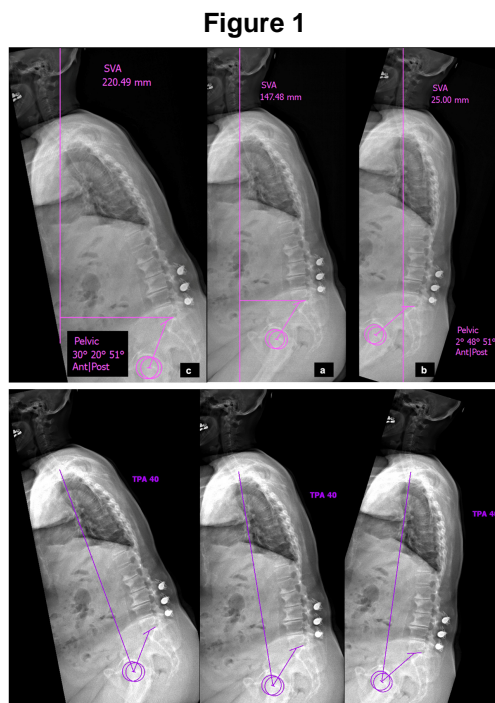


## Introduction

Sagittal Vertical Axis (SVA) and Pelvic Tilt (PT) have been shown to correlate directly with Health Related Quality of Life (HRQOL) in adult spinal deformity (ASD). This study investigates the relationship of the T1 Pelvic Angle (TPA), a novel radiographic parameter of global sagittal deformity, and other established measures, correlating them with HRQOL. TPA accounts for both truncal inclination and pelvic retroversion, and it can be measured on a prone intraoperative long-cassette radiograph to gauge global correction, a function which is not possible with SVA or PT. Since the TPA is an angular and not a linear measure, it does not require calibration of the radiograph and is independent of postural compensatory mechanisms (see Figure 1).



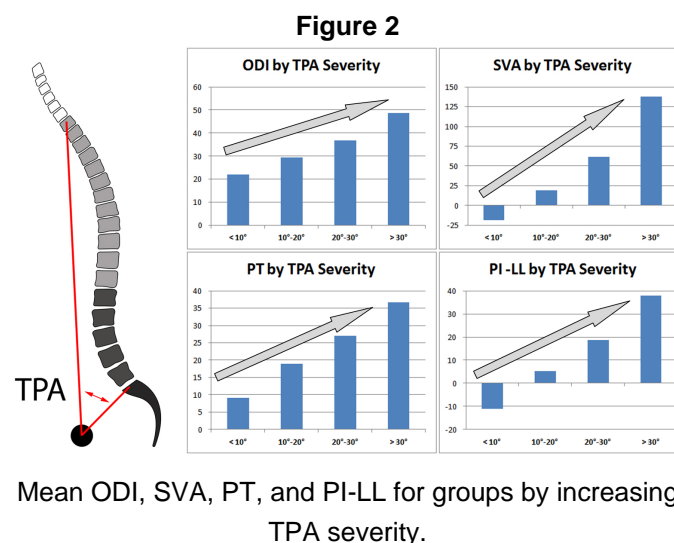
Variability of SVA vs consistency of TPA for one patient with different degrees of pelvic retroversion.

## Methods

Multicenter, prospective, analysis of consecutive ASD patients. Inclusion criteria: ASD, age>18, and any of the following: scoliosis Cobb angle >20 deg, SVA>5 cm, thoracic kyphosis>60 deg, and PT greater than 25 deg. Clinical measures of disability included ODI, SRS and SF36.

## Results

559 ASD patients (mean age 52.5) were enrolled. TPA correlated most strongly with SVA ( $r=0.837$ ) and PI-LL ( $r=0.889$ ) and PT (0.933). Categorizing the patients by increasing TPA (<10; 10-20; 20-30; >30) revealed a significant and progressive worsening in HRQOL (all  $p<0.001$ , see Figure 3). TPA and SVA correlated strongly with ODI (0.435, 0.457), SF36 PCS (-0.440, -0.465) SRS (-0.304, -0.360) (see Figure 2). Utilizing a linear regression analysis, the threshold for TPA of 19.8 was found to correspond to a severe disability (ODI>40). The meaningful change in TPA was 4.1, correlating it to an ODI change of 15 (see Figure 4).



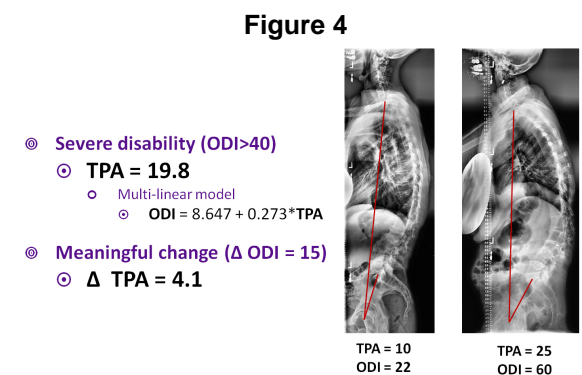
### Figure 3

	ODI	SF-36 Physical	SF-36 Mental	SRS Activity	SRS Pain	SRS App.	SRS Mental	SRS Total
TPA	0.435	-0.445	-0.144	-0.400	-0.355	-0.319	-0.171	-0.358
SVA	0.455	-0.458	-0.172	-0.407	-0.338	-0.362	-0.201	-0.383
PT	0.353	-0.368	-0.095	-0.329	-0.296	-0.248	-0.121	-0.284
PI - LL	0.424	-0.445	-0.152	-0.401	-0.359	-0.292	-0.178	-0.354
TIPTI	0.379	-0.372	-0.175	-0.338	-0.294	-0.301	-0.188	-0.325

Correlations between radiological parameters and HRQOL scores. All are statistically significant at  $p < 0.01$ .

## Conclusions

The TPA correlates strongly with HRQOL in patients with ASD . The TPA is related to both PT and SVA, but unlike SVA, it measures sagittal deformity independent of many postural compensatory mechanisms. It can be used as an intraoperative tool to measure global correction with a target TPA of less than 20.



TPA threshold corresponding to a severe disability (ie ODI > 40) was found to be 20° (ODI > 40); the PTA threshold corresponding to one MCID (i.e. ODI > 15) was found to be 4.1.

## References

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