Table 1. Impact of Nonoperative vs Operative Treatment on Outcomes

Outcome	Treatment Group (Unmatched)		*P* Value (Operative vs Nonoperative)
	Nonoperative (n = 223)	Operative (n = 246)	
ODI			
Baseline	22.9 (16.0)	41.5 (19.9)	< .001
Minimum 2-y follow-up	23.4 (17.9)	26.1 (20.6)	.134
P value (baseline vs 2-y)	.538	< .001	
SF-36 PCS			
Baseline	43.2 (10.0)	33.3 (10.3)	< .001
Minimum 2-y follow-up	42.6 (11.4)	41.4 (11.6)	.249
P value (baseline vs 2-y)	.620	< .001	
SRS-22 total score			
Baseline	3.6 (0.6)	2.8 (0.7)	< .001
Minimum 2-y follow-up	3.6 (0.7)	3.7 (0.8)	.218
P value (baseline vs 2-y)	.064	< .001	
NRS back pain score			
Baseline	4.4 (2.7)	7.1 (2.3)	< .001
Minimum 2-y follow-up	4.4 (3.0)	3.5 (3.1)	.001
P value (baseline vs 2-y)	.899	< .001	
NRS leg pain score			
Baseline	2.5 (2.9)	4.2 (3.3)	< .001
Minimum 2-y follow-up	2.7 (3.0)	2.5 (3.0)	.477
P value (baseline vs 2-y)	.261	< .001	

Data are presented as means (SD), unless otherwise indicated.

NRS, numeric rating scale; ODI, Oswestry Disability Index; PCS, physical component score; SF-36, Short Form-36 Health Survey; SRS-22, Scoliosis Research Society Questionnaire 22.

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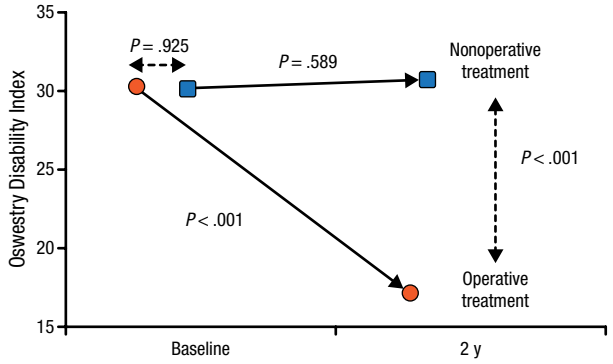
rating scale (NRS) back pain score ($P < .001$), and NRS leg pain score ($P < .001$), whereas the nonoperative group (n = 223) had no significant improvements from baseline in these measures (Table 1). The operative group had significantly improved mean back pain score compared with the nonoperative group ($P = .001$).

A total of 97 matched operative-nonoperative pairs were identified based on propensity scores. The only parameter that was significantly different between the operative and nonoperative pairs was mean age (51.4 vs 58.0; $P = .003$). Among the matched pairs, the operative group had significant improvements from baseline and vs the nonoperative group in ODI score ($P < .001$ both comparisons; Figure 1), SRS-22 total score ($P < .001$ both comparisons), SF-36 PCS ($P < .001$ both comparisons), back pain score ($P < .001$ both comparisons), and leg pain score ($P < .001$ both comparisons). The nonoperative group lacked significant improvements from baseline in any of the measures, except for the SRS-22 ($P = .021$).

Figure 1. Operative vs Nonoperative Treatment: Impact on Disability



Data are presented for 97 propensity-matched operative-nonoperative pairs. *P* values were calculated with the paired *t* test.

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Patients electing nonoperative treatment tend to have less deformity and less pain and disability than patients choosing to undergo surgery. Surgical treatment for ASD can provide significant improvements in HRQOL at a minimum 2-year follow-up. Nonoperative treatment appears to maintain presenting levels of pain and disability.

Cervical Sagittal Measurements Strongly Correlated Between Full-Length and C-Spine Radiographs

Written by Toni Rizzo

The effect of spinal deformity on cervical spine (C-spine) alignment has been a topic of recent interest. Several authors have proposed standardized radiographic sagittal alignment parameters for the C-spine. These papers recommend the use of full-length 36-inch spine radiographs. However, full-length spine radiographs often produce poor images of the cervical region, making evaluation difficult. Routine use of full-length spine radiographs also increases cost and patient exposure to radiation. Casey L. Smith,

MD, Grand Rapids Medical Education Partners, Grand Rapids, Michigan, USA, presented the Correlation of Cervical Sagittal Alignment Parameters on Full-Length Spine Radiographs Compared with Dedicated Cervical Radiographs study [Smith CL et al. *Spine*. 2014].

