# THE INFLUENCE OF RELATIVE CURVE CORRECTION AND UPPER INSTRUMENTED VERTEBRA (UIV) TILT ANGLE ON POST-OPERATIVE SHOULDER BALANCE FOLLOWING POSTERIOR SPINAL FUSION IN LENKE 1 AND 2 ADOLESCENT IDIOPATHIC SCOLIOSIS (AIS) PATIENTS

**CYW Chan, CH Ngan, CK Chiu, WH Chung, Saturveithan C, MK Kwan**

Department of Orthopaedic Surgery, National Orthopaedic Centre of Excellence for Research and Learning (NOCERAL), Faculty of Medicine, Universiti Malaya, Kuala Lumpur, Malaysia

**Background:**

Post-operative shoulder imbalance (PSI) is common after posterior spinal fusion (PSF) surgery. Relative curve correction of the proximal thoracic curve/main thoracic curve (PT/MT) and the upper instrumented vertebra (UIV) tilt angle are risk factors for PSI.

**Objectives:**

To investigate the relationship between relative curve correction, post-operative UIV tilt angle, and post-operative shoulder imbalance.

**Materials and methods:**

In this retrospective study, 151 adolescent idiopathic scoliosis (AIS) patients with Lenke 1 and Lenke 2 curves who underwent PSF from 2019 to 2021 were analysed. Patients were categorised into balanced or imbalanced shoulders based on T1 Tilt, Clavicle Angle, and Cervical Axis. Relative curve correction was assessed using the Relative PT/MT Correction Rate (RCR) and the Relative PT/MT Residual Cobb angle (RRCA). These metrics were correlated with PSI parameters and UIV tilt angle.

**Results:**

The prevalence of medial shoulder, neck, and lateral shoulder imbalance were 27.8%, 23.2%, and 9.9%, respectively. RCR showed a significant association with lateral shoulder (60.3%) and neck balance (62.2%). RRCA was significantly associated with medial shoulder imbalance (92.1%), lateral shoulder imbalance (97.5%), and neck imbalance (83.8%). Post-operative T1 Tilt had a significant correlation with RRCA ($p<0.001$, $R=0.628$). RCR significantly correlated with post-operative T1 Tilt ($p=0.009$) and Cervical Axis ($P < 0.001$). A strong correlation ($r=0.708$) was found between post-operative UIV tilt angle and T1 Tilt ($p<0.001$). RRCA also showed a significant correlation with UIV tilt angle ($p<0.001$, $r=0.406$).

**Conclusion:**

RRCA and UIV tilt angle significantly correlated with medial shoulder balance. RRCA also correlated with UIV tilt angle ($r=0.406$).