Introduction: The development of new minimally invasive spine (MIS) techniques for lumbosacral fusion has provided the spine surgeon multiple methods for fusion at the L5-S1 interbody space. The authors compare clinical and radiographic outcomes from a cohort of prospectively followed patients treated with three modern techniques, MIS-TLIF, ALIF, and AxiaLIF.

Methods: Between June 2003 and January 2009, 58 patients were treated for isolated degenerative disk disease of the L5-S1 segment. All patients presented with back pain with or without radiculopathy and had failed conservative management. The average patient age was 43.34 years. Twenty patients were treated with TLIF, 19 with ALIF, and 19 with AxiaLIF. All patients were prospectively followed with pre- and post-operative visual analog score (VAS) and Oswestry-Disability Index (ODI) scores as well as routine radiographic follow-up.

Results: Clinical outcome with ODI demonstrated a decrease in ODI of -25 with TLIF, -22 with ALIF, and -24 with AxiaLIF. VAS leg scores decrease 92% in patients treated with TLIF, 76% with ALIF and 71% with AxiaLIF. The time of access to the interbody space was most rapid with AxiaLIF (65m) and slightly longer with ALIF (85m) and TLIF (105m). Radiographic outcomes showed that ALIF produced the distraction of the interbody space (8.6mm); TLIF (6.3mm), AxiaLIF (5.9mm). Fusion with TLIF and ALIF was 95% and AxiaLIF 90%. Subsidence was greatest with AxiaLIF 16% followed by TLIF (12%) and ALIF (9%). Complications included 2 patients with radiculitis following TLIF. There was a single CSF leak (TLIF) and a single lumbar plexus injury (ALIF). There was a single vascular injury (ALIF) and a single visceral injury (AxiaLIF).

Conclusion: MIS-TLIF, ALIF, and AxiaLIF are all modern, MIS-type approaches to the L5-S1 interbody space. Patient outcomes suggest each has unique clinical strengths and specific disadvantages. Complications with each approach is unique and primarily related to anatomy of the access route.