

# Failed Back Syndrome

*Daniel Aghion, MD, Pradeep Chopra, MD, Adetokunbo A. Oyelese, MD, PhD*

**APPROXIMATELY 250,000 SURGERIES** for low back pain are performed annually in the USA.<sup>1</sup> Approximately 40% of patients undergoing lumbar surgery continue to report significant pain after surgery, and a significant portion of these will result in **failed back syndrome (FBS)**. FBS is defined as persistent or recurrent chronic pain after one or more surgical procedures on the lumbosacral spine. The incidence of true FBS is as high as 15%. Unfortunately, the diagnosis of FBS does not point to the actual cause for treatment failure. Multiple factors can contribute to the development of this syndrome such as residual or recurrent disc herniation, persistent post-operative radiculopathy, joint instability, scar tissue, or muscular deconditioning. Furthermore, patients may be predisposed to FBS due to systemic disorders such as diabetes, autoimmune disease, psychiatric disease, or vascular disease. Overall, it is clear that both biological and psychological issues play a significant role in the outcome of lumbar spine surgery.

The specific causes of FBS have been a topic of much debate. Patients with this syndrome can be divided into one of two groups: 1. Patients in whom surgery was never indicated, or the surgery performed carried a low likelihood of achieving the desired result. 2. Patients in whom the surgery was indicated but the surgical procedure was inadequately or incompletely performed, failing to achieve the intended result.

There have been several studies that have suggested that up to 95% of FBS cases are related to inappropriate surgery on patients with myofascial pain from muscle denervation, symptoms of fibromuscular dysplasia, or quadratus lumborum, iliopsoas and gluteal muscle syndromes which may mimic the pain distribution of a herniated disc.<sup>2</sup> Operative intervention in these cases would carry a low likelihood of success and as such, surgery should not be entertained in these scenarios. Furthermore, it has been generally agreed that patients with predominantly radicular pain will have better outcomes following surgery than those

with predominant complaints of back pain.<sup>3</sup> This is because it is usually more straightforward to identify the source of pain or “pain generator” on an MRI in the case of a pinched nerve causing radicular symptoms than it is to identify the pain generator causing low back pain. Thus, many patients with asymptomatic but abnormal appearing degenerated discs on MRI or with myofascial pain may be subjected to inappropriate lumbar surgery with resulting poor outcomes.

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The second group of patients with FBS includes those for whom surgery was indicated but in whom incomplete or inadequate operations were performed. This may happen after a standard laminectomy and discectomy or after a lumbar fusion. FBS after a laminectomy/discectomy may ensue due to a laminectomy being done at the incorrect level, an inadequate amount of bony removal, or the targeted fragment of disk was not removed. Waguespack et al showed that the most common diagnosis for FBS was residual lateral recess or foraminal stenosis from an inadequate bony decompression.<sup>4</sup> Discectomies or laminectomies done to decompress the central canal without addressing underlying lateral recess or foraminal stenosis can lead to continued radicular symptoms and disappointing results. Additionally, an inadequate surgical exposure can lead

to significant nerve root injury (2-3%) because more retraction on the neural elements is necessary to gain access to the disc pathology. Conversely, excessive bone removal as with a laminectomy, in which a significant amount of facet joint removal is performed, may lead to spinal instability and pain.

FBS after a lumbar fusion can ensue due to extensive instrumentation or fusion across multiple segments. This can result in a ‘flat back syndrome’ or loss of normal lumbar lordosis leading to FBS. Pseudoarthrosis and non-union (incomplete fusion; 5-35%), or hardware failure (fracture or loosening) may also contribute to continued back pain and FBS. Transitional or adjacent segment syndrome may also be a cause of FBS after lumbar fusion. This is where accelerated degenerative changes occur at levels adjacent to a spinal fusion resulting in instability that is characterized by hypermobility, kyphosis or scoliosis above or below a spinal fusion segment.

One of the most common and most overlooked causes of FBS is inappropriate patient selection. Appropriate patient selection is one of the most important factors in the outcome of any spinal surgery. In a retrospective study of patients who had low back surgery, less than half met the standard criteria for surgery, emphasizing that failure of initial surgery is not an indication for a second surgery.

