Clinical Study

Flexibility assessment of the unfused thoracic segments above the “potential upper instrumented vertebrae” using the supine side bending radiographs in Lenke 5 and 6 curves for adolescent idiopathic scoliosis patients

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Abstract

BACKGROUND CONTEXT: Selection of upper instrumented vertebra for Lenke 5 and 6 curves remains debatable, and several authors have described different selection strategies.

OBJECTIVE: This study analyzed the flexibility of the unfused thoracic segments above the “potential upper instrumented vertebrae (UIV)” (T1–T12) and its compensatory ability in Lenke 5 and 6 curves using supine side bending (SSB) radiographs.

STUDY DESIGN: A retrospective study was used.

PATIENT SAMPLE: This study comprised 100 patients.

OUTCOME MEASURES: The ability of the unfused thoracic segments above the potential UIV, that is, T1–T12, to compensate in Lenke 5 and 6 curves was determined. We also analyzed postoperative radiological outcome of this cohort of patients with a minimum follow-up of 12 months.

METHODS: Right and left SSB were obtained. Right side bending (RSB) and left side bending (LSB) angles were measured from T1 to T12. Compensatory ability of thoracic segments was defined as the ability to return to neutral (center sacral vertical line [CSVL]) with the assumption of maximal correction of lumbar curve with a horizontal UIV. The Lenke 5 curves were classified as follows: (1) Lenke 5−ve (mobile): main thoracic Cobb angle <15° and (2) Lenke 5+ve (stiff): main thoracic Cobb angle 15.0°–24.9°. This study was self-funded with no conflict of interest.

RESULTS: There were 43 Lenke 5−ve, 31 Lenke 5+ve, and 26 Lenke 6 curves analyzed. For Lenke 5−ve, >70% of thoracic segments were able to compensate when UIV were at T1–T8 and T12 and >50% at T9–T11. For Lenke 5+ve, >70% at T1–T6 and T12, 61.3% at T7, 38.7% at T8, 3.2% at T9, 6.5% at T10, and 22.6% at T11 were able to compensate. For Lenke 6 curve, >70% at T1–T6, 69.2% at T7, 19.2% at T8, 7.7% at T9, 0% at T10, 3.8% at T11, and 34.6% at T12 were able to compensate. There was a significant difference between Lenke 5−ve versus Lenke 5+ve and Lenke 5−ve versus Lenke 6 from T8 to T11. There were no significance differences between Lenke 5+ve and Lenke 6 curves from T1 to T11.

CONCLUSIONS: The compensatory ability of the unfused thoracic segment of Lenke 5+ve curves was different from the Lenke 5−ve curves, and it demonstrated characteristics similar to the Lenke 6 curves. © 2017 Elsevier Inc. All rights reserved.

Keywords: Adolescent; Fusion; Idiopathic; Lenke 5; Lenke 6; Lumbar; Scoliosis; Surgery; Thoracic; Upper instrumented vertebrae

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