

## RIGHT L4-L5 LATERAL RECESS DECOMPRESSION AND MICRODISCECTOMY USING A HAND-HELD CO<sub>2</sub> LASER FIBER



**Minimally Invasive Spine Institute**  
OUTPATIENT SPINE SURGERY CENTER

For more information regarding laser surgery  
at the Minimally Invasive Spine Institute:

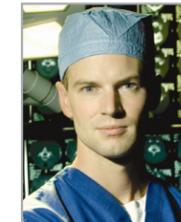
300 Exempla Circle  
Suite 130  
Lafayette, CO  
(303)-539-2533

[www.spinemisi.com](http://www.spinemisi.com)



Spine Case Report Archive, March 2009, sponsored by OmniGuide, Inc. Contact 1-617-551-8444 or visit [www.omni-guide.com](http://www.omni-guide.com)  
OmniGuide is a registered trademark of OmniGuide Inc. ©OmniGuide, Inc.

### Minimally Invasive Spine Institute *Lafayette, Colorado*



E. Lee Nelson, MD



Alan T. Villavicencio, MD



Cathleen Van Buskirk, MD



Alexander M. Mason, MD

The patient, a 61 year-old female, presented with a 3-week history of sciatica in the L5 dermatomal distribution and reported pain of 7 to 8 on the Visual Analog Scale. Magnetic Resonance Imaging revealed minimal grade 1 anterolisthesis of L4 on L5 with severe bilateral facet arthropathy and degenerative lumbar spondylosis. There was severe lateral recess stenosis at L4/5 for the right L5 nerve root. The patient was managed conservatively with oral steroids, NSAIDs, narcotics, and a transforaminal epidural steroid injection (ESI), but continued to be symptomatic. The patient elected to undergo a right L4/5 lateral recess decompression. The surgery was performed by Dr. Lee Nelson. A standard right hemi-laminotomy and medial facetectomy were performed and the L5 nerve was swept medially. The BeamPath™ CO<sub>2</sub> laser fiber (OmniGuide®, Cambridge, MA) was used to ablate tissue in the lateral recess, including small osteophytes and calcified portions of the annulus fibrosis while simultaneously cauterizing the nociceptive pain fibers within the wall of the annulus.

<b>PATIENT PROFILE</b>	<p>61 year-old female with a 3-week history of sciatica in the L5 dermatomal distribution and intermittent numbness and tingling.</p>
	<p>MRI scan revealed a minimal grade 1 anterolisthesis of L4 on L5 with Modic changes surrounding the L4-L5 disc space and degenerative lumbar spondylosis with severe bilateral facet arthropathy as well as a right foraminal and paracentral disc protrusion.</p>
	<p>Compression of the L5 nerve root in the lateral recess of the spinal canal at L4/5 causing L5 radiculopathy was the suspected etiology.</p> <p>Treatment with conservative means including transforaminal ESI proved ineffective, and following a discussion of the risks and benefits, the patient elected to undergo surgery.</p>

## SURGICAL COURSE

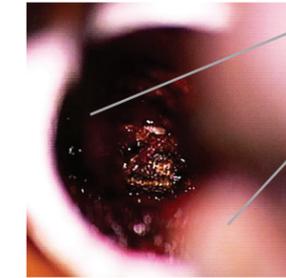
- A right L4-5 hemi-laminotomy and medial facetectomy were performed using a high-speed drill under the operating microscope.
- The ligamentum flavum was opened and Kerrison punches were used to decompress the lateral recess of the spinal canal.
- Severe lateral recess stenosis was observed with compression of the L5 nerve root.
- The nerve root was thoroughly exposed and retracted medially.
- The BeamPath CO<sub>2</sub> laser fiber (spot size 320 μm) was used through an 8cm dissecting handpiece at 20W to open the annulus of the disc, allowing removal the prolapsed portion of the disc underneath the nerve root.
- The CO<sub>2</sub> laser fiber was subsequently used to ablate the tissue in the lateral recess, including small osteophytes and calcified portions of the annulus fibrosis. This allowed the nerve root to sit flush in the lateral recess of the spinal canal without the mass effect.
- The fiber was used to cauterize nociceptive receptors within the wall of the annulus.
- The remaining disc was probed with a ball-tipped dissector and found intact. The incision was irrigated and closed in multiple layers.

<b>POSTOPERATIVE RESULTS</b>	<p>There were no complications and the patient tolerated the procedure well. She was awakened and taken to recovery in stable condition.</p>
	<p>The right lower extremity radicular symptoms were completely resolved postoperatively in the recovery room.</p>
	<p>The right radicular symptoms have not returned during 3 months of follow-up.</p>



Prolapsed Disc

Figure 1: Preoperative sagittal MRI scan revealed minimal grade 1 anterolisthesis of L4 on L5, degenerative spondylosis with severe bilateral facet arthropathy.



Nerve Retractor

BeamPath Fiber

Figure 2: The BeamPath CO<sub>2</sub> laser fiber was introduced through an 8cm straight dissecting handpiece and used at 20W to vaporize the prolapsed portion of the disc.

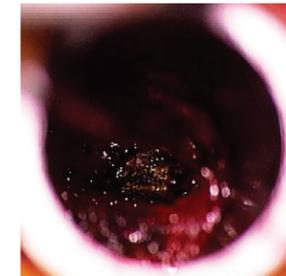
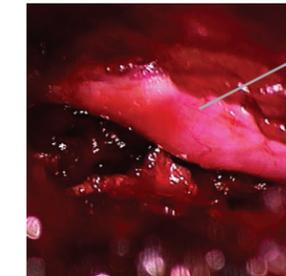


Figure 3: The fiber was subsequently used to ablate the osteophytes and calcified portions of the annulus fibrosis in the lateral recess.



Released Nerve Root

Figure 4: Following the procedure, the nerve root sat flush in the lateral recess without the mass effect.

## DISCUSSION

Lumbar disc surgery is often complicated by significant residual tissue in the spinal canal (bone spurs, portions of the annulus fibrosis, scar tissue) which cause secondary compression of neural anatomy and elicit pain. In the past, surgeons used a series of rongeurs or curettes to pull or scrape away this tissue. This technique requires substantial effort and mechanical skills, and it is conceivable that such efforts to remove tissue thoroughly could lead to inadvertent nerve injury or CSF leakage. Careful removal of this tissue is possible but takes time, even in the most experienced hands. The OmniGuide Beampath CO<sub>2</sub> laser fiber offers a potential solution as it renders the process

of tissue removal in the lateral recess precise, efficient, and thorough. The laser energy vaporizes tissue including osteophytes and very durable connective tissue, often more quickly than mechanical tools currently in use. The minimal lateral thermal spread associated with this novel technique reduces the risk of injury to the overlying nerve root. In addition, it thoroughly cauterizes the nociceptive fibers that lie within the wall of the annulus and it is our hope that this will lead to less postoperative radiculopathy and back pain in patients. The CO<sub>2</sub> laser fiber offers an important advance in the treatment of degenerative spine conditions.