

# Surgery In the Treatment of Lower Back Pain II – Lumbar Stenosis and Disc Herniations

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**LOW BACK PAIN IS ONE OF THE MOST COMMON** health problems encountered by the general population with a lifetime incidence of 70-80%.<sup>1</sup> While there are numerous causes of low back pain, this article will deal with two of the most common etiologies found in the US population: lumbar disc disease and lumbar spinal stenosis.

## LUMBAR DISC DISEASE

While the first anatomical descriptions of the lumbar disc can be traced back to Vesalius in the 16th century, the first lumbar laminectomy was not reported until 1829 by AG Smith. It was nearly a century later when Mixter and Barr first described neural compression from a herniated lumbar disc.<sup>2</sup> While trauma was thought to be the etiology of lumbar disc disease, it is now known that the majority of lumbar disc disease is the result of a normal degenerative cascade in the annulus itself.

The diagnosis of lumbar disc disease is often a clinical one with the most common symptoms being back pain, radicular pain, numbness, and weakness. Imaging studies such as **magnetic resonance imaging (MRI)** can also help with the diagnosis, but only in the correct clinical scenario, as studies have shown that the prevalence of degenerative discs increases with age, and that by age 70, 80% of lumbar MRIs were abnormal.<sup>3</sup> In addition, **electromyography (EMG)** can help pinpoint the location of a patient's symptoms.

The majority of cases of pain due to lumbar disc disease will resolve over a six week period with a trial of anti-inflammatory medication and physician therapy. In more recalcitrant cases, epidural steroid injections can assist in pain management.<sup>4</sup>

The indications for operative management of herniated lumbar discs include: severe, unremitting pain, neurologic deficit, and patient preference. The Main Lumbar Spine Study on Sciatica found that patients with severe

symptoms benefited more from surgery than conservative management (71% vs. 43%).<sup>5</sup>

The operative technique for lumbar discectomy has evolved over the last three decades. In the late 1970s, the microscope was first used to assist in the surgery, and technological advantages today include endoscopic and minimally invasive techniques that offer the potential of less peri-operative pain, smaller incisions, and faster recovery and return to work.

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## LUMBAR SPINAL STENOSIS

Lumbar stenosis is defined as narrowing of the central spinal canal, lateral recesses, or neural foramen which causes impingement on the neural elements. The word stenosis is etymologically derived from the Greek term for "choke," but while Hippocrates described low back pain and sciatica, it was not until 1911 that Bailey and Casamajor postulated that chronic compression of the spinal roots may result from narrowing of the spinal canal or foramina.<sup>6</sup>

The incidence of spinal stenosis is 50/100,000 and it is estimated that 13-14% of specialist visits for low back pain involve lumbar stenosis. The disease most often affects the L4-5 and L3-4 levels, and is responsible for approximately half of all cases of neurogenic claudication.

The diagnosis of lumbar stenosis is made by a combination of clinical symptoms and radiographic images. The most common symptoms are back and leg pain, subjective weakness exacerbated by walking, and lower extremity numbness. These symptoms are classically exacerbated by extension and improved with flexion. MRI is the imaging study of choice to document spinal cord compression in lumbar stenosis, while **computed tomography (CT)** helps demonstrate bony compression in the disease. Electrophysiological studies, such as EMG, can aid in the diagnosis in more complicated cases.

Non-operative management of stenosis includes physical therapy, oral pain medication, and invasive pain management, such as steroid injections.

Operative management of lumbar spinal stenosis should only be considered after patients have failed conservative therapy. The rationale behind surgical management is to improve the patient's symptoms, and accordingly most of the procedures involve decompression of the spinal cord and nerve roots. Operative management for lumbar stenosis ranges from surgical decompression via a laminectomy approach to fusion with instrumentation for more complex and mechanically unstable patients. Our preference is to perform the procedure through a small incision and with the use of an operative microscope. Studies have shown that older patients with increased comorbidities have higher rates of surgical complication, and as a result there is a trend towards minimally invasive decompression and fusion, which have the potential advantages of decreased blood loss and shorter operative time.<sup>7</sup> Although much advertised, the use of lasers in spinal surgery has not been proven safe or effective, particularly in comparison to the well-studied benefits of traditional minimally invasive surgery. Unlike the use of laser instruments in ophthalmology or dermatology, laser surgery in the spine still requires an incision and

endoscopic dilatation, with the sole difference being the use of laser instruments to cut away the disc fragment. Incidents of significant arterial bleeding have been reported, and the procedure is limited in its ability to remove larger disc fragments or visualize and control spinal fluid leaks.

The Maine Lumbar Spine Study prospectively compared operative and non-operative intervention for stenosis and found that 55% of patients in the surgical arm had improvement in their symptoms at one year compared with 28% in the non-surgical arm.<sup>8</sup> The randomized SPORT trial found that there was no difference in clinical outcomes between surgical and non-surgical patients in its intent-to-treat analysis. The study, however, was flawed by its high rate of cross-over between the arms, and when the patients were analyzed in an as-treated method, there was a significant advantage for surgery at three months, one year, and two years.<sup>9</sup>

In conclusion, patients with pain from a lumbar disc herniation or neurogenic claudication from lumbar spinal stenosis who have not responded to conservative, non-surgical intervention may benefit from and often so well with surgical intervention. However, proper selection of these patients is crucial in order to avoid poor functional outcomes which unfortunately are not uncommon with surgery for patients suffering from lumbar spinal disorders.

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## Disclosure of Financial Interests

Adetokunbo A. Oyelese, MD, PhD, is a teaching consultant (honoraria) for Depuy-Synthes Spine.

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