

Image-Guided Placement of Thoracolumbar Pedicle Screws Does Not Prolong Operative Duration

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Introduction

Modern intraoperative, image-guided spinal navigation has been shown to improve accuracy for thoracolumbar pedicle screw placement in comparison to the traditional methods. Also, there may an additional benefit of limited radiation exposure to both the patient and surgeon. However, one major deterrent to widespread use of image-guided spinal navigation has been the perceived prolongation of operative time due to the acquisition of intra-operative three-dimensional images. We postulated that, after the initial learning curve, the additional operative time in obtaining the intraoperative images is outweighed by the shorter time of placing pedicle screws with spinal navigation, improved accuracy, and less radiation exposure.

Methods

We performed a retrospective, observational study of 181 consecutive patients who underwent a thoracolumbar fusion for both traumatic and degenerative pathologies. In the image guidance group, each patient underwent an intraoperative CT scan of the area of interest. This was then registered to a navigation system prior to pedicle screw placement. In the control group, pedicle screws were placed using either fluoroscopic or traditional free-hand technique. Operating time was quantified as the total operative time divided by the number of screws placed.

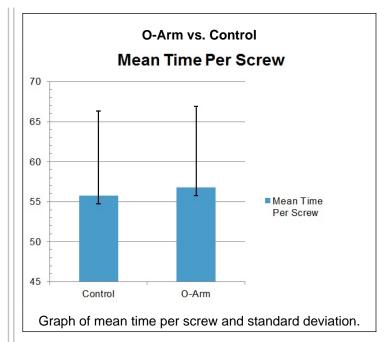
Learning Objectives

To describe the advantages and potential disadvantages of intraoperative spinal stereotactic navigation in thoracolumbar pedicle screw insertion with particular attention to operative duration.

Results

A total of 1110 pedicle screws were placed in 555 levels in 181 patients. There were 340 screws placed in 43 patients using intraoperative image-guidance, as compared to 770 screws placed in 138 patients using traditional techniques of either free-hand placement or fluoroscopy-guided placement. The mean operating time per screw was 28.4 minutes in the intraoperative image-guidance group vs. 27.9 minutes in the traditional technique group, which was **not significantly different** (P=0.78).

O-Arm vs. Control				
	Cases	Screws	Mean OR Time	Mean Time
				Per Screw
Control	138	770	143.77	55.73
O-Arm	43	340	198.77	56.77
Total	181	1110		
Results comparing O-Arm vs. Control				



Conclusions

Employing image-guided spinal navigation does not increase operative time compared to traditional techniques and may provide advantages such as limited radiation exposure to the patient and surgeon.

Additionally, since intraoperative 3-D navigation demonstrates an improved accuracy in pedicle screw insertion, its use can be justified in terms of no significant prolongation of operation duration.

References

Mason et al. 2014. The accuracy of pedicle screw placement using intraoperative image guidance systems. JNS Spine. 20: 196-203.