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SRS-22R Minimum Clinically Important Difference and Substantial Clinical Benefit After Adult Lumbar Scoliosis Surgery

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Abstract

Study Design: Longitudinal cohort.
Objectives: To determine if the minimum clinically important difference (MCID) and substantial clinical benefit (SCB) thresholds for the Scoliosis Research Society–22R (SRS22R) domains in patients with degenerative lumbar scoliosis are similar to those in patients with adult spinal deformity (ASD) with fusions extending into the thoracic spine.
Summary of Background Data: The MCID and SCB thresholds for the SRS22R domains in patients with ASD and adolescent idiopathic scoliosis have been reported.
Methods: Patients enrolled in the NIH-sponsored Adult Symptomatic Lumbar Scoliosis (ASLS) trial who underwent surgery and completed the SRS22R preoperative and the SRS30 one-year postoperative were identified. One-year postoperative answers to the last eight questions of the SRS30 were used as anchors to determine the MCID and SCB for the Pain, Appearance, and Activity domains, and the Subscore and Total score using receiver operating characteristic (ROC) curve analysis.

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Results: The sample population consisted of 147 patients. A total of 132 (89%) were females with a mean age of 59.4 years. There was a statistically significant improvement in all SRS22R scores from preoperative to one-year postoperative. There was also a statistically significant difference in domain scores among the different responses to the anchors. According to the ROC analysis, MCID was 1.17 for Appearance, 0.40 for Activity, 0.60 for Pain, 0.53 for Subscore, and 0.77 for Total; and SCB was 1.67 for Appearance, 0.60 for Activity, 0.62 for Subscore, and 1.11 for Total score. These are similar to previous reports of MCID and SCB thresholds for ASD patients who underwent fusion to the thoracic spine.

Conclusion: The MCID and SCB thresholds for the SRS22R domains in patients with adult symptomatic lumbar scoliosis are very similar to the threshold values previously reported for adult deformity patients.

Level of Evidence: Level II.

Keywords: Adult lumbar spine deformity; SRS-22R; Minimum clinically important difference

Introduction

Although the Scoliosis Research Society–22R instrument (SRS-22R) [1] was initially designed as a disease-specific instrument to measure health-related quality of life (HRQOL) in patients with adolescent idiopathic scoliosis [1-4], its use has been extended to patients with adult spinal deformity. Studies have shown that it is reliable, valid, and responsive to change in patients with adult spinal deformity (ASD) [5-7]. However, patients with ASD are a heterogenous group and may present with varying degrees and types of curvatures.

Most spine surgeons consider patients with lumbar degenerative scoliosis (LDS) as a unique subgroup as these patients include those with asymmetric disc collapse, facet arthritis, and stenosis. Surgical planning for LDS patients usually involves decompression with or without fusion that does not extend into the thoracic spine and may not require complex maneuvers to correct the deformity.

The minimum clinically important difference (MCID) [8,9] and substantial clinical benefit (SCB) [10] thresholds for the SRS22R domains in patients with ASD who underwent surgical fusion extending into the thoracic spine have been reported [11,12]. It is unknown if the same thresholds hold true for patients with primarily degenerative lumbar scoliosis. The purpose of the current study is to determine if these thresholds reported for adult spinal deformity applies to patients with LDS.

Methods

Deidentified data from subjects enrolled in a National Institutes of Health–sponsored trial for adult symptomatic lumbar scoliosis who underwent surgery and completed the SRS22R preoperatively and the SRS30 one year postoperatively were identified. One-year postoperative answers to the last 8 questions of the SRS-30 (Table 1) were used as anchors for the Appearance (Items 23, 24, 28, 29, and 30), Activity (Items 25 and 26), and Pain (Item 27) domains as well as the Total score (Items 23 to 30). Responses to the items that comprise the Satisfaction domain (Items 21 and 22) were used as anchors for the Subscore.

Answers to Questions 23, 24, 28, 29, and 30 were summed to produce an Appearance Anchor score, with a range of scores from 5 to 25. The Appearance Anchor scores were then classified as 1-5 "much worse," 6-10 "worse," 11-15 "unchanged," 16-20 "better," and 21-25 "much better." Answers to questions 25 and 26 were summed as the Activity Anchor score, with a range of scores from 2 to 6. These scores were then classified as 2 "decreased," 3-4 "same," 5 "increased," and 6 "much increased." Question 27 was used as the Pain Anchor with three possible responses: 1 "increased," 2 "same," and 3 "decreased."

Responses to the items that comprise Satisfaction (Items 21 and 22) were used as anchors for the Subscore. The Subscore is the average score from Items 1 to 20, that is, all items minus the items for Satisfaction. Responses were classified as 1-4 "unsatisfied," 5-10 "neither satisfied or unsatisfied," 11-13 "satisfied," and 14-15 "very satisfied." Responses for all the eight additional items of the SRS-30 were used as the anchor for Total Score: 1-10 "not improved," 11-25 "neither improved or not improved," 26-29 "improved," and 30-34 "much improved."

One-way analysis of variance with Bonferroni post hoc tests were used to compare change in domain scores between groups classified according to responses to the anchor question.

The receiver operating characteristic (ROC) curve–derived MCID for Appearance is the change score with equal sensitivity and specificity to distinguish the unchanged from the better patients; for Activity, it is the change score with equal sensitivity and specificity to distinguish same and increased patients; for Pain, it is the change score with equal sensitivity and specificity to distinguish same and decreased patients; for Subscore, it is the change score with equal sensitivity and specificity to distinguish between neither satisfied or unsatisfied and satisfied patients; for Total, it is the change score with equal sensitivity and specificity to distinguish between neither improved or not improved and improved patients.

The ROC curve–derived SCB for Appearance is the change score with optimal sensitivity and specificity to distinguish the better from the much better patients, for Activity, it is the change score with optimal sensitivity and