



Change in Classification Grade by the Schwab-SRS Adult Spinal Deformity (ASD) Classification Predicts Impact on Health Related Quality of Life (HRQOL) Measures: Prospective Analysis of Operative and Nonoperative Treatment



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Introduction:

SRS-Schwab classification (Fig. 1) is a validated system to classify Adult Spinal Deformity (ASD). We hypothesize that change in sagittal modifier will impact changes in HRQOL measures from baseline to 1 year follow-up for operatively (OP) and nonoperatively (NONOP) treated patients.

Figure 1: SRS-Schwab classification

Coronal Curve Types

T: Thoracic only with lumbar curve < 30°

L: TL / Lumbar only with thoracic curve < 30°

D: Double Curve with T and L curves > 30°

N: No Major Coronal Deformity all coronal curves < 30°

Sagittal Modifiers

PI minus LL
0 : within 10°
+ : moderate 10-20°
++ : marked >20°

Global Alignment
0 : SVA < 4cm
+ : SVA 4 to 9.5cm
++ : SVA > 9.5cm

Pelvic Tilt
0 : PT<20°
+ : PT 20-30°
++ : PT>30°

Methods:

Multicenter, prospective, consecutive case series of ASD OP/NONOP patients. Inclusion criteria: ASD, age>18, baseline and 1 year x-rays and HRQOL measures (ODI, SRS-22 and SF-36). Changes in sagittal modifiers (Radiographic improvement /deterioration) at 1 year were assessed for impact on HRQOL from pre-treatment values.

Results SVA (Tables 1-2):

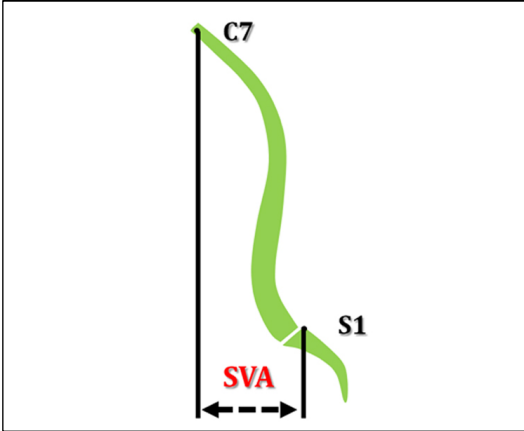
For **SVA**, radiographically improved patients had greater clinical improvement compared to deteriorated patients for most HRQOL scores. Relationships were noticed between a radiographical improvement/deterioration of the SVA and a clinical improvement/ deterioration (MCID).

Table 1: Sagittal Vertical Axis (SVA)

OP and NONOP	Radiographic Improvement		Radiographic Deterioration		t-test
	Mean	SD	Mean	SD	
ODI	-14.50	13.30	-5.00	23.53	0.039
PCS	9.06	10.61	-0.08	12.84	0.005
MCS	6.18	12.58	4.04	16.87	0.585
SRS Activity	0.89	0.82	0.21	1.11	0.006
SRS Pain	1.20	0.64	0.11	1.21	>0.001
SRS Appearance	0.98	0.85	0.29	1.20	0.009
SRS Mental	0.33	0.70	0.03	0.89	0.151
SRS Satis	0.77	1.05	0.22	1.38	0.077
SRS Total	0.84	0.64	0.17	1.03	0.002

Table 2: relationship HRQOL scores/SVA

Chi-square	ODI	PCS	SRS Act.	SRS Pain	SRS Appear.	SRS Mental
SVA	0.004	0.000	0.000	0.001	0.005	0.030



Results PI-LL (Tables 3-4):

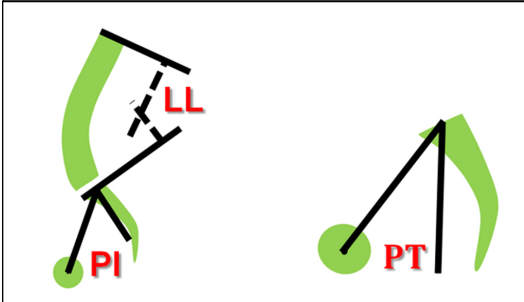
For **PI-LL**, significant clinical differences were noted between radiographically improved and deteriorated patients for most of the HRQOL scores. Only relationships between a radiographical improvement/ deterioration of the PI-LL and a clinical improvement/deterioration for the SRS Pain and Appearance were observed.

Table 3: Pelvic Incidence - Lumbar Lordosis (PI-LL)

OP and NONOP	Radiographic Improvement		Radiographic Deterioration		t-test
	Mean	SD	Mean	SD	
ODI	-14.91	17.25	-0.65	18.37	0.008
PCS	7.36	12.97	-4.04	11.86	0.005
MCS	8.58	12.54	5.26	17.65	0.463
SRS Activity	0.92	0.90	0.09	0.99	0.004
SRS Pain	1.18	0.96	0.22	1.26	0.004
SRS Appearance	1.18	1.13	0.10	1.02	0.002
SRS Mental	0.47	0.92	0.07	0.89	0.133
SRS Satis	0.97	1.15	-0.11	1.37	0.004
SRS Total	0.94	0.86	0.07	0.92	0.001

Table 4: relationship HRQOL scores/PI-LL

Chi-square	ODI	PCS	SRS Act.	SRS Pain	SRS Appear.	SRS Mental
VP	0.064	0.095	0.113	0.007	0.015	0.113



Results PT (Tables 5-6):

No significant clinical difference between radiographically improved and deteriorated patients was observed in terms of **PT**, and no relationship between a radiographical improvement/ deterioration of the PT and a clinical improvement or deterioration.

Table 5: Pelvic Tilt (PT)

OP and NONOP	Radiographic Improvement		Radiographic Deterioration		t-test
	Mean	SD	Mean	SD	
ODI	-12.01	19.99	-6.13	19.90	0.245
PCS	5.92	14.99	3.43	11.52	0.500
MCS	4.96	12.08	6.46	13.57	0.669
SRS Activity	0.76	0.76	0.42	0.93	0.115
SRS Pain	1.03	1.15	0.82	0.89	0.429
SRS Appearance	1.04	1.05	0.62	0.96	0.110
SRS Mental	0.32	0.74	0.39	0.78	0.716
SRS Satis	0.81	1.39	0.55	0.98	0.406
SRS Total	0.79	0.87	0.56	0.73	0.263

Table 6: relationship HRQOL scores/PT

Chi-square	ODI	PCS	SRS Act.	SRS Pain	SRS Appear.	SRS Mental
PT	0.449	0.449	0.071	0.176	0.124	0.895

Conclusion: The Schwab-SRS classification of ASD provides a validated language and has association with HRQOL measures. This study demonstrates that change in modifiers is correlated with changes in patient reported outcomes.