

## **Is There Cost-Utility Benefit of Robot Assistance in Correction of Adult Spinal Deformity?: Initial Clinical and Economic Outcomes of a Single-Center ASD Database**

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**INTRODUCTION:** Robotic surgery is on the rise in popularity throughout the realm of orthopaedic surgery. However, initial studies have not examined the cost-utility of robotic assistance benefit in adult spinal deformity (ASD) surgery. We hypothesize robotic-assisted techniques improve surgical, perioperative, and economic outcomes of robotic assisted techniques in adult spinal deformity surgery.

**METHODS:** ASD patients with 2Y data were isolated. Patients stratified based on usage of robotic assistance, Robotic (R) vs Non-Robotic (NR). Descriptive analyses identified differences in demographics and surgical details. Multivariate analyses controlling for age and baseline deformity assessed differences in outcomes between groups.

**RESULTS:** 171 ASD pts included (age 58.7, BMI 31.6, 50% female). R group: 65 cases (33%). R group had higher BMI (33.1 vs. 30.7,  $p=.02$ ). Baseline deformity and HRQL metrics did not differ between groups. R more often underwent a combined anterior-posterior approach (54% vs. 32%,  $p=.01$ ). R group more often used a support rod (52% vs 34%,  $p=.03$ ) and S2AI placement (62% vs 45%,  $p=.03$ ). R group had lower EBL and was less likely to lose less than 3500 mL (OR: 0.03, [0.01-0.3]). Adjusted analysis showed R also suffered less dural tears (OR: 0.2, [0.04-0.9]). Groups had similar LOS, while R had less SICU admissions and were less often discharged to rehab or SNF (OR: 0.3, [0.1-0.8]). After correction, groups had similar correction in both age-adjusted and PI-based parameters. R trended towards lower perioperative comps, major comps, and reoperations by 2Y, while more NR underwent cervical fusion more often within 2Y postop despite similar cervical parameters at baseline (OR: 0.2, [0.02-0.9]). Adjusted analysis demonstrated R patients had similar clinical improvement in ODI by 2Y (-23 vs. -19,  $p=.4$ ), leading to equivocal two-year cost-utility (R: \$95,282 vs. NR: \$103,508,  $p=.3$ ).

**DISCUSSION AND CONCLUSION:** Robotics in adult spinal deformity has shown to lower blood loss, SICU admissions and unfavorable discharge dispositions, while demonstrating similar correction to open techniques. Robotic assistance also trended towards lower complication rates and greater clinical improvement by two years. While we are just entering the robotic era of adult spinal deformity surgery, the overall cost-utility benefits have already paid dividends for this effective and efficient technology.