portuguese.<sup>19</sup> It was performed with a postoperative AIS cohort using a protocol different from ours. **The translators of the Finnish version were unanimous about the interpretations and followed established guidelines.**<sup>7,8</sup> The discussion of the expert committee was needed in only 2 questions, questions 11 and 18. The latter question appears slightly different in SRS-22 and helped in the cultural interpretation of the original question. The same question was debated by Danielsson and Romberg<sup>20</sup> while validating SRS-22r for Swedish AIS population as well as with Turkish,<sup>21</sup> Spanish,<sup>22</sup> and Chinese<sup>23</sup> versions. Culture and ethnicity are known to have an influence on SRS questionnaire outcomes in AIS patients and the same condition within a single culture may have different manifestations according to ethnicity especially in pain, activity, and appearance.<sup>24,25</sup> The population in our study represents typical characters of adult white Finnish patients with prolonged symptoms associated with degenerative spine conditions with sagittal disorder in radiographs.

The internal consistency was good in domains function, self-image, subtotal, and total scores, and it was excellent in mental health. The total score Cronbach $\alpha$  values were optimal in both no-surgery and previous surgery groups, since very high values may be an evidence of very homogeneous questions.<sup>26</sup> The

lesser internal consistency of satisfaction with management domain in the nonsurgery group may result from only 2 questions, whereas other domains have 5-6 questions per domain. **In addition, the surgery subgroup in our material had a higher internal consistency than that reported in previous adaptation studies, which may indicate the validity of the Finnish SRS-30 in measuring satisfaction with treatment when a recognizable intervention is done. In a Brazilian study,**<sup>19</sup> the Cronbach  $\alpha$  of domain means were 0.579-0.853, except in satisfaction with management, which was 0.288. Cheung *et al*<sup>23</sup> obtained a Cronbach  $\alpha$  of 0.53 in SRS-22r satisfaction with management domain, and Haidaret *al*<sup>28</sup> obtained 0.44 in heterogeneous preoperative and postoperative AIS materials. Our study population had a wider variety of diagnoses and preconsultation treatments, which may affect the internal consistency of that domain. Other authors<sup>20,22,27,28</sup> have reported high ceiling percentages in the pain domain of SRS-22, which was not observed in our study, although the patients had considerable level of pain.

The test-retest reproducibility in our material was good or excellent when patients' self-reported symptoms remained stable between questionnaires. When patients experienced change in their symptoms between questionnaires, the lower ICCs indicate that the change was detected during the short 2-week interval. Only satisfaction with management domain was less reproducible than other domains, which may be due to patients misinterpreting the first consultation without intervention as a treatment.

The SRS-30 mental health domain questions are adopted from the SF-36 mental health dimension, and very high reciprocal correlation was expected and achieved in our study. Function domain correlated strongly with ODI, which also measures the degree of disability. In the present material, the mean level of the SRS-30 domains and mean ODI were in line, both indicating severe disability. Moderate correlation in the pain domain may be due to different ways of inquiry on the duration of pain: ODI inquires about the present status; in this study, VAS inquires about pain during the previous week; SRS inquires about pain at 6 months, 1 month, and at rest; RAND-36 inquires about the intensity of the pain and the inconvenience it brings. Self-image is not asked in any other compared questionnaires, but it briefly includes the same areas as mental health questions, and in our study, a strong correlation was found between the self-image domain and DEPS.

Satisfaction with management is a domain missing from all other questionnaires, and thus, correlations were poor.

Compared with the SRS-30 domain means of the age-sex normative nonscoliotic population data published by Balduset *al*,<sup>29</sup> our cohort had significantly lower means in all domains, 4.1 to 4.6 vs 2.46 to 3.11. This suggests that the questionnaire can discriminate nondeformity population from symptomatic adults with sagittal spine disorders. Bess *et al*<sup>30</sup> stated that the disability of adult scoliosis patients cannot be solely predicted by radiographic findings. Our findings are parallel, since only 2 domains, function and self-image, were statistically significantly correlated with severity of deformity measured from radiographs. The SRS-30 domains did not correlate to diagnostic groups either. The limited capability of the domains to discriminate different etiologies of adult spine deformity and radiographic findings in our adult population seems to be related to the versatile nature of degenerative spine disorders.

The power of this study was that we controlled possible changes in self-perceived health status between the baseline and the follow-up examinations and analyzed the subgroups separately to demonstrate good reproducibility and capability to find change in patient's status. The limitation is that the previous surgery group was small and did not represent deformity surgery only, but all spine surgery. The predictive ability of the SRS-30 in the Finnish population has to be evaluated in further studies.

