# Navigated Robotic-Guided Pedicle Screws Placed Successfully in Single-Position Lateral Lumbar Interbody Fusion

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# Disclosures

- LAA, JRR, and CGL are employees of Globus Medical, Inc. with stock options
- KTH is a consultant and receives royalties from NuVasive, royalties from Titan Spine, and royalties from ODC

# Background

Minimally invasive lateral interbody fusion has distinct advantages over traditional posterior approaches

- Percutaneous placement of pedicle screws from the lateral decubitus position may potentially increase safety and improve operative efficiency
- Precludes need for repositioning
- Studies investigating the safe placement of pedicle screws in lateral position needed

# Materials and Methods

- Single-center contribution
- Retrospective, IRB-exempt
- Radiographic Outcomes
  - Screw placement evaluation
  - Screw malposition rate
  - Screw reposition rate
  - Return to operating room (OR) rate

# SP-LLIF Single Position Lateral Lumbar Interbody Fusion (SP-LLIF)

- Lateral decubitus position
- Retroperitoneal approach
- Neuromonitoring
- No repositioning

# Intraoperative Pedicle Screw Placement Planning

- Dynamic reference base + surveillance marker placed
- Introperative CT taken + registered w/ software
- Pedicle screw trajectory planning

# Intraoperative Pedicle Screw Placement

- Surgeon-controlled foot pedal activated + positioned robot arm to planned pedicle trajectory
- Stab incisions
- Pedicle screws inserted under neuromonitoring using navigated instruments guided by robotic arm

# Results

**Baseline Characteristics**

- 55 consecutive patients
- 49% female
- Avg Age: 67 yrs
- Avg BMI: 29.5 $kg/m^2$
- 27% current/former smokers

**Surgical Data**

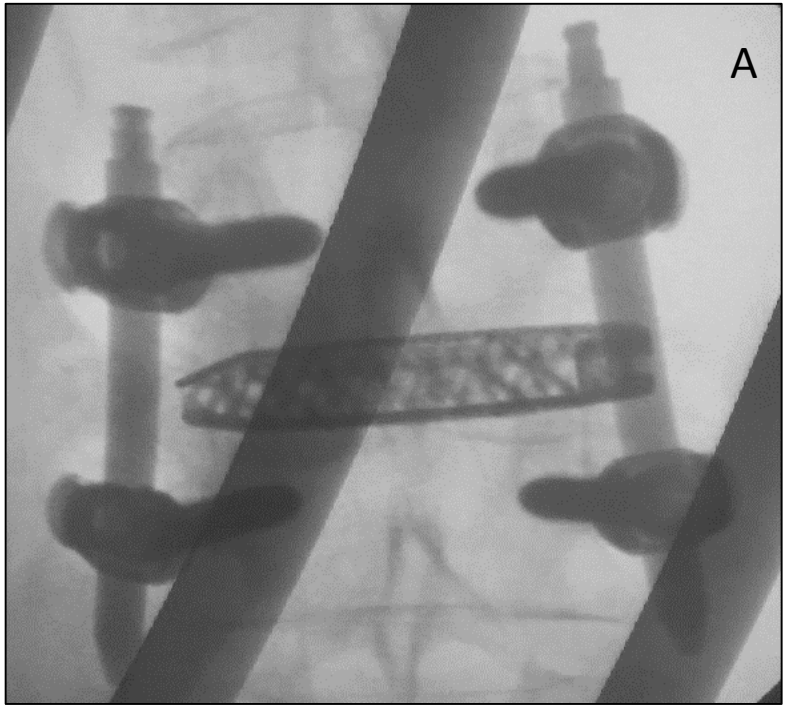
- 19/55 2-level cases
- 171 levels treated
  - 52/171 at L4
- 342 screws placed
- Mean EBL: 117.4cc
- Mean OR Time: 155.7 min.
- Mean LOS: 2.9 days

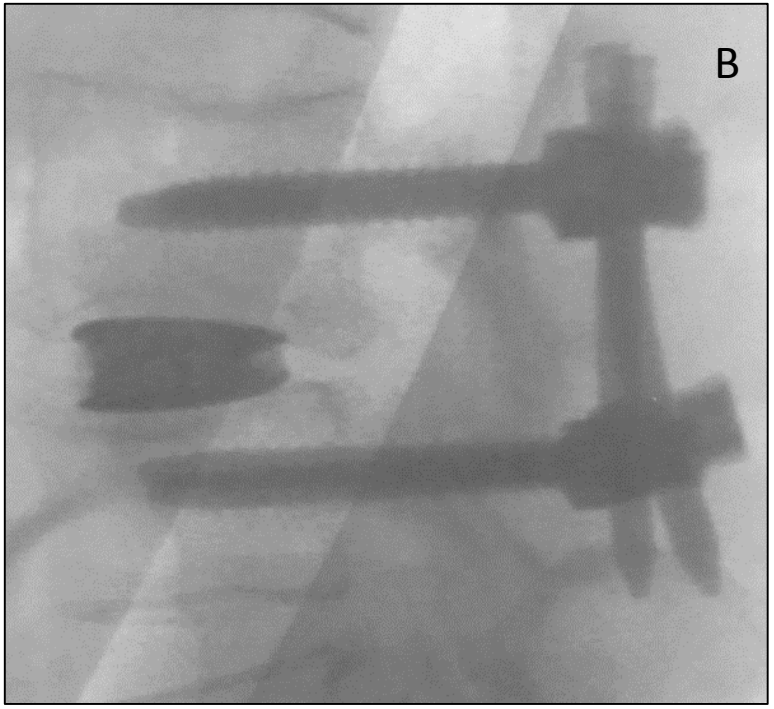
# Results: Pedicle Screw Positioning

- 342 pedicle screws placed
- 4% (14/342) placed manually
  - Due to surgeon discretion

- 328 screws placed with the robot
- 2% (7/328) repositioned
  - Due to surgeon discretion
- No malpositions requiring return to OR

98% screw placement success rate for navigated robot-assisted pedicle screw placement




Postoperative anteroposterior (A) and lateral (B) fluoroscopic images of a one-level MIS SP-LLIF

# Conclusions

This study demonstrates a high level (98%) of successful surgeon-assessed pedicle screw placement in minimally invasive navigated robot-assisted SP-LLIF