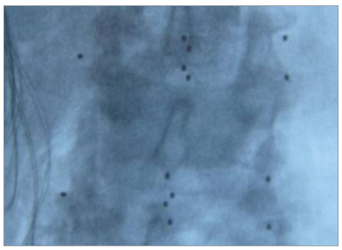
# Biomechanics of Posterior Lumbar Fixation After Unilateral L4-5 Facetectomy and TLIF Cage*

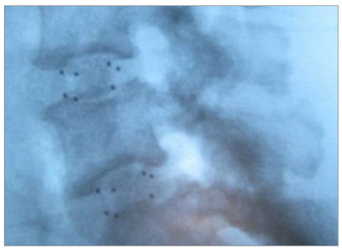
**Kingsley R. Chin, M.D.**, *Institute for Modern and Innovative Surgery, Fort Lauderdale, FL*
**L. Perez-Orribo**, *Barrow Neurological Institute, Phoenix, AZ*
**Philip M. Reyes, BSE**, *Barrow Neurological Institute, Phoenix, AZ*
**Anna G.U. Sawa, M.S.**, *Barrow Neurological Institute, Phoenix, AZ*
**Steven C. Anagnost, M.D.**, *The Orthopaedic Center, Tulsa, OK*
**Vivek P. Kushwaha, M.D.**, *Houston Orthopedic and Spine Hospital, Houston, TX*
**Josue P. Gabriel, M.D.**, *St. Anthony's Memorial Hospital, Effingham, IL*
**S. Craig Meyer, M.D.**, *Columbia Orthopaedic Group, Columbia, MO*
**Carl A.R. Bruce, M.D.**, *Univeristy Hospital of the West Indies, Kingston, Jamaica*
**Warren D. Yu, M.D.**, *George Washington University Hospital, Washington DC*
**Neil R. Crawford, Ph.D.**, *Barrow Neurological Institute, Phoenix, AZ*

**Research Performed At:**
Barrow Neurological Institute, Spinal Biomechanics, Phoenix, AZ 85013

**Principal Investigator:**
Neil R. Crawford, Ph.D.

**Co-Investigator:**
Kingsley R. Chin, M.D.
Institute for Modern and Innovative Surgery, Fort Lauderdale, FL 33311





## Background Context

After unilateral lumbar facetectomy, discectomy, and placement of a T-LIFT graft, it is unclear the extent to which the level is destabilized and how much stability can be regained with different fixation methods. It would be predicted that bilateral pedicle screws/rods (PS) would provide the greatest stability, but other hardware combinations that include contralateral transfacet pedicle screw fixation (FS) and spinous process plate (SPP) fixation may provide reasonable stability as well and thus need to be evaluated.

## Purpose

*The goal of this in vitro study was to quantify the stabilizing potential at L4-L5 after unilateral facetectomy with different combinations of hardware including PS, FS, and SPP fixation.*

## Study Design/Setting

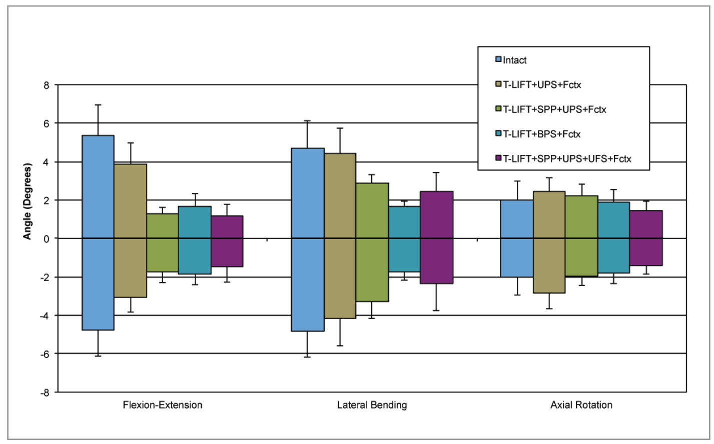
Nondestructive repeated-measures in vitro flexibility test comparing stability of several constructs.

## Patient Sample

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

## Outcome Measures

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




## Methods

Nondestructive, nonconstraining pure moments (maximum 7.5 Nm) were applied to specimens while recording segmental motion optoelectronically. Specimens were tested (A) intact, then after facetectomy, discectomy, and T-LIFT placement followed by (B) unilateral ipsilateral PS (UPS), (C) SPP+UPS, (D) bilateral PS (BPS), and (E) SPP+UPS+contralateral FS (UFS).

## Results

The construct utilizing UPS alone allowed significantly greater ROM than all other constructs in all loading modes ($p<0.03$, RM-ANOVA/Holm-Sidak) except SPP+UPS during axial rotation. The remaining constructs that included FS, PS, or SPP did not allow different ROM during flexion or extension. However, SPP+UPS allowed significantly greater ROM than SPP+BPS during lateral bending ($p=0.01$) and significantly greater ROM than SPP+UPS+UFS during axial rotation ($p=0.02$).

## Discussion & Conclusion

Our findings indicate that, after facetectomy and T-LIFT, equivalent stability can be achieved from constructs utilizing BPS or UPS+UFS+SPP. Constructs utilizing only UPS are unable to achieve comparable stability to constructs utilizing at least one additional component.

## References

Kaibara T, et al: Biomechanics of a Lumbar Interspinous Anchor with Transforaminal Lumbar Interbody Fixation. World Neurosurgery 73(5):572-577, 2010.

**Pending Publication*

This study was sponsored by the LES Society
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