## **Conclusions**

Deformity-specific HRQoL instruments are essential for evaluating the outcome of adult deformity surgery. This study showed that the Finnish SRS-30 translation was reliable and valid. It has 2 domains related to deformity that are not covered by other generally used questionnaires. SRS-30 can be recommended for use among Finnish-speaking patients treated for pain and disability associated with adult spine deformities.

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TABLE 1 Demographic and Clinical Characteristics of 274 Patients

<b>Clinical characteristics</b>	<b>All patients (n=274)</b>
Female	163 (60)
Age (years)	61±13
BMI	27.9±4.7
Marriage or common law marriage	187 (68)
Smoking	61 (22)
Available for work	114 (42)
Education years	12±4
Diagnosis class:	
Nerve root compression	130 (47)
Degenerative spine diseases (without known deformity)	72 (26)
Spondylolisthesis	48 (18)
Scoliosis or kyphosis	19 (7)
Fracture	5 (2)
Duration of current spine symptoms (months)	24 (7, 72)
Pain VAS	
Back	60±28
Leg	55±31
Deformity grade*	
Marked	56 (20)
Moderate	218 (80)
Spinal operation(s) in history	19 (7)
RAND-36	
Physical functioning	38.8±23.2
Role functioning/physical	12.7±26.7
Role functioning/emotional	43.3±44.3
Energy/fatigue	48.0±23.4
Emotional well-being	65.7±22.3
Social functioning	55.9±28.5
Pain	28.1±18.4



General health	44.0±19.4
ODI	40.4±15.1
DEPS	9.6±6.4

Values are n (%), mean±SD, or median [IQR].

BMI indicates body mass index; IQR, interquartile range; VAS, Visual Analogue Scale; ODI indicates Oswestry Disability Index; DEPS, Depression Scale.

\*SRS Schwab deformity classification: moderate ≤3 positive modifier grades; marked >3 positive modifier grades.

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TABLE 2. Descriptive Data and Internal Consistency of the SRS-30 Finnish Version

Domains	n	Mean score (SD)	Range	Floor (%)*	Ceiling (%)†	Number of items‡	Cronbach's $\alpha$ (95% CI)
Non-surgery							
Function	255	2.77 (0.70)	1.00-4.60	0.4	0	5	0.726 (0.664-0.779)
Pain	255	2.46 (0.76)	1.00-5.00	1.6	0.4	5	0.635 (0.532-0.721)
Self-image	255	2.78 (0.65)	1.17-4.50	0	0	6	0.751 (0.700-0.796)
Mental health	255	3.44 (0.89)	1.00-5.00	0.8	2.0	5	0.919 (0.902-0.934)
Subscore	255	2.87 (0.59)	1.40-4.33	0	0	21	0.884 (0.853-0.910)
Satisfaction with management							
Satisfaction with management	234	3.11 (0.70)	1.50-5.00	0	0.4	2	0.413 (0.241-0.546)
Total SRS-30	234	2.89 (0.55)	1.61-4.26	0	0	23	0.885 (0.854-0.911)
Previous surgery							
Function	19	2.41 (0.68)	1.57-3.86	0	0	7	0.635 (0.303-0.843)
Pain	19	2.43 (0.70)	1.33-3.83	0	0	6	0.653 (0.123-0.910)

Self-image	19	2.57 (0.56)	1.56-3.44	0	0	9	0.679 (0.407-0.857)
Mental health	19	2.94 (0.79)	1.60-4.20	0	0	5	0.880 (0.768-0.948)
Subscore	19	2.57 (0.52)	1.69-3.44	0	0	27	0.845 (0.650-0.958)
Satisfaction with management	19	3.01 (0.82)	1.33-4.50	0	0	3	0.748 (0.447-0.898)
Total SRS-30	19	2.61 (0.53)	1.66-3.47	0	0	30	0.853 (0.670-0.960)

SRS-30 indicates Scoliosis Research Society 30; CI, confidence interval.

\*Best possible value of the item.

†Worst possible value of the item.

‡Number of questions included in each domain.

TABLE 3 Reproducibility of the SRS-30 Questionnaire and Self-Reported Change of Symptoms Within 2 Weeks' Interval.

