What is the Fate of the Adjacent Segmental Angles 6 months After Single-level L3-4 or L4-5 Lateral Lumbar Interbody Fusion?

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INTRODUCTION: Lateral lumbar interbody fusion (LLIF) is an effective technique for fusion and sagittal alignment correction/maintenance. Studies have investigated the impact on the segmental angle and lumbar lordosis (and pelvic incidence-lumbar lordosis mismatch), however not much is documented regarding the immediate compensation of the adjacent angles. Our goal was to evaluate acute adjacent and segment angle as well as lumbar lordosis changes in patients undergoing a L3-4 or L4-5 LLIF for degenerative pathology.

METHODS: We retrospectively identified patients who underwent single-level LLIF with posterior fixation at L3-L4 and L4-L5 between January 1, 2017 and November 1, 2020. Demographics and measurements of pre- and 6 month post-operative lumbar lateral plain radiographs included: lumbar lordosis (LL), segmental lordosis (SL), infra and supra-adjacent segmental angle, and pelvic incidence (PI). All analyses were run for the overall sample, and separately for each operative level (L3-4 and L4-5).

RESULTS:

We identified 84 patients who underwent a single level LLIF (61 at L4-5, 23 at L3-4). For both the overall sample and at each operative level, the operative segmental angle was significantly

more lordotic post-op compared to pre-op (all ps ≤ .01). Infra-adjacent segmental angles were significantly less lordotic post-op compared to pre-op both overall (p = .001) and at L4-5 (p = .01) [table 1]; this effect was trending toward significance at L3-4 (p = .07). For the overall sample, more lordotic change at the operative segment led to more compensatory reduction of lordosis at the supra-adjacent segment (p = .02). This effect trended towards significance when L4-5 cases were tested separately (p = .08) and was nonsignificant at L3-4. At L4-5, more lordotic change at the operative segment led to more compensatory lordosis reduction at the infra-adjacent segment (p = .04).

DISCUSSION AND CONCLUSION:

In patients that underwent a L3-4 or L4-5 LLIF for degenerative pathology, we observed overall increased lordosis at the operative level with compensatory changes (lordosis reduction) at the adjacent levels immediately following surgery. These findings provide early evidence on the compensation ability of the adjacent levels following a single level fusion procedure. Ongoing studies will evaluate the changes in these angular measurements over time.