

Biomechanics of Stability After Unilateral Facetectomy at L5-S1 Using FacetFuse Transfacet Pedicle Screw Alone or in Combination With Contralateral Pedicle Screw Rod Fixation*

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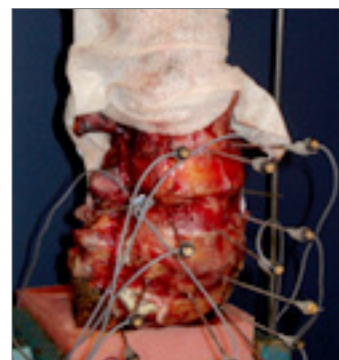
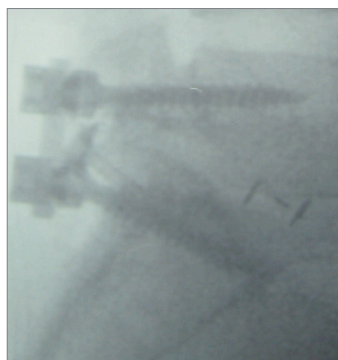
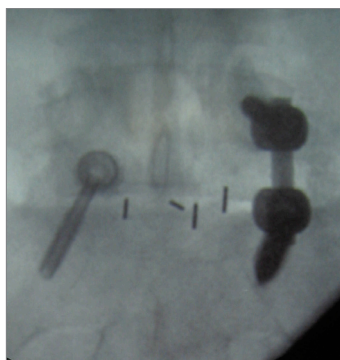


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Background Context

Fixation across the lumbosacral segment is challenging and is made worse with unilateral facetectomy for transforaminal interbody placement or for severe stenosis. No study has previously investigated the biomechanics of stabilization at L5-S1 when using combined facet screw fixation (FF) and pedicle screw-rod fixation (PS), either in the intact spine or after unilateral facetectomy.

Purpose

To assess the stability after FF or combined FF+PS in the intact condition and after facetectomy at L5-S1.

Study Design/Setting

Paired in vitro nondestructive flexibility comparison in specimens instrumented at L5-S1 with FF or combined FF and PS.

Patient Sample

Two human cadaveric L2-S1 specimens were studied, with motion assessed at L5-S1.

Outcome Measures

Range of motion (ROM) during flexion, extension, axial rotation, and lateral bending was 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 bilateral L5-S1 FF+T-LIFT, (C) after FF on the left and PS on the right (T-LIFT), (D) after FF on the left+T-LIFT (PS disengaged), (E) after facetectomy with FF L+PS R+T-LIFT, and (F) facetectomy with FF L+T-LIFT.

Results

Facetectomy and stabilization with unilateral FF Only allowed greater ROM in all modes than facetectomy and stabilization with L FF+R PS.

Discussion & Conclusion

Our preliminary results suggest that unilateral facetectomy destabilizes the segment and that contralateral facet fixation alone offers much less stability than having a hybrid of contralateral facet fixation and ipsilateral pedicle screw fixation on the facetectomy side.

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