Case Report

Cortical Bone Trajectory Technique

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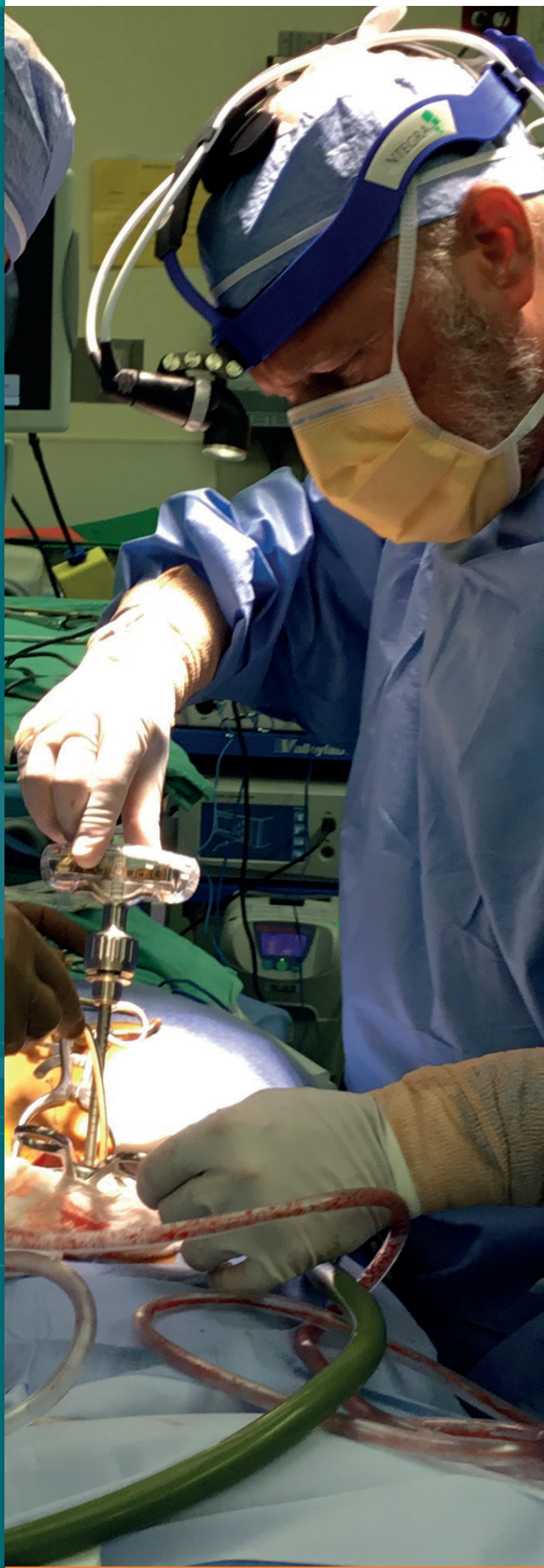

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Case

Female, 54 y/o. With significant mechanical and chronic low back painas well as bilateral leg pain. There is a noted degenerative disk with herniated nucleus pulposus at L4-5, and right clinical L4-5 radiculopathy. She had a pervious history of several spinal procedures. She has sacroiliacjoint dysfunction with adjacent segment disease above and below her prior multiple operated fusions.

Operative Plan

360 degree decompressive lumbar laminectomy, osteotomy, and posterior instrumented fusion L1-S1.

Fig. 1

Preparation Technique

Cortical Bone Trajectory (CBT) screw insertion follows a lateral path in the transverse plane and caudocephalad path in the sagittal plane. This technique has been advocated because it is reportedly less invasive, improves screw-bone purchase and reduces neurovascular injury.

Recent studies and literature reports that Dr. Richard Hynes developed a safe and accurate screw placement technique for thoracic and lumbar posterior fixation. This technique is referred to as CBT "Cortical Bone Trajectory". Dr. Hynes has researched the biomechanics of such CBT placement, and reports a cortical thread screw across the pars has equal or better pullout strength to a conventionally placed pedicle screw and provides adequate fixation for an interbody fusion. The Dr. Hynes CBT technique also has been shown to have the potential for somewhat better fixation in the presence of osteopenic bone. CBT also avoids the traditional midline approach while significantly reducing the amount of intra-operative radiation exposure. Adjacent segment disease is commonly addressed by spine surgeons and requires investigation of previously placed hardware either for adding on a level or complete hardware removal. The CBT technique allows for additional level treatment without the need to remove any previously placed hardware, reducing surgical and anesthesia time.

Fig. 2

Screw Path Preparation Instrumentation: PediGuard® Threaded

The PediGuard® Threaded probe with DSG® (Dynamic Surgical Guidance) Technology is a stand-alone, screw hole preparation instrument, requiring no additional equipment. It differentiates between tissue types (cancellous, cortical or soft tissue) based on their electrical conductivity via a bipolar sensor embedded at the tip of each device. The PediGuard Threaded provides real-time audible and visual signals to the surgeon, allowing for anticipation of far side cortical wall. The PediGuard Threaded device (Fig.3) allows the surgeon to preform a cortical trajectory for better mechanical strength while saving time by elimitating the «tapping step».

Fig. 3: PediGuard Threaded

Surgery report

Anterior retrograde approach L4-5 for anterior lumbar diskectomy of L4-5. Anterior interbody fusion.
Posterior CBT fusion L1-S1. Threaded PediGuard used to achieve optimum screw length.
One AP, one lateral fluoro intra-operative imaging were taken.
Total blood loss 25mL . There were no surgical complications.

Conclusion

The PediGuard Threaded device with DSG® (Dynamic Surgical Guidance) Technology is used to add safety to the placement of the CBT screws and significantly reduce the number of radiographic images needed. In addition, definite bicortical purchase is obtained.

Fig. 4a Fig. 4b

"You have an accurate idea of where you are concerning the length. With DSG/PGT I am able to get to the last mm of cortical thread, I am able to put in longer screw".

"Anatomical landmarks and DSG equate to minimal radiation".

Richard Hynes, M.D.
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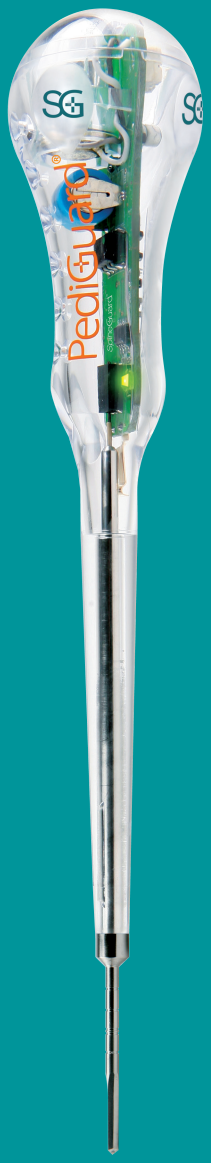

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