

SUMMARY

Computer modeling has shown decreased stress and improved deformity correction with translation techniques compared to derotation. Clinical and radiographic outcomes of 126 consecutive nonrandomized adult scoliosis patients were corrected by one of these techniques and followed 46 months. Translational correction was superior to derotation 70% vs. 47% ($P < 0.01$), with the biggest improvements seen in thoracolumbar and lumbar curves and in degenerative scoliosis. Complications, Oswestry, and VAS scores were not statistically different between groups.

INTRODUCTION

Computer finite element analysis has shown decreased stress and improved deformity correction with segmental translational forces vs. rod derotation. This study compares clinical and radiographic outcomes in adult scoliosis patients corrected using these two techniques. This is also the largest series of adult scoliosis corrected by low-stress translation ever reported.

METHODS

A prospective nonrandomized study of 126 consecutive adult scoliosis patients age 61 (19-88yrs) underwent posterior instrumented correction by one surgeon, followed 46mo (24-84mo); the first 17 by rod derotation/in situ rod bending, the next 109 by low-stress translation by slowly pulling the spine to a contoured rod via pivoting reduction posts attached to screws, simultaneously correcting both coronal and sagittal deformity. Anterior surgery: 15/17 derotation, 57/109 translation patients. Osteotomies: Derotation- 2, Translation- 4. Clinical and radiographic results (curves, sagittal T5-12, T10-L2, T12-S1, balance, pelvic incidence) were analyzed by curve type.

RESULTS

Translation group curves of 42° (range $10-87^\circ$) corrected 70% to 13° ($0-48^\circ$) was better ($P < 0.01$) than derotation group curves of 55° ($25-84^\circ$) corrected 47% to 30° ($10-59^\circ$). Translation group idiopathic scoliosis of 57° ($26-87^\circ$) corrected 69% to 18° ($4-48^\circ$) compared to 49% derotation group correction (thoracic curves 65% vs 51%, thoracolumbar 76% vs 44%, lumbar 76% vs 67%, double major 60% vs 34%). Translation vs derotation group correction for degenerative scoliosis was 72% vs 49%. Derotation group complications included 3 nonunions (17%), 2 screw loosening, 1 broken rod, 1 infection. Translation group had 10 nonunions (9%), 5 infections, 10 adjacent fractures, 1 screw pullout, 1 broken rod. Oswestry preop 45 (4-84) improved to 27 (0-70); VAS preop 6.2 (1-10) improved to 2.7 (0-8), not statistically different between groups at 2 years and later.

CONCLUSION

This study showed better deformity correction of by translation than rod derotation for all types adult scoliosis, without increased complications. Thoracolumbar, lumbar, and degenerative scoliosis benefited most.

SIGNIFICANCE

Translation appears superior to rod derotation in correcting adult scoliosis.