Summary: 167 patients underwent fusion of 245 lumbar levels via LLIF, ALIF, TLIF or PSF. Segmental lordosis change was measured. All interbody fusion procedures provided significantly greater lordosis at the operative levels compared to posterior fusion.

Introduction: Potential advantages of minimally-invasive lateral lumbar interbody fusion (LLIF) include reduced morbidity and blood loss, decreased post-op pain, and faster recovery. Improvement in sagittal parameters is considered an important goal in lumbar fusion. There are no studies comparing restoration of sagittal parameters utilizing the LLIF approach versus standard approaches.

Methods: This is a comparative x-ray analysis of 4 lumbar fusion approaches. In a 2-year period, 245 levels in 167 patients were fused: LLIF (43 patients; 63 levels); ALIF (41 patients; 67 levels); TLIF (56 patients; 74 levels); and PSF (30 patients; 41 levels). The following parameters were measured on pre- and post-op standing radiographs: segmental lordosis; overall lumbar lordosis (L1-S1); anterior and posterior disk heights. Comparison of measurement changes between groups were performed using student's t-test.

Results: All interbody procedures produced significantly greater lordosis change compared to posterior fusion alone (ALIF p=0.007; TLIF p=0.019; LLIF p=0.03). The 3 interbody approaches were not significantly different (ALIF vs. TLIF p=0.15; ALIF vs. LLIF p=0.28; TLIF vs. LLIF p=0.80). Only ALIF showed significant improvement in overall lumbar lordosis (p=0.0017). Significant differences were noted in terms of anterior disk height restoration, in the following order: ALIF > LLIF > TLIF > PSF.

Conclusion: LLIF provides similar segmental sagittal contour change compared to ALIF and TLIF, and significantly greater compared to posterior fusion alone. Overall lumbar lordosis remains unchanged after LLIF.

Significance: This is the first study that directly compares the sagittal radiographic parameter changes provided by the LLIF approach compared to traditional approaches.