

Surgical and Functional Implications of Lenke Type 3 Idiopathic Scoliosis in Children and Adolescents: A Comparative Study

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Abstract

Background: Lenke type 3 double major curves represent a complex deformity that may progress rapidly during pediatric development and often raise early surgical considerations. This study aimed to compare clinical, radiographic, and quality-of-life (QoL) characteristics between children and adolescents with Lenke type 3 scoliosis and to explore age-related factors that may influence future surgical decision-making.

Methods: A cross-sectional analysis was conducted on pediatric patients diagnosed with Lenke type 3 double major curves, divided into two groups: children (<12 years) and adolescents (12-16 years). Demographic, clinical, and radiographic parameters were recorded, including thoracic and lumbar major coronal curves, axial rotation, and inflection points. QoL was assessed using the SRS-22r questionnaire.

Results: Adolescents presented with significantly greater thoracic major coronal curve ($p < 0.01$) and reported lower quality of life scores, particularly in the Pain ($p = 0.008$) and Appearance ($p = 0.001$) domains of the SRS-22r questionnaire. A moderate inverse correlation was observed between thoracic major coronal curve and both Function ($r = -0.45$, $p = 0.011$) and Appearance ($r = -0.52$, $p = 0.004$) scores. Lumbar major coronal curve did not show significant associations with quality of life domains. Children reported overall higher quality of life scores across all domains, although Mental Health differences were not statistically significant between groups.

Conclusions: Adolescents with Lenke type 3 scoliosis demonstrate more advanced deformity and greater QoL impairment than younger children, even before reaching classical surgical thresholds. Age-related psychosocial decline and thoracic curve progression may represent early indicators relevant for surgical planning and timing of intervention.

Keywords: Lenke type 3, double major curve, SRS-22r, quality of life, surgical planning