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CASE REPORT

# Anterior Lateral Graft Insertion During an ALIF Procedure Using SPIRA Open Matrix Spacer

Jayme Trahan, MD

**Study Design.** This is a case report.
**Objective.** This report describes an anterior-lateral graft option when performing an anterior lumbar interbody fusion (ALIF).
**Summary of Background Data.** ALIF is a valuable approach to the lower lumbar spine. Vascular mobilization is essential to proper disc exposure.
**Methods.** A 70-year-old male who underwent a two-level ALIF for the treatment of low back pain and lumbar radiculopathy.
**Results.** Secondary to difficulties with venous mobilization, an anterior-lateral approach had to be utilized to perform the discectomy and graft insertion.
**Conclusion.** The SPIRA open matrix ALIF spacer allows for both anterior and anterior-lateral insertion techniques to account for variations in approaching the discectomy and graft placement.
**Key words:** ALIF, low back pain, SPIRA.
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Chronic low back pain effects 23% of people at some point during their lifetime.[1] Surgical fusion is a consideration for those patients who have failed 6 months of conservative therapy, have one or two-level degenerative disc disease, or have instability at a lumbar spinal segment.[2] There are multiple approaches to performing a lumbar spinal fusion. Interbody grafting offers the biomechanical advantages of providing anterior column support, graft loading, and increased graft-bone surface contact.[3] Anterior lumbar interbody fusion (ALIF) is an approach that offers these advantages in addition to providing improved lordosis restoration through release of the anterior longitudinal ligament as well as improved grafting volumes.[3]

## CASE REPORT

A 70-year-old male presented with a greater than 2-year history of low back pain with an associated left lower extremity radiculopathy into his calf region as well as into the top of his foot. He described his pain as ranging from 7 to 8 out of 10 in intensity, worsened by standing and walking and relieved by rest. He underwent greater than 6 months of conservative therapy, including physical therapy, chiropractic treatments, lumbar epidural steroid injections, and self-directed exercising.

On examination, the patient was neurologically intact. He did endorse pain with forward flexion of the lumbar spine as well as display paraspinal muscle spasm upon inspection and palpation. Magnetic resonance imaging (MRI) lumbar spine (Figure 1A) noted advanced degenerative changes at the L4-5, L5-S1 disc space; spondylolisthesis at L4-5, L5-S1; neuroforaminal stenosis on the left at L4-5, L5-S1 (Figure 1B); and bilateral spondylolysis at L5. Dynamic X-rays of the lumbar spine noted motion at the L5-S1 level.

## SURGICAL TREATMENT

With the assistance of an access surgeon, a standard anterior retroperitoneal exposure of the L4-5 and L5-S1 disc space was performed. Due to difficulties mobilizing the inferior vena cava, true anterior orientation to the L4-5 disc could not be achieved; therefore, an anterior-lateral approach to the disc was utilized. After standard discectomy and arthrodesis was performed, a $9 \times 23 \times 26$ mm $15^\circ$ SPIRA open matrix alif spacer (Camber Spine, Wayne, PA), filled with cellular allograft, was inserted in an oblique trajectory into the disc space carefully avoiding injury to the adjacent vessels.

The retractors were then readjusted to expose the adjacent L5-S1 disc space. A standard discectomy and interbody arthrodesis was performed. Afterwards, a $15 \times 26 \times 32$ mm $8^\circ$ ENZA spacer (Camber Spine, Wayne, PA), filled with cellular allograft, was inserted into the disc space. The vertebral body fixation blades were deployed and the locking plate was secured (Figure 2).

