

Supplemental Interspinous Aspen Fixation for Minimally Invasive Transforaminal Lumbar Interbody Fusion

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ASPEN™

Spinous Process Fixation System



INTRODUCTION

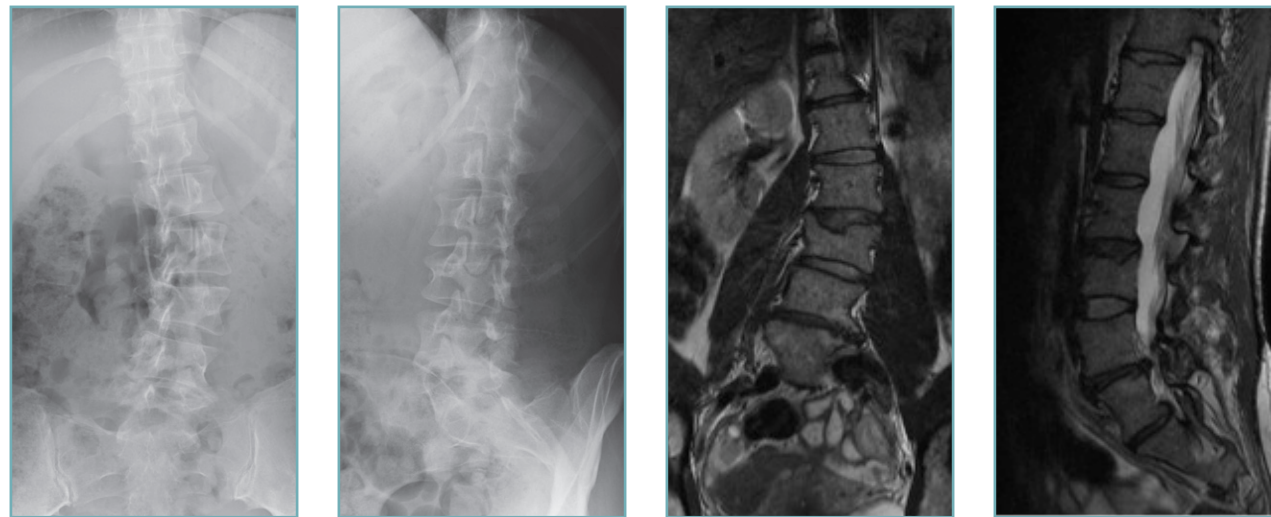
First described by Harms and Rollinger, the transforaminal lumbar interbody fusion technique (TLIF) was an innovative improvement in posterior surgical approaches to the disc space for interbody arthrodesis. While the TLIF procedure only requires a unilateral approach to the intervertebral space, this technique is most often combined with bilateral pedicle screw and rod constructs. Unilateral pedicle screw constructs or other less invasive percutaneous bilateral pedicle screw systems are among several techniques used in combination with TLIF to minimize tissue trauma, postoperative pain and length of recovery.

As an illustrative case, a patient with degenerative disc disease, a large herniated disc and scoliosis is presented to describe a less invasive yet feasible alternative to traditional, more invasive techniques.

HISTORY OF PRESENT ILLNESS AND IMAGING STUDIES

The patient is a 40-year-old female competitive triathlete who presented with a history of low back and left leg pain. She underwent a left L4-L5 microdiscectomy in 2006 with minimal, temporary relief of her symptoms. Her radicular pain subsequently worsened in association with back pain secondary to instability at L4-L5. She also suffered from numbness and tingling in the L5 distribution. The patient tried another round of conservative treatment that included medications, physical therapy and epidural steroid injections. After failing to improve she was then advised to undergo a multilevel thoracolumbar instrumentation and fusion and to quit sports altogether.

Neurological examination confirmed decreased sensation in the left L5 distribution associated with dorsiflexor weakness and foot drop. MRI of the lumbar spine demonstrated moderate to severe degenerative disc disease with Modic changes in the endplates of L4 and L5. There was a left paracentral disc herniation and right-sided facet joint arthropathy at L4-L5 causing moderate foraminal stenosis. Significant epidural scar tissue and fibrosis was noted at the L4 and L5 nerve roots. A 20° scoliosis was measured on plain radiographs along with 3 mm translational listhesis or instability at L4-L5 on flexion and extension views.



Pre-operative anterior-posterior and oblique radiographs and MRI of the lumbar spine.

TREATMENT METHOD AND MATERIALS

The goals of the procedure for this very active patient were to decompress the neural elements utilizing the least invasive methods possible while also stabilizing the spine with a solid construct in order to facilitate fusion.

A small midline incision was performed over the L4-L5 spinous processes. This was carried down to the fascial layer where a subperiosteal plane was created along spinous processes and down the lamina bilaterally. The facet joint on the left was identified and verified using intraoperative fluoroscopy. Unilateral pedicle screw placement was performed on the left at the L4 and L5 levels with distraction across the interspace. A far lateral transfacet decompression was then performed on the same side. There was significant residual disc herniation and osteophytes protruding posteriorly causing L5 root compression. A complete discectomy was performed with preparation of the endplates, and two 8 mm structural allografts, locally harvested autograft from the facetectomy, and bone morphogenetic protein were placed to promote interbody fusion. A 12 mm Aspen device was then inserted at L4-L5 in lieu of bilateral pedicle screw fixation, thus decreasing the operative time, blood loss and postoperative pain associated with the instrumentation.

The operative time was 157 minutes. Total blood loss associated with the procedure was approximately 50 cc. The patient was subsequently discharged without event.

The Aspen device (Lanx, Broomfield, CO) is a plate designed for attachment to spinous processes in order to provide a supplemental posterior, non-pedicle fixation. It is easy to implant and no fluoroscopic guidance is required. By utilizing the Aspen device, the construct eliminated the need for pedicle screws on the contralateral side, thus limiting the need for a more extensive lateral dissection, decreasing the operative time and blood loss and eliminating the risk of neural injury on the opposite side. This also allowed for the preservation of the entire contralateral facet complex for posterolateral bone graft without requiring exposure of the transverse processes.

FOLLOW UP RESULTS

The patient reported no back pain at two weeks following the surgery. Her leg pain and foot drop were completely resolved by six weeks. She began swimming and biking within 12 weeks and was back to her previous active lifestyle by six months. Almost exactly one year after her surgery she completed an Ironman triathlon.

CONCLUSION

The development of new, less invasive surgical techniques allows lumbar interbody fusion surgery with decreased morbidity, quicker recovery and immediate mobilization and rehabilitation. In the unilateral pedicle screw fixation in conjunction with the Aspen device and TLIF described in this case report, optimal biomechanical stability was achieved while limiting the need for a more extensive lateral exposure and preserving the entire contralateral facet for a more rapid and solid fusion.



Plain films of the lumbar spine three months after surgery demonstrate solid fusion.

The descriptions of the results obtained from use of the Aspen Spinal Fixation System in this promotional piece are based on the physician's actual experience. The results achieved in any particular case using the Aspen device can vary and the results achieved in the case discussed may not be typical. The use of the Aspen device entails certain risks, such as the possibility of implant bending or breakage, loosening, movement or migration of the device, or bone or spinous process fracture. In addition, the Aspen device should be used for only those indications described in the Package Insert for the Aspen device, entitled "Important Information on the Lanx Spinal Fixation System," a copy of which may be obtained by contacting Lanx Customer Service at 1.866.378.4195. Refer to the Package Insert for a more complete description of indications, contraindications, warnings and other information about the product.

*The physician author of this case has been compensated for his illustration by Lanx, Inc. and has stock ownership in Lanx, Inc.

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