<b>Domains</b>	<b>Patients self-reported change</b>	<b>First measurement mean (SD)</b>	<b>Change to measurement 2, mean (95% CI)</b>	<b>ICC (95% CI)</b>	<b>SEM (range)</b>
Function	All*	2.75 (0.70)	-0.02 (-0.07 to 0.03)	0.829 (0.788 to 0.863)	0.28 (0.26 to 0.31)
	Improved	2.93 (0.71)	0.12 (-0.02 to 0.26)	0.719 (0.555 to 0.829)	0.37 (0.31 to 0.46)
	Stable	2.79 (0.72)	-0.04 (-0.09 to 0.02)	0.871 (0.827 to 0.904)	0.25 (0.22 to 0.28)
	Worse	2.51 (0.59)	-0.08 (-0.18 to 0.02)	0.754 (0.627 to 0.843)	0.29 (0.24 to 0.35)
Pain	All	2.45 (0.75)	0.08 (0.01 to 0.14)	0.741 (0.681 to 0.790)	0.38 (0.35 to 0.42)
	Improved	2.52 (0.66)	0.27 (0.12 to 0.41)	0.636 (0.384 to 0.789)	0.42 (0.32 to 0.61)
	Stable	2.54 (0.78)	0.05 (-0.03 to 0.13)	0.759 (0.684 to 0.818)	0.38 (0.34 to 0.42)
	Worse	2.19 (0.68)	-0.01 (-0.13 to 0.12)	0.708 (0.561 to 0.811)	0.36 (0.31 to 0.43)
Self-image/appearance	All	2.77 (0.65)	0.00 (-0.05 to 0.05)	0.795 (0.749 to 0.834)	0.30 (0.28 to 0.33)
	Improved	2.90 (0.59)	0.19 (0.06 to 0.31)	0.722 (0.528 to 0.839)	0.34 (0.27 to 0.46)
	Stable	2.82 (0.65)	-0.02 (-0.07 to 0.04)	0.856 (0.808 to 0.893)	0.24 (0.22 to 0.27)
	Worse	2.54 (0.64)	-0.09 (-0.22 to 0.04)	0.653 (0.489 to 0.772)	0.38 (0.32 to 0.46)
Mental health	All	3.41 (0.89)	-0.10 (-0.19 to -0.01)	0.703 (0.637 to 0.758)	0.53 (0.49 to 0.58)
	Improved	3.61 (0.80)	0.18 (-0.20 to 0.56)	0.371 (0.110 to 0.632)	0.96 (0.80 to 1.19)

				0.585)	
	Stable	3.47 (0.89)	-0.12 (-0.19 to 0.04)	0.847 (0.790 to 0.888)	0.34 (0.30 to 0.39)
	Worse	3.09 (0.89)	-0.27 (-0.41 to -0.14)	0.764 (0.573 to 0.866)	0.43 (0.33 to 0.62)
Subscore	All	2.85 (0.59)	-0.01 (-0.05 to 0.03)	0.843 (0.805 to 0.874)	0.24 (0.22 to 0.26)
	Improved	2.99 (0.51)	0.19 (0.05 to 0.34)	0.611 (0.393 to 0.762)	0.38 (0.31 to 0.51)
	Stable	2.91 (0.61)	-0.03 (-0.07 to 0.01)	0.904 (0.871 to 0.929)	0.18 (0.17 to 0.21)
	Worse	2.59 (0.52)	-0.12 (-0.19 to -0.05)	0.832 (0.710 to 0.901)	0.21 (0.17 to 0.29)
Satisfaction with management	All	3.10 (0.71)	0.25 (0.16 to 0.35)	0.463 (0.338 to 0.568)	0.56 (0.48 to 0.67)
	Improved	3.23 (0.70)	0.49 (0.26 to 0.73)	0.314 (0.028 to 0.552)	0.66 (0.47 to 1.11)
	Stable	3.11 (0.65)	0.24 (0.13 to 0.35)	0.475 (0.322 to 0.601)	0.50 (0.43 to 0.62)
	Worse	2.98 (0.82)	0.11 (-0.11 to 0.33)	0.504 (0.289 to 0.670)	0.59 (0.50 to 0.72)
Total	All	2.87 (0.55)	0.00 (-0.03 to 0.04)	0.874 (0.842 to 0.901)	0.20 (0.18 to 0.22)
	Improved	3.01 (0.48)	0.19 (0.09 to 0.29)	0.726 (0.458 to 0.857)	0.27 (0.19 to 0.43)
	Stable	2.94 (0.57)	-0.02 (-0.06 to 0.02)	0.905 (0.870 to 0.930)	0.17 (0.15 to 0.19)
	Worse	2.60 (0.50)	-0.09 (-0.16 to -0.02)	0.840 (0.737 to 0.904)	0.20 (0.17 to 0.26)

\*All patients (n=274 patients; improved, n=51; stable, n=158; worse, n=65) filled in all domains within the subscore; 253 patients (improved, n=47; stable, n=146; worse, n=60) also answered the satisfaction with management domain and total score was applicable.