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Address correspondence and reprint requests to Jayme Trahan, MD, 99 W Martial Ave, Lafayette 70508, LA; E-mail: jtrahanmdmng@cox-internet.com

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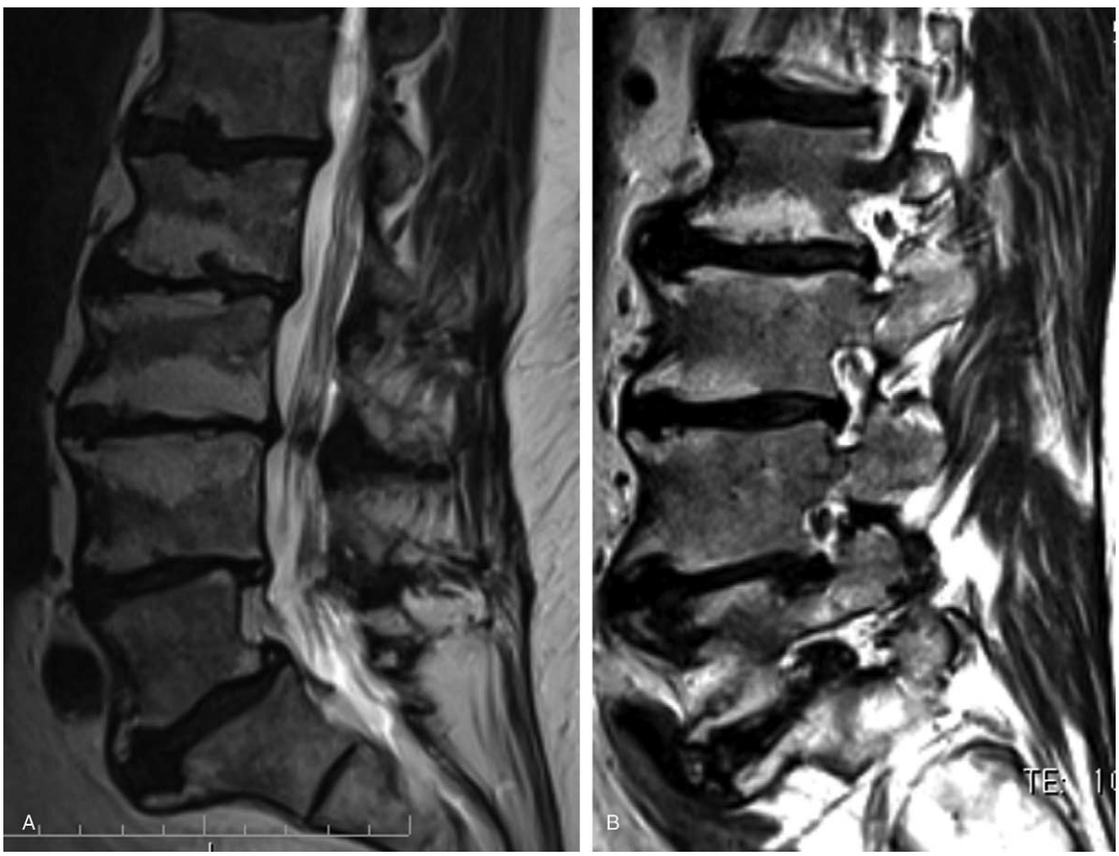


**Figure 1. (A)** A sagittal view showing listhesis of the L4-5 and L5-S1 disc spaces. **(B)** A parasagittal view showing foraminal stenosis of the exiting left L4 and L5 nerve roots.

The patient was then turned prone for the posterior portion of the procedure. Through a paramedian trajectory, percutaneous pedicle screw segmental fixation was implanted from L4 to S1 using O-arm neuronavigation (Medtronic, Minneapolis, MN). After appropriate screw placement was confirmed, navigation was used to doc a tubular retractor on the trailing edge of the L5 laminae on the left. A standard hemilaminectomy, medial L5