In this retrospective cross-sectional study from a single tertiary spine practice, a billing database was used to identify patients who had both dedicated C- and full-length spine radiographs within a period of 4 months. Sets of radiographs from single patients were measured by one reviewer. Each radiograph set consisted of a dedicated lateral C-spine radiograph and a lateral full-length spine radiograph. Radiograph sets were excluded if the sagittal parameters on 1 or both images could not be accurately measured.

The outcome measures were the following sagittal parameters: C0-C2, C0-C1, C0-C7, C1-C2, and C2-C7 Cobb angles; C1-C7, C2-C7, and CGH-C7 sagittal vertical axis (SVA) differences; T1 tilt; and chin-brow vertical angle. Paired *t* tests and correlation analyses were performed for the corresponding paired radiographs from each patient. A marked correlation was defined as correlation coefficients between 0.60 and 0.80. A robust correlation was defined as correlation coefficients between 0.8 and 1.0.

Radiograph sets were collected from 40 patients. There were 33 women and 7 men. The mean patient age was 48.9 ± 14.5 years. All of the cervical sagittal alignment parameters measured were significantly correlated between the full-length and dedicated C-spine radiographs ($P < .001$). The sagittal Cobb angle correlation coefficients ranged from 0.62 to 0.81. The SVA difference correlation coefficients ranged from 0.42 to 0.65. Paired *t* tests showed that only the C0-C7 angle and T1 tilt angles were significantly different between the full-length and C-spine radiographs ($P = .000$, both).

There were no statistically significant differences between the full-length and C-spine radiographs in C1-C7 SVA and CGH-C7 SVA. The full-length and C-spine radiograph measurement differences were statistically significant for the C2-C7 SVA ($P = .049$).

The results of this study are limited by the small sample size. Although >100 pairs of radiographs were identified, many were excluded due to poor C-spine visualization on the full-length spine radiograph.

Strong correlations were observed between most cervical sagittal measurements taken from dedicated C-spine radiographs and full-length spine radiographs. Most of the measurements were similar between the pairs of radiographs. Dr Smith concluded that a 36-inch full-length spine radiograph may not be necessary for evaluation of C-spine sagittal alignment when a C-spine radiograph has already been obtained.

Intrawound Vancomycin May Influence Postsurgical Bone Fusion

Written by Phil Vinall

Deep surgical site infection rates up to 15% have been reported after multilevel spinal surgery [Caroom C et al. *Spine (Phila Pa 1976)*. 2013]. Furthermore, there is an increasing incidence of cephalosporin-resistant bacterial strains [Sweet FA et al. *Spine (Phila Pa 1976)*. 2011]. Interest in intrawound vancomycin powder has grown, with early data suggesting decreased infection rates [Pahys JM et al. *J Bone Joint Surg Am*. 2013]. In a prior study, however, drainage from wounds treated with vancomycin was found to contain levels of vancomycin high enough to cause toxic effects in the surrounding tissue [Sweet F et al. *Spine J*. 2009]. Thus, further research is needed in order to determine the vancomycin dose for intrawound application that optimizes bactericidal effects while minimizing detrimental effects on bone healing.

Michael Ogon, MD, PhD, Orthopaedic Hospital Speising, Wien, Austria, reported data from an in vitro study entitled Does Intrawound Application of Vancomycin Influence Bone Regeneration in Spinal Fusion? [Eder C et al. *Spine*. 2014], indicating that locally applied vancomycin interferes with migration, proliferation, and differentiation of human osteoblasts (particularly at doses of 6 and 12 mg/cm^2) and thus may influence bone fusion after spinal surgery.

The protocol for this study was based on a phase 1 US Dose Escalation Trial of Intrasite Vancomycin Pharmacokinetics study [NCT01764750], which was designed to develop rules for standardizing application and dosing, define peak/trough concentrations and clearance parameters, verify bactericidal potency, and select a dose for use in future studies. The study is not yet open for recruitment but expects to enroll 40 adult patients who are undergoing posterior instrumented spinal surgery with an instrumented fusion of ≥3 vertebral levels. The primary outcome measures were wound and seroma vancomycin concentrations.

The objectives of this study [Eder C et al. *Spine*. 2014] were to assess the effect of vancomycin on changes in local pH, cell migration, proliferation, viability, and morphological changes. Prof Ogon presented data based on an analysis of bone samples from 10 patients (5 men and 5 women; mean age 57 years; 2 smokers). Cells were cultured in Dulbecco's modified Eagle's medium plus 10% fetal calf serum plus 2 mM L-glutamine plus 0.05 ascorbic acid plus gentamycin 50 µg/ml plus vancomycin 3, 6, or 12 mg/cm^2 or no vancomycin.