

Biomechanics of Spinous Process Plating With and Without Lateral or Transforaminal Interbody Cage at L4-5*

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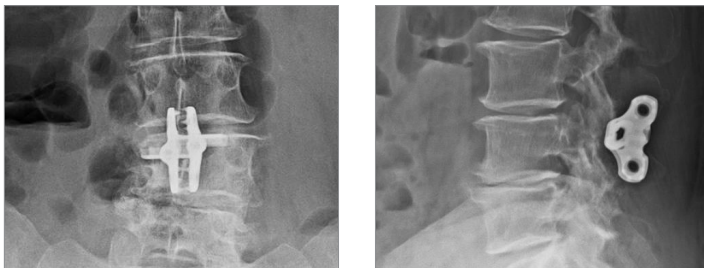


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Background Context

A spinous process plate (SPP) is one option for stabilizing a lumbar motion segment to achieve fusion. It was hypothesized that the stabilizing potential of the SPP may differ with and without interbody support, and depending on the surface area covered by the interbody spacer.

Purpose

To quantify lumbar stability after placement of a SPP in the setting of an intact disc, after lateral (trans-psoas) interbody fixation using the Sagittal Lumbar Interbody Fusion Technology (S-LIFT) cage, and after transforaminal cage placement using the Transforaminal Lumbar Interbody Fusion Technology (T-LIFT) cage.

Study Design/Setting

Nondestructive repeated-measures in vitro flexibility test comparing stability of several constructs.

Patient Sample

Seven human cadaveric L3-S1 specimens were studied, with procedures performed at L4-L5.

Outcome Measures

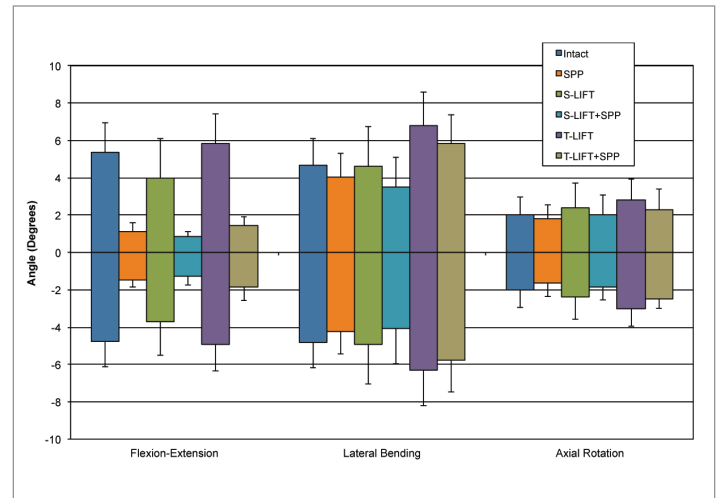
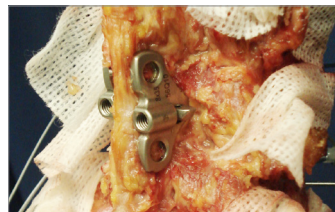
L4-L5 range of motion (ROM) was assessed during flexion, extension, axial rotation, and lateral bending.

Methods

Specimen flexibility was tested by applying nonconstraining nondestructive pure moments (7.5 Nm maximum) while recording specimen motion optoelectronically in 3D. Specimens were tested (A) intact, then after (B) SPP (C) S-LIFT, (D) SPP+S-LIFT, (E) T-LIFT, (F) SPP+T-LIFT.



Inspan Spinous Process Plate
 (SpineFrontier, Inc.) MA, USA



Results

T-LIFT+SPP allowed significantly greater ROM during lateral bending and axial rotation than SPP with intact disc ($p < 0.001$, RM-ANOVA/Holm-Sidak) or S-LIFT+SPP ($p < 0.03$). Conversely, S-LIFT+SPP allowed slightly smaller ROM than SPP with intact disc during flexion, extension, and lateral bending, although differences were not significant.

Conclusion

At the loads studied and utilizing the same specimens to study two conditions of interbody support, it was found that the SPP provided the same or slightly better stability with S-LIFT lateral interbody cage in place as in the intact condition, whereas the SPP performed significantly worse with a T-LIFT in place than in the intact condition. These findings are likely due to the much larger support area provided by S-LIFT lateral interbody cage than a T-LIFT lateral interbody cage relative to the amount of disc removed.

References

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*Pending Publication