TABLE 4 Spearman's Correlation Coefficients (*r*) with 95% CI between SRS-30 Domains and RAND-36 Dimensions, ODI 2.0, DEPS Depression Scale, and VAS Scales for Back and Leg Pain.

	<b>Function</b>	<b>Pain</b>	<b>Self-image</b>	<b>Mental health</b>	<b>Subtotal</b>	<b>Satisfaction</b>	<b>Total</b>
Rand-36*							
Function	0.64 (0.56 to 0.71)	0.29 (0.16 to 0.40)	0.57 (0.49 to 0.65)	0.41 (0.31 to 0.51)	0.60 (0.50 to 0.68)	0.17 (0.05 to 0.29)	0.60 (0.51 to 0.68)
RoPhy	0.42 (0.30 to 0.52)	0.26 (0.13 to 0.37)	0.34 (0.23 to 0.44)	0.36 (0.25 to 0.45)	0.43 (0.32 to 0.52)	0.06 (-0.06 to 0.18)	0.40 (0.29 to 0.51)
RoEm	0.38 (0.27 to 0.49)	0.16 (0.04 to 0.27)	0.37 (0.28 to 0.47)	0.59 (0.51 to 0.67)	0.50 (0.41 to 0.59)	0.14 (0.02 to 0.26)	0.51 (0.41 to 0.60)
Energy	0.53 (0.44 to 0.62)	0.27 (0.16 to 0.38)	0.61 (0.53 to 0.68)	0.77 (0.70 to 0.82)	0.72 (0.66 to 0.77)	0.21 (0.08 to 0.32)	0.71 (0.64 to 0.76)
Mental	0.50 (0.41 to 0.59)	0.27 (0.15 to 0.39)	0.64 (0.55 to 0.71)	0.90 (0.86 to 0.92)	0.76 (0.71 to 0.81)	0.16 (0.02 to 0.28)	0.75 (0.69 to 0.80)
SocFunc	0.59 (0.50 to 0.67)	0.38 (0.26 to 0.48)	0.61 (0.52 to 0.68)	0.65 (0.57 to 0.72)	0.71 (0.64 to 0.77)	0.14 (0.02 to 0.25)	0.70 (0.63 to 0.76)
Pain	0.61 (0.52 to 0.68)	0.54 (0.44 to 0.62)	0.45 (0.35 to 0.54)	0.40 (0.29 to 0.50)	0.61 (0.53 to 0.69)	0.20 (0.07 to 0.32)	0.61 (0.52 to 0.69)

GeHealth	0.51 (0.41 to 0.59)	0.23 (0.12 to 0.34)	0.57 (0.48 to 0.65)	0.55 (0.46 to 0.62)	0.60 (0.52 to 0.67)	0.16 (0.04 to 0.28)	0.58 (0.50 to 0.66)
ODI 2.0	-0.69 (-0.75 to 0.62)	-0.47 (-0.56 to -0.37)	-0.57 (-0.64 to -0.49)	-0.43 (-0.54 to -0.33)	-0.67 (-0.74 to -0.59)	-0.17 (-0.30 to -0.05)	-0.66 (-0.73 to -0.58)
DEPS	-0.59 (-0.66 to 0.50)	-0.30 (-0.42 to -0.19)	-0.71 (-0.77 to -0.64)	-0.81 (-0.85 to -0.76)	-0.79 (-0.84 to -0.74)	-0.26 (-0.38 to -0.13)	-0.79 (-0.83 to -0.73)
VAS							
Back	-0.28 (-0.39 to -0.16)	-0.39 (-0.49 to -0.29)	-0.30 (-0.41 to -0.18)	-0.28 (-0.39 to -0.16)	-0.38 (-0.48 to -0.27)	-0.24 (-0.36 to -0.13)	-0.38 (-0.49 to -0.27)
Leg	-0.20 (-0.30 to -0.07)	-0.25 (-0.37 to -0.14)	-0.24 (-0.36 to -0.13)	-0.19 (-0.31 to -0.07)	-0.28 (-0.38 to -0.16)	-0.16 (-0.28 to -0.03)	-0.29 (-0.40 to -0.18)

\*Abbreviations of RAND-36 dimensions: Function indicates physical functioning; RoPhy, role limitations due to physical health; RoEm, role limitations due to emotional problems; Energy, energy/fatigue; Mental, emotional well-being; SocFunc, social functioning; GeHealth, general health.

