Background Context
After transforaminal lumbar interbody fixation (T-LIFT), several options exist for augmentation to provide a stable fusion construct. Some of these options are application of spinous process plate (SPP), pedicle screws and rods (PS), and/or transfacet pedicle screws (FS).

Purpose
The purpose of this study was to quantify and compare the stabilizing potential at L4-L5 after T-LIFT of constructs that include PS, FS, and SPP fixation.

Study Design/Setting
Nondestructive repeated-measures in vitro flexibility test comparing stability of several constructs.

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

Outcome Measures
Range of motion (ROM) at L4-L5 was quantified during flexion, extension, axial rotation, and lateral bending.

Methods
In each specimen, nonconstraining nondestructive pure moments (7.5 Nm maximum) were applied while recording 3D specimen motion optoelectronically. Specimens in Group 1 (N=7) were tested (A) intact, (B) after T-LIFT, (C) after T-LIFT+BFS, (D) after T-LIFT+SPP+unilateral FS (UFS), and (E) after T-LIFT+SPP+bilateral FS (BFS). Specimens in Group 2 (N=7) were tested (A) intact, (B) after T-LIFT, (C) after T-LIFT+SPP, (D) after T-LIFT+SPP+unilateral PS (UPS), and (E) after T-LIFT+bilateral PS (BPS).

Results
During flexion and extension, all constructs that included FS, PS, or SPP significantly reduced the ROM relative to the intact condition (p<0.001, ANOVA/Holm-Sidak). However, during lateral bending, only T-LIFT+BPS significantly reduced the ROM relative to intact (p<0.001), and during axial rotation, no construct reduced ROM to significantly less than intact (p>0.06). T-LIFT+BPS allowed significantly smaller ROM than any other construct during lateral bending (p<0.04). During axial rotation, constructs utilizing PS-rod fixation did not allow significantly different ROM than constructs utilizing FS.

Discussion & Conclusion
It was found that, after T-LIFT, comparable fixation was obtained by constructs utilizing SPP+UFS, SPP+UPS, and SPP+BFS. A construct of T-LIFT+SPP+BPS provided the best stability in all directions of loading, especially lateral bending.

References