

Comparison of Cortical Bone Trajectory Screw Placement Using the Midline Lumbar Fusion Technique to Traditional Pedicle Screws: a Case-Control Study

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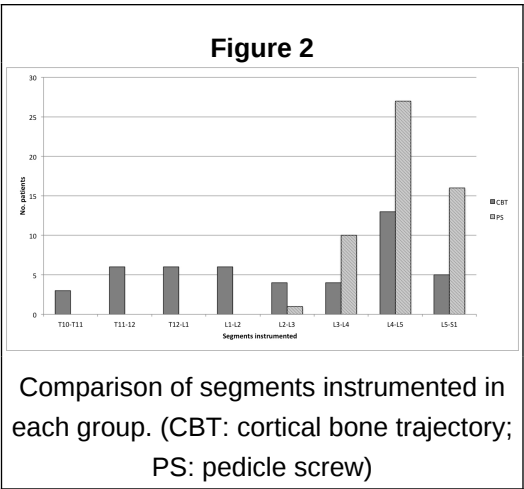
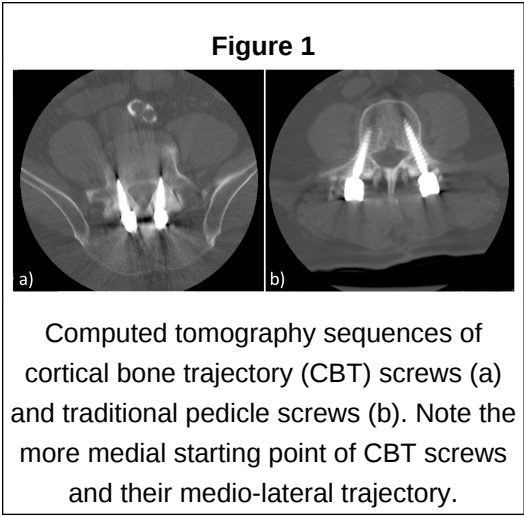


Introduction

Cortical bone trajectory (CBT) screws are an alternative to traditional pedicle screws (PS) for lumbar fixation. The proposed benefits of CBT screws include decreased approach-related morbidity and greater cortical bone contact to prevent screw pullout. Relatively little data is published on this technique. Here, we compare the midline lumbar fusion (MIDLF) approach for CBT screw placement to transforaminal lumbar interbody fusion (TLIF) for traditional PS placement.

Methods

A prospectively maintained institutional database was retrospectively reviewed for all patients undergoing lumbar fusion using CBT screws over the past five years (**Figure 1**). Controls were identified from the same database as patients undergoing lumbar fusion with traditional PS placement. We compared the CBT screw and PS groups according to operative time, EBL, LOS, and improvement in visual analog scale (VAS) and Oswestry Disability Index (ODI) scores.

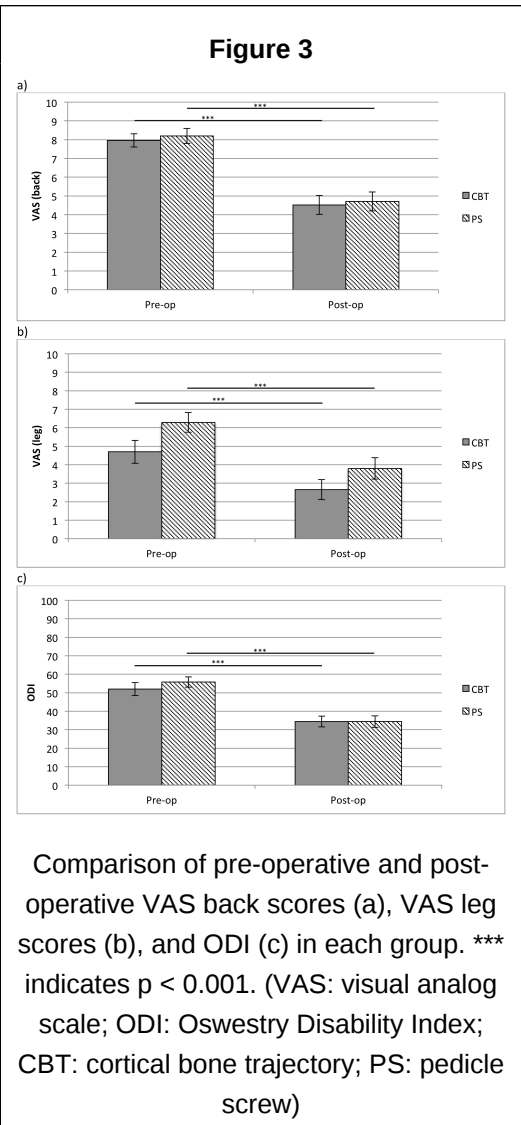


Results

A total of 23 patients who underwent CBT screw placement and 35 controls who received traditional PS were identified. The mean age of the cohort was 51.5 years $\pm$ 12.1. The median follow-up time was 52.5 months (range: 8 - 74). **Figure 2** displays the distribution of segments operated on in each group. When adjusting for age, sex, number of segments operated on, and whether or not an interbody cage was placed, the CBT screw group had significantly less EBL than the PS group (186 mL vs. 414 mL respectively; $p = 0.008$). Two patients in the PS group required a blood transfusion in the immediate postoperative setting. No patients in the CBT group received a blood transfusion. The mean LOS in the CBT group was significantly shorter than in the PS group (3.6 days vs. 4.6 days, respectively; $p = 0.02$). However, there was no significant difference between the groups in regard to operative time.

Results (cont.)

As shown in **Figure 3**, there were statistically significant improvements in pre-operative ODI and VAS scores for back and leg pain in each treatment group. There was no difference in the amount of improvement in ODI and VAS scores between the two groups.



Conclusions

The MIDLF approach with CBT screw placement is associated with less intraoperative blood loss and shorter LOS than traditional pedicle screw placement. There is no difference between the two techniques in regard to improvement in pain or disability.

Learning Objectives

By the conclusion of this session, participants should be able to:

- 1) Describe the proposed benefits of the midline lumbar fusion approach for cortical bone trajectory screw placement
- 2) Compare the outcomes of cortical bone trajectory screw placement to pedicle screw placement

Results (cont.)

There were two hardware complications in the group that underwent CBT screw placement and three in the group that received traditional PS placement. Two patients in each group had screw loosening or pullout on follow-up. In the PS group, one patient had screw malposition necessitating return to the operating room for revision. Furthermore, two patients in the PS group developed pseudoarthrosis.