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Anatomic versus Scoliosis Driven Leg Length Discrepancy: Prevalence, Prediction and Subanalysis of 2 Years Outcomes

INTRODUCTION: Leg length discrepancy (LLD) is commonly encountered among adolescent idiopathic scoliosis (AIS) patients; yet, data on LLD prevalence, differentiating anatomical (A-LLD) versus scoliosis-driven (S-LLD) LLD, and impact of LLD on surgical correction of AIS remain understudied. This study reports the prevalence of A-LLD and S-LLD, develops a model to predict A-LLD, and investigates the impact of LLD on outcomes in AIS-corrected patients.

METHODS: 119 subjects underwent baseline radiographs of both lower extremities. A-LLD and S-LLD were defined as >1 cm difference between anatomical limb lengths and iliac crest apices, respectively. Impact of curve side and A-LLD on S-LLD was investigated. Bilateral and two-year coronal alignment were compared across patients with and without A/S-LLD.

RESULTS: Patients had a mean age was 14.5 years and were 52% females. 75% of patients had Lenke 1 or 2 curves. Mean A-LLD was 9.3 ± 1.6 mm and mean S-LLD was 9.4 ± 7.7 mm. Out of 119 patients, 63 (53%) had neither LLD, 39 (25%) had A-LLD, and 48 (40.3%) had S-LLD, concomitant with A-LLD in 49% of cases. 60% of patients had S-LLD ipsilateral to their respective main curve. After controlling for curve magnitude and Lenke type, A-LLD of the leg contralateral to the main curve increased the odds of having S-LLD on the A-LLD side (OR=4.9, 95% confidence interval [1.9-13.1], $p < 0.05$). A-LLD and S-LLD patients had similar baseline coronal deformity and magnitude of correction at two-year follow-up. The percentage of patients with isolated S-LLD improved postoperatively from 29.2% to 9% at two-year follow-up.

DISCUSSION: This study reports 25% A-LLD in AIS patients. Despite more patients having S-LLD ipsilateral to their curves, if patients present with contralateral S-LLD, this warrants assessment of the contralateral leg for A-LLD. Spine surgeons may counsel their patients that 70% of S-LLD is likely to improve by two years following AIS correction.