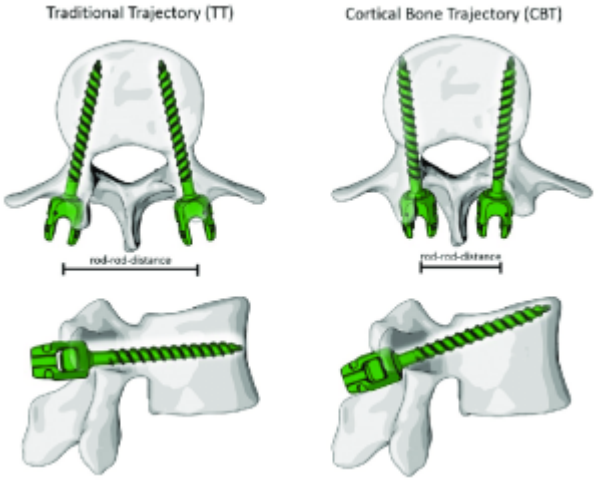
# Cortical bone trajectory screw fixation




Cortical bone trajectory (CBT) screw fixation is a technique used in spinal surgery to provide fixation and stabilization of the vertebral column. This technique involves the use of screws that are inserted through a trajectory that passes through the outer or cortical layer of the bone, rather than the traditional midline trajectory.

The CBT technique has several advantages over traditional screw placement techniques, including a smaller incision size, reduced muscle dissection, and decreased intraoperative blood loss. Additionally, the CBT technique has been shown to provide better pullout strength and more stable fixation than traditional screw placement techniques.

CBT screws are inserted at a shallower angle than traditional screws, which allows for a longer screw and greater cortical purchase. This increased purchase provides greater resistance to pullout forces, allowing for a more stable fixation. CBT screws are typically used in the lumbar spine for the treatment of degenerative disc disease, spinal stenosis, and other spinal conditions.

The CBT technique does have some potential risks, including the risk of screw misplacement or malposition, nerve or vascular injury, and infection. As with any surgical procedure, proper patient selection and surgical technique are essential to minimizing the risks associated with CBT screw fixation.

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A retrospective study was conducted on 46 patients (26 men and 20 women; average age 60.8 ± 6.78 years) with symptomatic ASD. The patients were treated with three approaches. The operation time, incision length, time to return to work, complications, and the like were compared among the three groups. Intervertebral disc space height, angular motion, and vertebral slippage were obtained to assess spine biomechanical stability following surgery. The visual analog scale (VAS) score and Oswestry disability index were evaluated at preoperation and 1-week, 3 months, and the latest follow-ups. Clinical global outcomes were also estimated using modified MacNab criteria.

Results: The operation time, incision length, intraoperative blood loss, and time to return to work for the percutaneous transforaminal endoscopic discectomy (PTED) group were significantly decreased compared with those for the other two groups ($P < 0.05$). The radiological indicators in the CBT-PLIF group and TT-PLIF group had better biomechanical stability compared with those in the PTED groups at the latest follow-up ($P < 0.05$). The back pain VAS score in the CBT-PLIF group was significantly

decreased compared with those in the other two groups at the latest follow-up ($P < 0.05$). The good-to-excellent rate was 82.35% in the PTED group, 88.89% in the CBT-PLIF group, and 85.00% in the TT-PLIF group. No serious complications were encountered. Two patients experienced dysesthesia in the PTED group; screw malposition was found in one patient in the CBT-PLIF group. One case with a dural matter tear was observed in the TT-PLIF group.

All three approaches can treat patients with symptomatic adjacent segment degeneration efficiently and safely. Functional recovery was more accelerated in the PTED group compared with the other approaches in the short term; CBT-PLIF and TT-PLIF can provide superior biomechanical stability to the lumbosacral spine following decompression compared with PTED; however, compared with TT-PLIF, CBT-PLIF can significantly reduce back pain caused by iatrogenic muscle injury and improve functional recovery. Therefore, superior clinical outcomes were achieved in the cortical bone trajectory screw fixation (CBT-PLIF) group compared with the PTED and TT-PLIF groups in the long term [1)].

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Li T, He H, Zhang T, Li X, Xie W, Huang B, Xu F, Xiong C. Comprehensive comparison of three techniques for the treatment of adjacent segment degeneration after lumbar fusion. Front Surg. 2023 Mar 30;10:1096483. doi: 10.3389/fsurg.2023.1096483. PMID: 37066013; PMCID: PMC10097961.