Does the Choice of Upper Instrumented Vertebrae (UIV) Matter in Patients with Previous Cervical Spine Fusion Undergoing Thoracolumbar (TL) Deformity Surgery?

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INTRODUCTION: Surgical planning for TL deformity patients involves careful consideration of preoperative cervical constructs. However, literature is limited regarding optimal selection of UIV within this population and its impact on postoperative outcomes.

METHODS:

ASD patients without (NONE) and with prior ANTERIOR and POSTERIOR cervical fusion were included if they underwent TL fusion with UIV ≤T12 and LIV ≥S1, and had baseline and 2-year outcomes data available. Comparative analyses were performed on demographics, spinopelvic alignment, patient-reported outcome measures (PROMs), and complications. Univariate and multivariate analyses were performed on POSTERIOR patients to identify preop parameters predictive of and to evaluate 2-year postop outcomes impacted by UIV selection.

RESULTS:

Among 542 patients, mean age (NONE=64.2, ANTERIOR=65.0, POSTERIOR=64.9; p=0.764) and sex (80%, 78%, 92%; p=0.307) were similar. Cervical patients were frailer (3.4, 4.2, 4.3; p<0.001) and had worse baseline PROMs (ODI, NDI, SRS-22 Total; all p<0.001), cervical deformity (C2PA, cSVA, C2SPi; all p<0.05), and lumbosacral deformity (PT, PI-LL, SVA, T1SPi; all p<0.05) (**Figure 1**). In the POSTERIOR cohort, preop UIV was frequently below cervicothoracic junction (54%); surgical UIV sometimes (13%) connected to cervical constructs but was often between T6-T12 (67%), similar to NONE (61%) and ANTERIOR (60%) cohorts. Multivariate analyses found that higher thoracic kyphosis (coeff=0.14, 95%CI=0.01–0.28, p=0.040), lower TL lordosis (coeff=0.22, 95%CI=0.10–0.33, p=0.001), and lower cervical SVA (coeff=-0.22, 95%CI=-0.43–-0.01, p=0.038) were predictive of a higher UIV. Two years postop, all groups had similar spinopelvic deformity, but cervical patients continued to have worse PROMs (ODI, NDI, SRS-22 Total; all p<0.001). Choice of UIV below or above T6 and number of unfused levels below or above 5 levels did not change patient outcomes.

DISCUSSION AND CONCLUSION:

In this large adult spinal deformity database, prior cervical fusion patients have more severe preoperative TL deformity and worse 2-year postop PROMs following TL fusion. Choice of new UIV was most strongly predicted by baseline thoracic alignment but did affect outcomes in this challenging population.

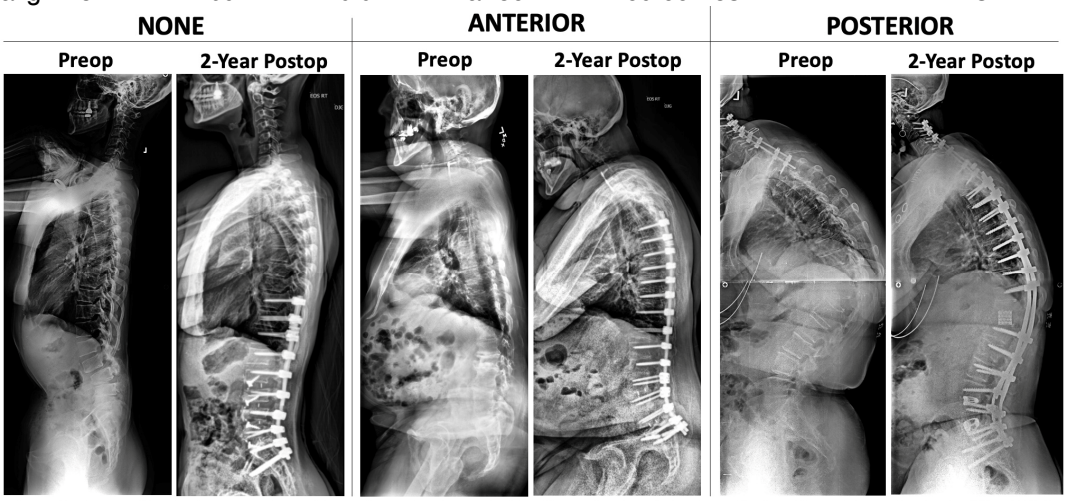

Figure 1. Preoperative to 2-year postoperative radiographs demonstrating thoracolumbar fusion in patients with a history of anterior (ANTERIOR), posterior (POSTERIOR), or no (NONE) cervical fusion.