

Analysis of radiographic parameters reveals differences in outcomes when comparing patient-specific short rod constructs to conventional rods

Katherine Drexelius, MD Candidate; Eren Kuris, MD; Michelle Akiyama, BS; David Ou-Yang, MD; Evalina Burger, MD; CJ Kleck, MD

University of Colorado Department of Orthopedic Surgery

Purpose: Patient-specific spine rods (PSSRs) are pre-contoured custom rods manufactured based on preoperative spinopelvic parameters and postoperative alignment goals. Recent studies have indicated that these rods can improve surgical correction for long segment adult spinal deformity constructs. However, few studies have investigated the impact these rods have on short segment lumbar fusion for degenerative conditions. We aimed to determine how the use of PSSRs affect radiographic parameters and categorical outcomes when compared to conventional rods.

Methods: In this retrospective cohort study, fifty patients underwent primary lumbar fusion with PSSR and were compared to a historical cohort of patients. Using pelvic incidence (PI) and lumbar lordosis (LL), patients were divided into preserved, restored, not corrected, and worsened categories based on pre- and postoperative measurements. Statistical analysis was performed using ANOVA and t-tests.

Results: Patients undergoing spinal fusion with PSSRs had a more significant change in pre- to postoperative PI-LL, compared to the non-PSSR historical cohort of patients ($p < 0.001$).

Postoperative analysis of spinopelvic parameters in the PSSR patients placed 74% in the preserved category, 18% in the restored category, and 4% in each the not corrected and worsened categories. A greater proportion of patients in the PSSR sample were in the preserved group, more patients in the PSSR group had restored spinopelvic parameters after surgery ($p = 0.05$), and fewer patients had not-corrected parameters ($p = 0.006$).

Conclusion: PSSRs may be able to better maintain or correct spinopelvic alignment when compared to conventional rods.