



Relationship between the angle of vertebral screws and spinal lateral angulation after fixation of thoracolumbar fractures via an anterior approach

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ABSTRACT. This study investigated possible contributors to lateral spinal angulation after surgical fixation of thoracolumbar fractures via an anterior approach. We retrospectively examined lateral angulation in 172 cases of thoracolumbar fractures treated in this manner. The coronal Cobb angle and angles of the screws relative to the endplates were determined from radiographs. The patients completed the Short Form 36, Oswestry Disability Index, Japanese Orthopaedic Association Back Pain Evaluation Questionnaire, and Visual Analogue Scale at the final follow-up visit. The mean coronal Cobb angle was $0.75^\circ \pm 3.91^\circ$ (-14.25° to 14.55°) preoperatively, $3.17^\circ \pm 4.07^\circ$ (-8.18° to 14.01°) immediately postoperatively, and $3.46^\circ \pm 4.21^\circ$ (-1.05° to 17.27°) at the final follow-up visit. The superior posterior and inferior anterior screws were more parallel to their respective endplates when the approach was made ≥ 2 vs ≤ 1 vertebral levels above the fracture ($P < 0.001$). Lateral angulation was more likely when the approach was made ≤ 1 vs ≥ 2 levels above the fracture ($P < 0.001$). The coronal Cobb angle differed

significantly ($P < 0.01$) between patients with lumbar and thoracic fractures. The immediate postoperative coronal Cobb angle correlated tightly with the sum of the screw angles (superior plus inferior posterior and/or inferior plus superior anterior). Lateral angulation may occur after surgical fixation of thoracic and lumbar fractures via an anterior approach. Non-parallelism between the vertebral screws and their corresponding endplates may predict postoperative lateral spinal angulation. Postoperative lateral angulation does not correlate with low back pain, quality of life, or preoperative lateral angulation.

Key words: Thoracic vertebrae; Lumbar vertebrae; Lateral angulation; Anterior approach; Thoracolumbar fracture