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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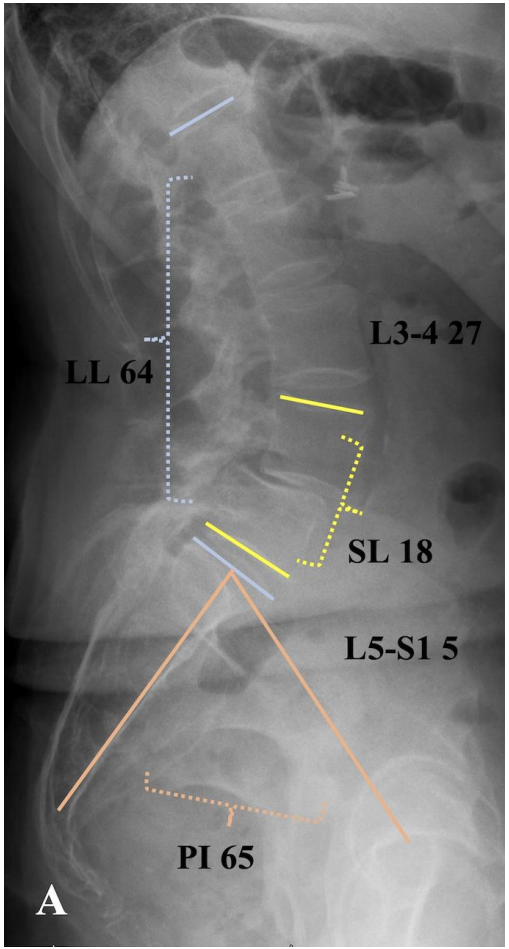
Introduction

- Increased evidence suggests preserving or correcting spinopelvic alignment following degenerative lumbar surgery improves patient outcomes.
- Several studies have highlighted how lateral lumbar interbody fusion (LLIF) effects global lumbar sagittal parameters.
- The immediate early post-operative impact on the adjacent segmental angles following LLIF has not been well-described.



The purpose of this study is to evaluate the changes in adjacent segmental angles in patients who underwent L3-4 or L4-5 single level Lateral Lumbar Interbody Fusion.

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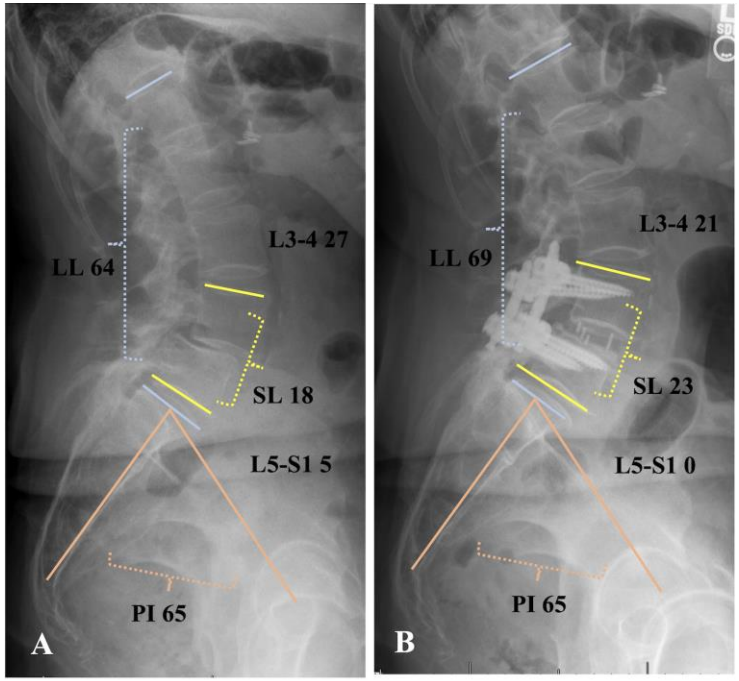
Methods

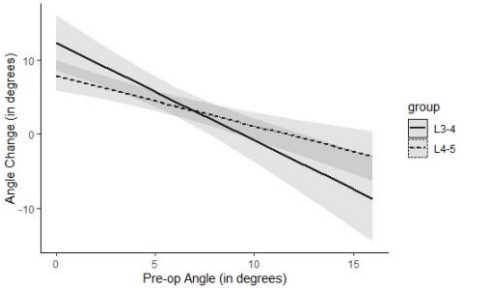
- Retrospective study; underwent single-level LLIF at L3-4 or L4-5 for degenerative spondylolisthesis between 2017 and 2020 by three fellowship-trained spine surgeons
- Pre-operative and 6-month post-operative radiographic measurements were obtained including pelvic incidence, pelvic tilt, lumbar lordosis, segmental lordosis, and lordosis of the levels supra- and infra-adjacent to the operative level.
- Each patient was grouped into one of four categories of global lumbar alignment progression from before to after surgery: ***Preserved, restored, not corrected, or worsened.***

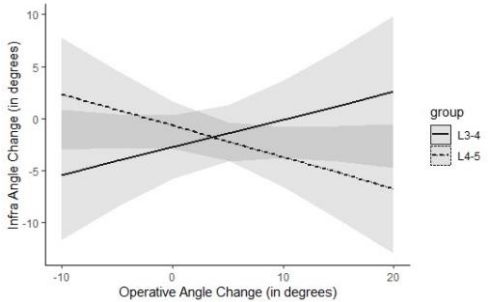


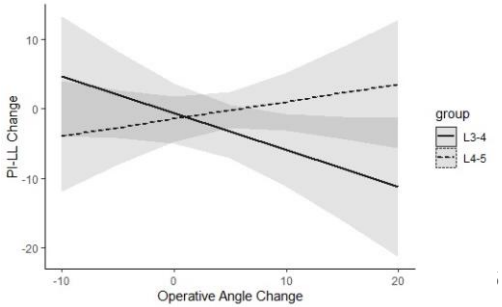
Pre-Operative **6 months after surgery**

Results

- Adjacent segmental angles were significantly less lordotic post-op compared to pre-op overall ($p < .001$).
- For the overall sample, greater lordotic change at the operative segment led to more compensatory reduction of lordosis at the infra-adjacent segment. ($p = .001$).
- At L4-5, more lordotic change at the operative segment led to more compensatory lordosis reduction at the infra-adjacent segment.
- PI-LL did not significantly differ between post-op and pre-op.







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Thoughts…

- Interestingly, our findings demonstrated how the infra-adjacent segmental angles (supra-adjacent angles nearly significant, but not statistically so) were significantly less lordotic post-op compared to pre-op both overall and at L4-5.
- For the overall sample, more lordotic change at the operative segment led to more compensatory reduction of lordosis at the infra-adjacent segment.
- Despite increased post-op segmental lordosis at the operative level, overall PI-LL mismatch did not significantly change.
- This may be explained by local correction of pre-operative adjacent level compensatory alignment adaptations (Improving the operative level lordosis mitigates the need for these adaptations/segmental compensations).

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Conclusion

- In this study of patients presenting with degenerative lumbar pathology, single level LLIF at L3-L4 or L4-L5 resulted in significant increase in operative level as well as infra-adjacent level lordosis, but with no significant impact on spinopelvic mismatch.
- **When treating degenerative lumbar conditions, surgeons should consider the effect of LLIF on local alignment without overly relying on it to restore spinopelvic balance; keeping in mind the compensatory nature of the levels adjacent to the fusion.**

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Thank you!

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