Biomechanics Advantage of the FacetFuse Contained Multiaxial Washer in Lumbar Transfacet Pedicle Fixation*

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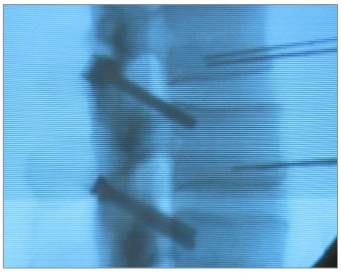
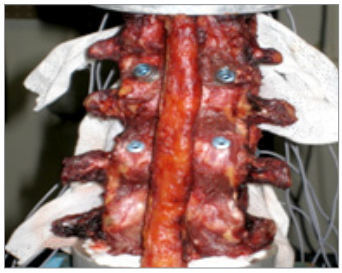




Background Context

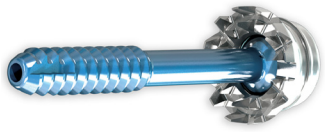
Unattached ringed washers have been used to distribute loads around screws. A multiaxial-contained washer has been incorporated into the FacetFuse lumbar transfacet pedicle screw design to help distribute the load to a wider area, improve construct stability, and limit screw backout. No study has directly assessed the benefit of this design feature.

Purpose

The goal of this in vitro study was to quantify the reduction in specimen motion when the proximal washer feature is added to the transfacet pedicle screw, with or without lateral interbody fixation present.

Study Design/Setting

Non-paired comparison of motion in cadaveric specimens instrumented using transfacet screws with and without washers.



FacetFuse MIS Screw System
(SpineFrontier, Inc.) MA, USA

Patient Sample

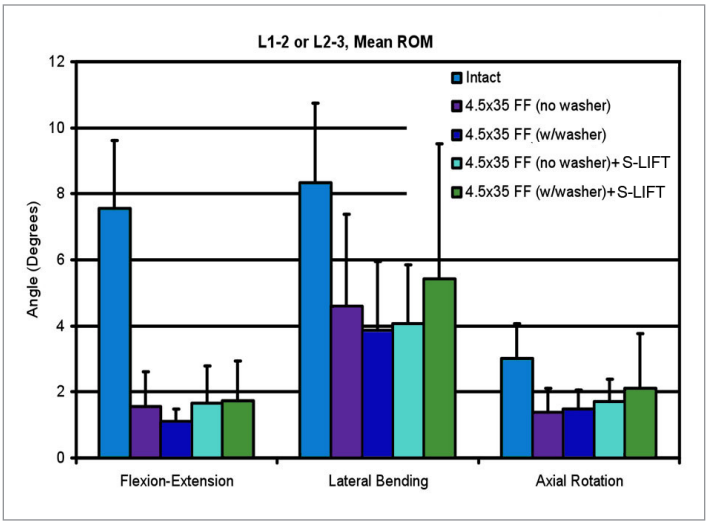
Six human cadaveric T12-S1 specimens were studied. Data were obtained for 12 motion segments (L1-2 or L2-3).

Outcome Measures

Range of motion during flexion, extension, axial rotation, and lateral bending were compared in multiple conditions.

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, (B) after inserting 4.0x35mm facet screws with washer at L1-2 and without washer at L2-3 (or vice versa), (C) after trans-psoas interbody cage (S-LIFT), leaving screws still in place.



Results

The proximal washer reduced ROM during flexion-extension but not during axial rotation or lateral bending. During lateral bending, the effectiveness of the facet screws was most variable (largest standard deviations). After S-LIFT, the ROM during axial rotation was slightly increased, with or without washer, but was unchanged in other loading modes.

Discussion & Conclusion

The study suggests that the presence of the proximal multiaxial washer feature in a lumbar facet screw is beneficial, especially in helping to resist flexion-extension. The benefit of the washer is less readily apparent in lateral bending and rotation and with an interbody spacer. There was discernible difficulty in the upper lumbar region in precise screw positioning, so further studies will be needed in the lower lumbar spine and using larger screw size and lengths to understand the extent of the benefits of the multiaxial washer.

Reference

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**Pending Publication*

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