Neck Tilt and Shoulder Imbalance in Adolescent Idiopathic Scoliosis patients underwent Posterior Spinal Fusion. How to prevent these problems?

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Introduction: Shoulder imbalance and neck tilt are common in AIS patients undergone surgery. We performed two studies to answer: 1) Are shoulder imbalance and neck tilt are separate clinical problems? 2) How to prevent these problems?

Part 1: This is a prospective study involved 89 AIS patients. Shoulder imbalance is graded according to acromioclavicular height difference. Neck tilt is graded according to Figure 1. Results: There was no significant correlation between clinical neck tilt and shoulder imbalance grading (p = 0.939). T1 tilt and CA had significant correlation with the clinical neck tilt grading (p = 0.004) but not with clinical shoulder imbalance grading (p = 0.984, p = 0.528).

Part 2: A prospective review of 60 AIS. This study analyzes the relationship between the 'Reserved motion' above the UV, post-operative UIV tilt angle and the occurrence of 'Neck Tilt' post surgery. The optimal range of the UIV tilt angle (X) which allows the 'Reserved motion' above the UV to be aligned to the CSVL is determined by a preoperative side bending film. Results: There were no neck tilt (G0) in 55.0%, mild neck tilt (G1 and G2) in 36.7% and severe neck tilt (G3) in 8.3% patients. Deviation of postoperative UIV tilt angle (Y) from preoperative optimum UIV tilt angle (X) correlated significantly with clinical and radiological 'Neck Tilt' phenomenon. 80% of patients with grades 2 and 3 neck tilt had Y, which is outside X, (p < 0.005). A postoperative UIV tilt angle (Y), within preoperative optimum UIV angle (X) will prevent postoperative 'Neck Tilt'.

Figure 6: Images illustrating Grade 2. Grade 1 (Neck tilt - corrected by active muscle contraction) or Grade 2 (non corrected) and Grade 3 neck tilt (Sawers' neck tilt with asymmetry of variable height > 2 cm whole arrow).

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Keywords: Neck Tilt and Shoulder Imbalance, Adolescent Idiopathic Scoliosis, Posterior Spinal Fusion

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