95% CI indicates 95% confidence intervals; SRS-30, Scoliosis Research Society 30; ODI, Oswestry Disability Index; VAS, Visual Analogue Scale.

Level of correlation by Dawson *et al*<sup>18</sup> (*r* values ±): 0-0.25, absence of correlation; 0.25-0.50, poor; 0.50-0.75, moderate to good; 0.75-1.00, very good to excellent.

Supplemental Digital Content Legend:

SDC 1: SRS-30 Questionnaire Finnish version, PDF

ACCEPTED



# Scoliosis Research Society -kysely, versio 30 (SRS-30)

Muokattu 11/12/03, suomennos 12/2012

Potilaan nimi: \_\_\_\_\_ Ikä: \_\_\_\_\_

Henkilötunnus: \_\_\_\_\_ - \_\_\_\_\_ Päivämäärä: \_\_\_\_\_

Tutkimusajankohta/hoidon vaihe: \_\_\_\_\_ (tutkija täyttää)

Lääkäri arvioi selkänne tilannetta huolellisesti ennen hoitoa ja sen jälkeen. Olkaa hyvä ja ympyröikää jokaisesta kysymyksestä yksi parhaiten sopiva vastaus ellei toisin pyydetä. Jos Teidät on jo leikattu, täyttäkää osat 1 ja 2, muutoin vain osa 1.

Kaikki tulokset käsitellään luottamuksellisesti.

## Osa 1.

### 1. Mikä seuraavista kuvaa parhaiten viimeksi kuluneen 6 kuukauden aikana tuntemanne kivun voimakkuutta?

- Kivuton
- Lievää kipua
- Kohtalaista kipua
- Kohtalaista tai kovaa kipua
- Kovaa kipua

### 2. Mikä seuraavista kuvaa parhaiten viimeksi kuluneen kuukauden aikana tuntemanne kivun voimakkuutta?

- Ei kipua
- Lievää kipua
- Kohtalaista kipua
- Kohtalaista tai kovaa kipua
- Kovaa kipua

### 3. Oletteko ollut hyvin hermostunut viimeksi kuluneen 6 kuukauden aikana?

- En ollenkaan
- Pienen osan aikaa
- Jonkin aikaa
- Lähes koko ajan
- Koko ajan

### 4. Jos joutuisitte elämään loppuelämänne nykyisen selkätilanteenne kanssa, miltä se tuntuisi?

- Oikein hyvältä
- Melko hyvältä
- Ei hyvältä eikä pahalta
- Melko pahalta
- Erittäin pahalta

### 5. Miten aktiivinen olette nykyään?

- Vuoteessa/pyörätuolissa
- Pääasiassa ei aktiivista toimintaa
- Kevyttä työtä, kuten kotityötä
- Kohtalaista ruumiillista työtä ja liikuntaa, kuten kävelyä ja pyöräilyä
- Täysin toimintakykyinen ilman rajoituksia

### 6. Miltä näytätte vaatteet päällä?

- Oikein hyvältä
- Hyvältä
- Kohtalaiselta
- Huonolta
- Erittäin huonolta

### 7. Oletteko ollut viimeksi kuluneen 6 kuukauden aikana niin alakuloinen, että mikään ei pysty piristämään teitä?

- Hyvin usein
- Usein
- Joskus
- Harvoin
- En koskaan

### 8. Tunnetteko selässänne lepokipua?

- Hyvin usein
- Usein
- Joskus
- Harvoin
- Ei koskaan

### 9. Millainen on työ-/opiskelukykyenne?

- 100 % (normaali)
- 75 % normaalista
- 50 % normaalista
- 25 % normaalista
- 0 % normaalista

**10. Mikä seuraavista kuvaa parhaiten keskivartalonne ulkonäköä? Määritelmänä on ihmisen keho päätä ja raajoja lukuun ottamatta.**

- Erittäin hyvä
- Hyvä
- Kohtalainen
- Huono
- Erittäin huono

**11. Mikä seuraavista kuvaa parhaiten lääkkeiden käyttöä selkänne vuoksi?**

- Ei mitään
  - Perustason kipulääkettä (esim. ibuprofeeni tai parasetamoli) viikoittain tai harvemmin
  - Perustason kipulääkettä päivittäin
  - Vahvaa kolmiokipulääkettä (esim. oksikodoni, kodeiini, tramadoli) viikoittain tai harvemmin
  - Vahvaa kolmiokipulääkettä päivittäin
  - Jotain muuta (määrittele tarkemmin)
- Lääkitys:

