

## Neural Decompression via XLIF and TLIF. The Impact of Fan-beam Intraoperative CT in Clinical Spine Research?

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### Introduction

The purpose of the study was to intraoperatively assess and evaluate the degree of neural decompression through minimally invasive (MIS)-ELIF and MIS-TLIF utilizing a novel intraoperative fan beam CT (iCT). Using the fan beam iCT provides immediate feedback to the surgeon, allowing him or her to assess the success of the operation and recognize needed corrections during the surgery.

### Methods

A retrospective study of patients undergoing iCT-guided MIS-ELIF or MIS-TLIF was conducted. Preoperative and intraoperative radiographic parameters obtained from iCT were quantified, including intervertebral disc height, foraminal area, central canal surface area, and segmental lumbar lordosis.

### Results

34 patients containing 41 spinal motion segments were analyzed. Intraoperative CT-based navigation was successfully accomplished in all patients and the quality was sufficient for morphological analysis of all spinal segments. Radiographic parameters, including disc height (m=+4.3 mm/+2.8mm), axial central canal surface area (m= +57.1mm<sup>2</sup>/+102.4mm<sup>2</sup>), foraminal area (m= +42.3mm<sup>2</sup>/ +37.1mm<sup>2</sup>), segmental disc angle (m= +7.32°/+6.11°) and lumbar lordosis (m= +9.64°/+3.3°) revealed significant improvement immediately after MIS-ELIF and MIS-TLIF surgeries (p = 0.05). Despite a significantly stronger restoration of disc height in MIS-ELIF compared to MIS-TLIF (p = 0.05) no significant increases in the foraminal area, the central canal surface and the lumbar lordosis were demonstrated between MIS-ELIF and MIS-TLIF (p = 0.05). Facet degeneration did not affect the amount of neural decompression in MIS-ELIF.

### Conclusions

Intraoperative CT was capable of assessing neural decompression by MIS-ELIF and MIS-TLIF with high accuracy. Both procedures demonstrated equivalent efficiency in neural decompression and restoration of spinal biomechanics.

### Learning Objectives

Participants should be able to:

Understand that; Fan Beam iCTs, also known as intraoperative conventional CT scanners, provide unique soft tissue definition that is much better than their previous generation of cone beam CT scanners, and they provide critical radiological information that may influence surgeons' decision making before the patient leaves the OR.

### References