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Biomechanical Analysis Of Inspan Spinous Process Fixation Alone Or With Facet Screws In The Lumbar Spine

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ABSTRACT

Background: Biomechanical assessments of interspinous process fixation have demonstrated particularly advantageous outcomes in stabilizing the sagittal plane for during flexion and extension. The authors aim to evaluate Inspan (Inspan LLC) interspinous device (ISD) as a stand-alone device spinous process plate (SPP), and with supplemental fixation using in vitro biomechanical testing range of motion (ROM) and change in foraminal height.

Methods: Human cadaveric spines were biomechanically tested under the following conditions: 1) intact/control; 2) SPP only, 3) SPP with facet screws (FS), 4) SPP with S-LIF, 5) SPP with SLIF and facet screws. Each test consisted of 100 N of axial preload with ± 7.5 Nm of torque in flexion-extension (FE), right/left lateral bending (LB), and right/left axial rotation (AR).

Results: A decrease in flexion-extension, lateral bending and axial bending was noted in all conditions compared to intact control. Adding facet screws does not improve stability during flexion/extension (already best loading mode for SPP). With SLIF, each point of fixation added (facet screw or SPP) incrementally improves stability by about the same amount during lateral bending and axial rotation. Mean foraminal height change is 0.7mm.

Conclusion: Inspan SPP is effective biomechanically in increasing foraminal height and restricting flexion/extension motion. Other effects without LIF, Inspan SPP is moderately effective in restricting axial rotation or lateral bending. Comparisons revealed without LIF, SPP+2 FS = bilat PSF. With the S-LIF interbody, testing showed better stability than no LIF. When you add a SPP to lumbar fixation, you will increase the foraminal height by 1mm minimum.

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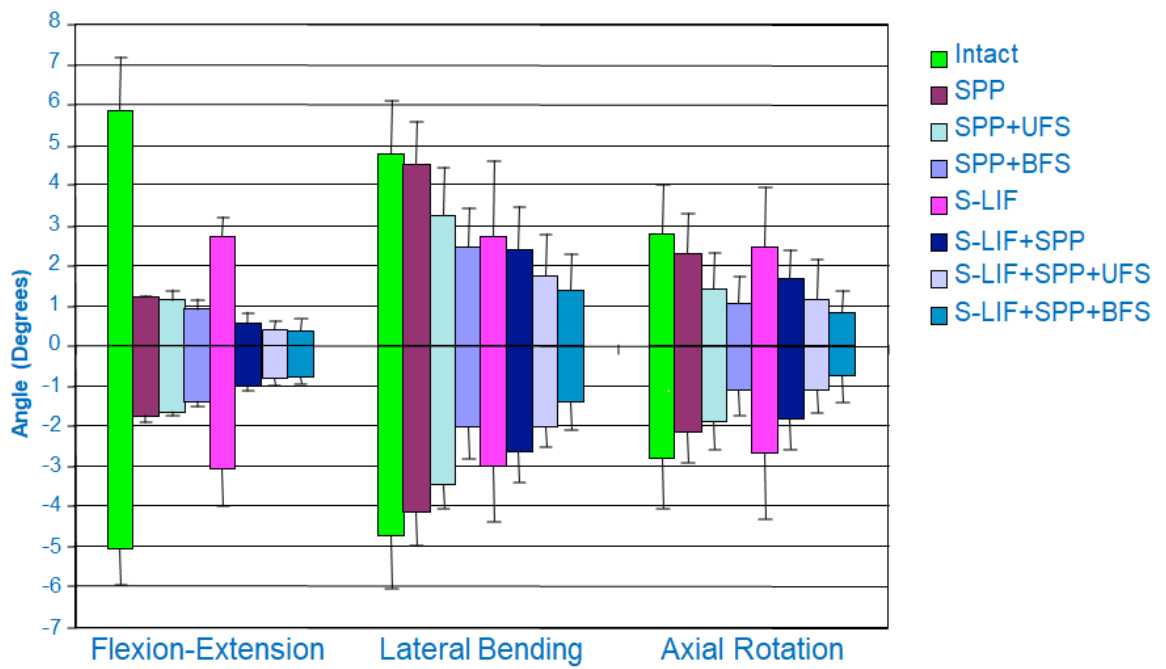


Fig. 1. Biomechanical Testing in FE, LB and AR