Biomechanics of Stand-Alone Lateral Interbody Fixation at L4-5 and L5-S1*

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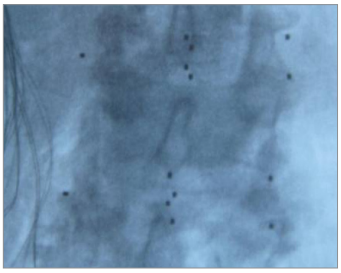
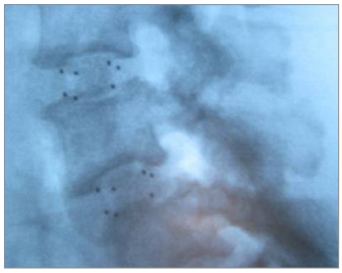




Background Context

Transection of lateral annulus and removal of intervertebral disc are destabilizing procedures. However, it is unclear to what extent the insertion of a lateral interbody cage into the disc space restores stability to the motion segment. This question is of interest at L4-L5 where this is currently being done clinically as well as at L5-S1, where techniques for lateral interbody placement are inevitably being developed.

Purpose

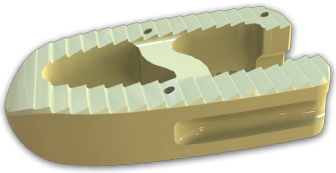
The goal of this in vitro study was to quantify the stability imparted by a stand-alone lateral interbody lumbar PEEK cage that spans the width of the vertebral body.

Study Design/Setting

Nondestructive in vitro flexibility test with paired comparison of stability in two conditions.

Patient Sample

Seven human cadaveric L3-S1 specimens were studied. Procedures were performed at L4-L5 and L5-S1.



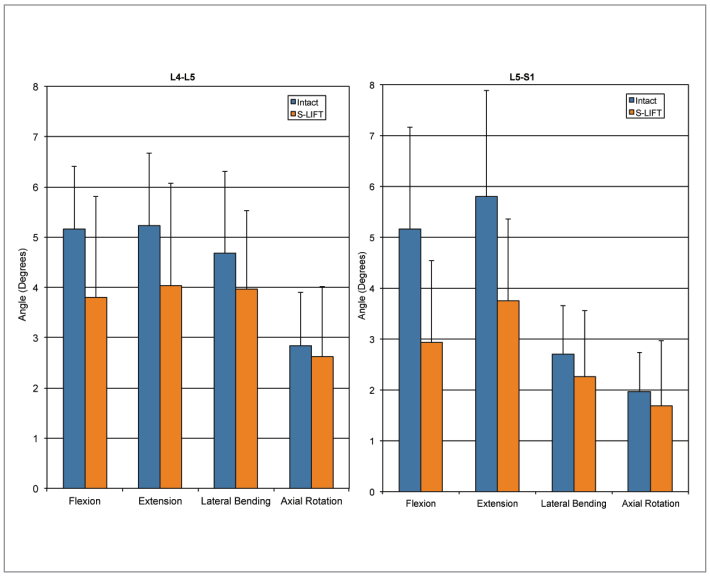
S-LIFT (Sagittal Lateral Interbody Fusion Technology) (SpineFrontier, Inc.) MA, USA

Outcome Measures

The range of motion (ROM) was quantified at L4-L5 and L5-S1 during flexion, extension, axial rotation, and lateral bending.

Methods

Nonconstraining nondestructive pure moments (7.5 Nm maximum) were applied to specimens while recording angular L4-L5 and L5-S1 motion optoelectronically. Specimens were tested intact and then again after discectomies at L4-L5 and L5-S1 and insertion of lateral interbody spacers (S-LIFT) spanning the entire width of the endplate. Difference in mean ROM in the two conditions at either level was assessed using paired two-tailed Student's t-tests.



Results

At L4-L5, insertion of S-LIFT resulted in mean reductions in ROM of 26% during flexion (p=0.06), 23% during extension (p=0.09), 15% during axial rotation (p=0.19) and 8% during lateral bending (p=0.67) relative to the intact condition. At L5-S1, insertion of S-LIFT resulted in mean reductions in ROM of 43% during flexion (p=0.017), 35% during extension (p=0.016), 16% during axial rotation (p=0.30) and 14% during lateral bending (p=0.50) relative to the intact condition.

Discussion & Conclusion

The surgeon can expect a stand-alone lateral interbody device to provide a reasonably stabilizing effect but not enough to impart rigidity. Therefore posterior supplemental fixation is needed for greater rigidity.

References

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**Pending Publication*

This study was sponsored by the LES Society
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