

Clinical Study

# The benefit of nonoperative treatment for adult spinal deformity: identifying predictors for reaching a minimal clinically important difference

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## Abstract

**BACKGROUND CONTEXT:** Adult spinal deformity (ASD) patients may gain minimal clinically important difference (MCID) in one or more of the health-related quality-of-life instruments without surgical intervention. The present study identifies the baseline characteristics of this subset of nonoperative patients and proposes predictors of those most likely to benefit.

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**PURPOSE:** The study aims to determine the factors that affect likelihood of nonoperative patients to reach MCID.

**STUDY DESIGN/SETTING:** This is a retrospective review of a prospective, multicenter database.

**PATIENT SAMPLE:** The study includes nonoperative ASD patients.

**OUTCOME MEASURES:** Health-related quality-of-life measures, including the Scoliosis Research Society (SRS)-22 questionnaire, were used.

**METHODS:** The study used a multicenter database of 215 nonoperative patients with ASD and with minimum 2-year follow-up. Using a multivariate analysis, two groups were compared to identify possible predictors: those who reached MCID in the SRS pain or activity (N=86) at 2 years and those who did not reach MCID (N=129). A subgroup multivariate analysis of patients with a deficit (potential improvement) in both SRS pain and activity (N=84) was performed. Data collection was supported by a grant from DePuy for the International Spine Study Group Foundation.

**RESULTS:** At baseline, the nonoperative patients who reached MCID had a significantly lower SRS pain score (3.0 vs. 3.6), smaller thoracolumbar Cobb (TL Cobb) angle (29.6° vs. 36.5°; 87 patients with SRS-Schwab classification of lumbar or double), lower sacral slope (33.1° vs. 36.4°), and less lumbar lordosis (46.5° vs. 52.8°) (all  $p < .05$ ). The SRS pain and TL Cobb were significant predictors for reaching MCID. The pelvic incidence minus lumbar lordosis (PI-LL) was significant on univariate analysis but not on multivariate analysis (7.5° vs. 2.6°;  $p = .14$ ). In the subset of severely disabled patients, worse vertebral obliquity was a predictor for not achieving MCID ( $p < .05$ ).

**CONCLUSIONS:** Nonoperative ASD patients who achieved MCID in SRS activity or pain had a lower baseline SRS pain score and less coronal deformity in the TL region. Greater baseline pain offers significant room for potential improvement, which may be important in identifying ASD patients who have the potential to reach MCID nonoperatively. Coronal deformities in the TL region and associated vertebral obliquity may negatively impact potential for improvement in nonoperative care. © 2015 Elsevier Inc. All rights reserved.

*Keywords:*

Health-related quality of life; HRQOL; Nonoperative; Outcomes; Spinal deformity; Treatment

## Introduction

Spinal deformity in the skeletally mature patient, with an incidence of up to 32% in adults and 60% in the elderly, is becoming a more commonly recognized condition among spine surgeons and general healthcare providers [1–4]. Physicians across all specialties are increasingly recognizing the impact of adult spinal deformity (ASD) on patients and on the health-care system [5]. The healthcare costs for treating spinal deformity are rising [5]. Although large gains have been made in the evolution of surgical treatment, nonoperative management in certain patients is prudent and necessary in everyday practice. The economic issues of delivering care involve a balance between surgery with evident clinical improvement and nonoperative management, which may be effective for some patients.

The treatment of ASD can be assessed quantitatively and tracked over time using validated patient-reported outcomes, such as the Scoliosis Research Society questionnaire (SRS-22r), the Oswestry Disability Index (ODI), and the Short Form-36 (SF-36) questionnaire [3,5–10]. Since the incorporation of these health-related quality-of-life (HRQOL) measures into medical practice and research, multiple reports have shown the significant impact of surgical intervention for ASD [11–16].

With the inception of HRQOL arose the concern that improvements in these scores do not necessarily translate into a clinically discernible difference that is of significance to the patient. Hence, the concept of a minimal clinically important difference (MCID) has been introduced in the spine literature to quantify the absolute minimum change that can be considered a success [17–19]. Many studies have demonstrated a clear advantage in gaining MCID after surgical treatment for spinal pathologies, such as spondylo-lysthes, disc pathology, spinal stenosis, and ASD, with comparatively poor improvement with nonoperative care [17,20–23].

Although surgical treatment can improve both pain and disability [11–13,24,25], there are risks involved [26,27]. Thus, it is important to thoroughly assess all treatment options, including nonoperative care, which has not been as well studied in the literature. Often, nonoperative patients are grouped together in cohort analyses, but it is possible that nonoperative management may actually offer acceptable quality-of-life maintenance or improvements for a certain subset of patients [23,28]. A recent study on 464 patients with ASD found that a subgroup of nonoperatively treated patients actually improved in MCID: Up to 52% (N=117) reached MCID in at least 1 HRQOL, with 20% reaching MCID in SRS activity and 24% reaching MCID in SRS pain [28].

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