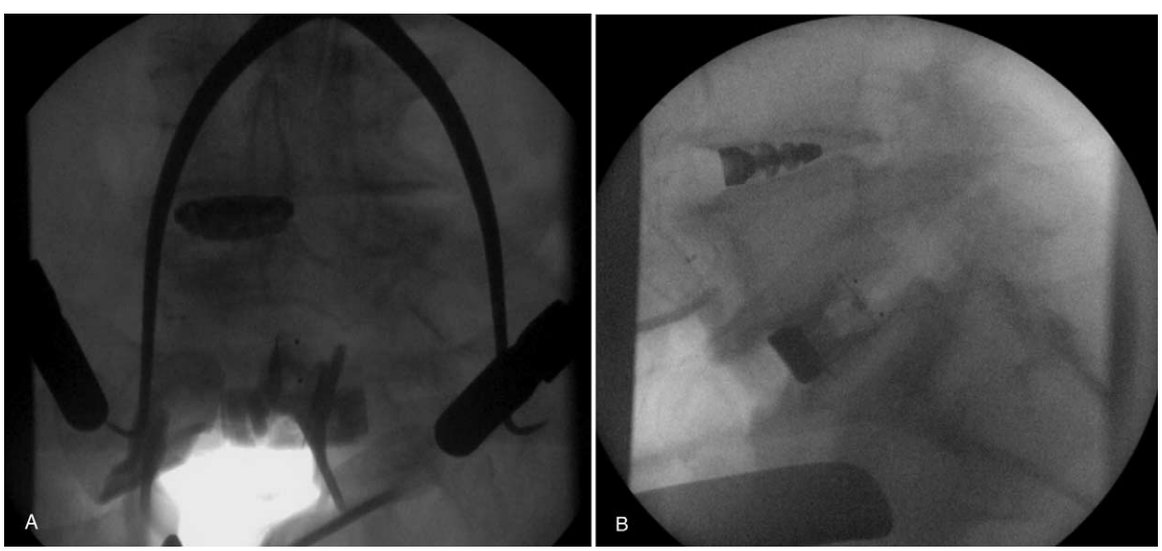


**Figure 2.** Intra-op A-P and lateral views noting L4-5 SPIRA graft spacer inserted across midline through and anterior-lateral insertion corridor.

parsectomy, and foraminotomy was performed on the left. No intraoperative complications occurred.

## DISCUSSION

In the case illustrated above, an ALIF procedure was utilized to restore disc height to the L4-5, L5-S1 levels resulting in indirect decompression of the neural foramen of L4 and L5, to provide large graft-bone surface area, and to provide anterior column support.[3] Limitations of the ALIF procedure were encountered during the operation, specifically mobilizing the inferior vena cava at the L4-5 level. In this case, the vein could not be retracted past the midline without encountering significant bleeding. Therefore, an anterior lateral or oblique approach to the disc space had to be employed. Rather than insert, an ENZA interbody spacer, which utilizes an anterior insertion technique, it was decided to use a SPIRA interbody spacer through the anterior-lateral trajectory.

The SPIRA open matrix ALIF graft offers both anterior and anterior-lateral/antepsoas insertion options. It also offers a porous titanium surface area for enhanced graft fusion properties.[4] In this case example, inserting the graft from an anterior-lateral trajectory allowed placement of the graft across midline despite not having optimal vein mobilization. Through an anterior-lateral working channel to the disc space, vein manipulation is minimized and risk of significant intraoperative bleeding is reduced.

## CONCLUSION

The ALIF procedure is a valuable approach in the armamentarium of a spine surgeon when addressing lower lumbar disc pathology. It is imperative to have various graft insertion angles when troubleshooting challenging venous anatomy. Grafts such as the SPIRA open matrix ALIF spacer allows the surgeon to approach either from an anterior trajectory or anterior-lateral trajectory if optimal venous retraction cannot be achieved.

### ➢ Key Points

- ❑ Adherent venous anatomy to the anterior vertebral spine when performing an ALIF dissection can lead to suboptimal disc space exposure.
- ❑ Using an anterior lateral or anteropsoas corridor to the disc space can allow a surgeon to perform the discectomy and graft insertion while limiting manipulation of the adjacent vascular structures.
- ❑ The SPIRA open matrix ALIF spacer allows for both an anterior and also an anterior-lateral graft insertion option to achieve optimal graft placement despite potential intraoperative challenges encountered with vascular mobilization.

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