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Käyttö: (viikoittain, harvemmin tai päivittäin)

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**12. Rajoittaako selkä kykyänne tehdä kotitöitä?**

- Ei koskaan
- Harvoin
- Joskus
- Usein
- Erittäin usein

**13. Oletteko tuntenut olonne tyyneksi ja rauhalliseksi viimeksi kuluneen 6 kuukauden aikana?**

- En ollenkaan
- Pienen osan aikaa
- Jonkin aikaa
- Lähes koko ajan
- Koko ajan

**14. Tuntuuko, että selän kunto rajoittaa henkilökohtaisia suhteitanne?**

- Ei lainkaan
- Hieman
- Jonkin verran
- Kohtalaisesti
- Paljon

**15. Aiheutuuko teille ja/tai perheellenne taloudellisia vaikeuksia selkänne vuoksi?**

- Paljon  Kohtalaisesti
- Jonkin verran
- Hieman
- Ei lainkaan

**16. Oletteko tuntenut itsenne lannistuneeksi ja alakuloiseksi viimeksi kuluneen 6 kuukauden aikana?**

- En koskaan
- Harvoin
- Joskus
- Usein
- Erittäin usein

**17. Oletteko viimeksi kuluneen 3 kuukauden aikana ollut sairauslomalla töistä tai poissa koulusta selkävivun vuoksi, ja jos olette, kuinka monta päivää?**

- 0
- 1
- 2
- 3
- 4 tai useampia

**18. Vietättekö sosiaalista elämää enemmän vai vähemmän kuin ystävänne?**

- Paljon enemmän
- Enemmän
- Saman verran
- Vähemmän
- Paljon vähemmän

**19. Tunnetteko itsenne viehättäväksi, kun selkänne on nykykunnossaan?**

- Kyllä, erittäin
- Kyllä, jossain määrin
- En viehättäväksi enkä epämiellyttäväksi
- En kovin paljon
- En lainkaan

**20. Oletteko ollut onnellinen viimeksi kuluneen 6 kuukauden aikana?**

- En koko aikana
- Pienen osan aikaa
- Jonkin aikaa
- Lähes koko ajan
- Koko ajan

**21. Oletteko tyytyväinen selkänne hoitotuloksiin?**

- Erittäin tyytyväinen
- Tyytyväinen
- En tyytyväinen enkä tyytymätön
- Tyytymätön
- Erittäin tyytymätön

**22. Tulisitteko samaan hoitoon uudestaan, jos olisitte samassa tilanteessa kuin ennen hoitoa?**

- Ehdottomasti kyllä
- Todennäköisesti kyllä
- En ole varma
- Todennäköisesti en
- Ehdottomasti en

**23. Millaiseksi arvioitte minäkuvanne asteikolla 1–9? (1 on hyvin matala ja 9 hyvin korkea arvo.)**

- 1  2  3  4  5  6  7  8  9

**Osa 2: Vain leikatuille potilaille**

**24. Miltä nykyinen ulkonäköne tuntuu verrattuna hoitoa edeltävään ulkonäköön?**

- Paljon paremmalta
- Paremmalta
- Samalta
- Huonommalta
- Paljon huonommalta

**25. Onko hoito muuttanut selkänne toimintaa tai päivittäisiä toimintojanne?**

- Parantanut
- Ei muutosta
- Huonontanut

**26. Onko selkänne hoito muuttanut kykyänne nauttia urheilusta tai harrastuksista?**

- Parantanut
- Ei muutosta
- Huonontanut

**27. Miten hoito on vaikuttanut selkäkipuunne?**

- Lisännyt kipua
- Ei muutosta
- Vähentänyt kipua

**28. Onko hoito muuttanut itsetuottamustanne henkilökohtaisissa suhteissa toisiin ihmisiin?**

- Lisännyt
- Ei ole muuttanut
- Heikentänyt

**29. Miten hoito on muuttanut muiden ihmisten käsitystä teistä?**

- Parantanut paljon
- Parantanut
- Ei ole muuttanut
- Huonontanut
- Huonontanut paljon

**30. Miten hoito on muuttanut minäkuvaanne?**

- Parantanut
- Ei ole muuttanut
- Huonontanut