Introduction: Few studies have focused on the oblique technique as a potentially more accurate method of placing percutaneous lumbar pedicle screws without direct visualization. A prospective, randomized, IRB-approved study was undertaken to evaluate the accuracy and safety of the oblique technique using computer assistance (NeuroVision® Guidance, NuVasive, San Diego, CA) to facilitate orienting the C-arm into the oblique view efficiently and accurately.

Methods: After providing informed consent, patients were randomized into one of two groups: one underwent placement of lumbar pedicle screws using the oblique technique with the assistance of Guidance; the other group underwent screw placement per the surgeon's usual technique using fluoroscopy alone (non-Guidance). Fluoro time, screw placement time, and EMG thresholds were recorded intraoperatively for both groups. A neural exam and VAS pain assessment were obtained pre- and immediately post-op. A post-op CT scan was also obtained to determine screw placement accuracy.

Results: A total of 47 patients (27 females and 20 males) have been enrolled to-date. Primary surgeries included instrumented ALIF (9), XLIF (18), and/or TLIF (22). Of the 214 screws evaluated post-op by CT, 11 (5.1%) breaches occurred: 8 (3.7%) medial, 2 (0.9%) lateral, and 1 (0.5%) inferior; 10 of the 11 pedicle breaches were less than 2mm in magnitude, and 1 breach in the non-Guidance group was 2-4mm in magnitude. None of the breached screws required revision, and there were no significant differences in clinical improvements between patients with breached screws (n=7) and those without (n=40). Use of Guidance resulted in a statistically lower fluoro usage per screw (p< 0.001, figure 1) and quicker placement of guidewires (p< 0.001). Although there was no statistical difference in the average time it took to place each screw, average times trended lower with the use of Guidance (p=0.059).

Conclusion: The oblique technique for percutaneous pedicle screw placement using NeuroVision Guidance provides feedback on the appropriate targeting of the pedicle and successfully reduces the amount of fluoroscopy used without significantly adding to the time required for placing pedicle screws.