Title	Do contiguous multilevel pedicle screws offer added curve correction over alternate level screw strategy in AIS patients when curve flexibility is taken into account?
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Citation	The 17th International Meeting on Advanced Spine Techniques (IMAST 2010), Toronto, Canada, 21-24 July 2010.
Issued Date	2010
URL	http://hdl.handle.net/10722/142883
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Paper Abstracts

96. Factors Predicting Coronal Decompensation of Lenke 1 Curves Following Selective Fusion

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Summary: Relatively high rates of early frontal decompensation may be improved by careful attention to preoperative socioclinical and radiographic characteristics.

Introduction: Selective fusion of main thoracic curves (Lenke I) can lead to coronal decompensation. This study examines factors which may predict decompensation, including the relationship between the lowest instrumented vertebral level and lowest end vertebral level (LIV-LEV).

Methods: Review of a prospective multicenter database revealed 460 AIS patients who have been treated with primary selective posterior spinal fusion for Lenke Type 1 curves. Patients with coronal decompensation (defined as trunk shift > 2cm away from CSVL) 2 years following surgery were compared to those without such imbalance. The LIV-LEV relationship was compared between groups, with a negative number implying an LIV proximal to the LEV of the main thoracic curve.

Results: Rates of coronal decompensation 2 years postoperatively were as follows: Type A (19/250, 7.60%), Type B (5/73, 6.85%), Type C (16/137, 11.68%). No significant differences in age, sex, total levels fused, or LIV level were noted between those decompensated and those not decompensated for all curve types. The relationship between LIV and LEV did not correlate with decompensation for 1A (p=.2), 1B (p=.6) or 1C (p=.3) curves. 1B curves with coronal decompensation were found to have a significantly higher curve correction (74.5% vs. 58.5%, p=.02). 1C curves with coronal decompensation were found to have significantly higher BMI (24.8 vs. 21.3, p=.01) and preoperative curve size (64.8° vs. 55.4°, p=.005).

Conclusion: The relationship between LIV and LEV was not associated with rates of curve decompensation for any curve type. In 1B curves, overcorrection may lead to increased rates of decompensation. In 1C curves, larger curves and higher BMI correlated strongly with decompensation.

Significance: In 1B curves, care must be taken not to overcorrect the main thoracic curve. In 1C curves, consideration should be given to either nonselective fusion or earlier intervention before curve magnitude increases, especially in patients with higher BMI.

97. Do Contiguous Multilevel Pedicle Screws Offer Added Curve Correction over Alternate Level Screw Strategy in AIS Patients when Curve Flexibility is Taken into Account?

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Summary: This study assessed the radiographic and cost analysis of contiguous multilevel pedicle screws to alternate level pedicle screw strategy (ALSS) in the context of the fulcrum bending correction index (FBCI) in AIS patients treated with titanium instrumentation. The study noted similar FBCIs between strategy-types, but significant cost reductions associated with ALSS.

Introduction: With the use of each pedicle screw in AIS surgery, there is an increase in instrumentation-related costs, operative time, risk of complications and health-care expenses. As such, alternate level screw strategy (ALSS) is an alternative to contiguous multilevel screw strategy (CMSS). Moreover, studies have demonstrated the importance in accounting for the flexibility of the curve based on the fulcrum bending radiograph when assessing postoperative curve correction. Therefore, being cognizant of curve flexibility, the following study addressed a radiographic and cost analysis comparing CMSS to ALSS for the treatment of thoracic AIS with titanium instrumentation.

Methods: Seventy-seven AIS patients underwent surgery (range: 6-15 levels). Thirty-five patients received CMSS, characterized as bilateral screw fixation at every level. Forty-two patients underwent ALSS, which entailed bilateral screw fixation at alternate levels. Titanium rods were utilized in all cases. Pre- and postoperative postero-anterior and fulcrum bending radiographic Cobb angles were obtained of all patients. The fulcrum flexibility and the fulcrum bending correction index (FBCI) were assessed. Cost analysis was also performed.

Results: There was a statistically significant difference between screw strategy-type to that of pre- and postoperative Cobb angles, and postoperative curve correction ($p<0.05$). No statistically significant difference was noted between screw strategy-type and fulcrum flexibility (CMSS mean, 66.9%; ALSS mean, 62.7%; $p>0.05$). The mean FBCIs of the CMSS and ALSS were 126.1% and 122.1%, respectively, and did not statistically differ (p=0.734). In comparison to the CMSS, the ALSS was associated with pedicle screw cost reductions of up to 46.2%.

Conclusion: This study is the first to illustrate that regardless of curve rigidity, ALSS utilizing less pedicle screws can achieve comparable FBCI as CMSS. We attribute this to the relatively flexible titanium rods used in this study. Thus in this context, ALSS is as effective as CMSS in terms of coronal curve correction, it has the added benefits of reducing operative time and neurological complication risk, as well as the possiblity of better kyphosis restoration compared to the lordosing effect of CMSS.

98. Sagittal Plane Changes According to the Thoracic Kyphosis Change Following Posterior Segmental Spinal Instrumented Fusion of Adolescent Idiopathic Scoliosis

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Summary: Radiographic measurements of 397 AIS patients (average age 14.7 years) who underwent posterior only segmental spinal instrumentation and fusion (lowest instrumented vertebra: L2 or above) with a minimum 2 years postoperative follow up demonstraed that thoracic kyphosis change at ultimate follow-up demonstrated a significant impact on the proximal junctional angle change, lumbar lordosis and sagittal vertical axis at the ultimate compared to the preoperation