Psychological, social, and behavioral issues play a significant role in the outcome of the surgery as well, since patients with chronic low back pain as a result of FBS frequently have psychological illnesses. These psychopathologies include depressive disorders, anxiety, and somatization, all of which may be undertreated. A patient’s psychopathology is thought to influence the pain level and outcome from aggressive spine surgeries. In cases where there is pre-existing neural damage, it is important to not have unrealistic expectations of a complete return to full pre-morbid condition. Patients must understand that they may continue to have some residual pain as a result of pre-existing nerve injury. Partial

relief from their pain can sometimes help patients improve their quality of life and help them tolerate any residual pain. In addition to pre-operative expectations, limited social support may contribute to a poor outcome after spine surgery.

Motivational problems or secondary gain may be the source of long-term pain complaints. Patients presenting with work related low back pain tend not to show the same benefit from any of the common modalities of treatment as non-work related problems. In a prospective two year study, patients with low back pain, who had been off work for more than 90 days from work related injuries, did not show any improvement from medical interventions including surgery.<sup>5</sup> Even when objective findings are present in a psychologically unstable patient or there are compensation and litigation factors present, the outcome from back surgery is doubtful.

The key to evaluating a patient with multiple lumbar surgeries or failed back surgery is to gather all the information in a very organized fashion. Testing in FBS patients is done to confirm a diagnosis rather than to 'fish' for a diagnosis. A good history and focused physical exam is very important, as is reviewing of all radiological data. Seek answers to questions such as pre-operative versus post-operative complaints. Knowing the duration of relief from symptoms after the surgery may help determine whether there is a recurrence of a herniated disk or residual lateral recess stenosis. A history of systemic complaints such as irritability, fatigue, fever and weight loss, and back pain as compared to leg pain should be elicited to rule out post-operative infections. Factors that exacerbate the pain such as flexion (anterior column pain), extension (posterior column pain), sitting (Sacroiliac joint) are important components of a history that may provide successful results.

## TREATMENT

Treatment options for FBS are numerous and depend upon the specific underlying cause. Conservative care of the FBS patient is a necessary starting point. Only a few clinical circumstances would preclude a conservative approach and these include severe spinal instability, infection, or impending neurologic

dysfunction. Most patients should be given the opportunity to improve without additional surgeries. Comprehensive programs have demonstrated effectiveness in relieving pain, myositis, inflammation, spasm, and restoration of range of motion. Vigorous physical therapy and behavioral therapy aimed at the elimination of local mechanical issues has been shown to improve function and patient satisfaction. While conservative measures are being implemented, specialized pain management may also offer improvement in the functional outcome. For neuropathic pain, a series of anticonvulsants such as Tegretol and Neurontin have been found to be useful.<sup>6</sup> Tricyclic antidepressants have also proved beneficial, though may be limited by anticholinergic and central effects.<sup>7</sup> When pain is of somatic origin, NSAID's have been a mainstay of treatment.

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Identifying the pain generator may be quite frustrating and, because of this, provocative diagnostic blockades have been explored. These may be both diagnostic and therapeutic and include zygapophyseal joints, single or multiple lumbar nerve root blocks, and intradiscal blockade.

Spinal cord stimulation (SCS) is a treatment modality that has been in use for over 30 years and has been widely utilized with good outcomes in FBS. The ideal patient is one who suffers from intractable sciatic pain. This method involves placing percutaneous leads in the epidural or intrathecal space and providing electrical stimulation over a specified portion of the spinal cord based on the patient's pain pattern. Thorough testing

and trials of SCS prior to final implantation has been shown to provide the best results. Infection, lead migration or breakage, CSF leak, and weakness are some of the complications associated with these devices. Success rates are on the order of 50% improvement in 50% of patients at specialized centers.<sup>7</sup>

Spinal narcotics may be administered epidurally or intrathecally for pain relief in the form of a permanent delivery system such as pain pump. Morphine is the most common analgesic agent used, though other medications have been trialed in patients who have inadequate pain relief or adverse effects from morphine.<sup>8</sup> FBS is the most common indication for pain pump insertion, and anywhere from 60-80% of patients achieve good pain relief from intrathecal drug administration.<sup>6</sup> Pump malfunction causing overdose or withdrawal symptoms, infection, meningitis, or respiratory failure are some of the complications associated with these devices.

Additional surgery for FBS is controversial and several general principles must be taken into account. If root compression syndromes or instability is the cause of the syndrome, those patients will respond to a second operation with almost the same outcomes as would have attended first surgery.<sup>9</sup> Beyond a second operation, however, there is usually declining efficacy and success rates drop to 15% after the third and 5% after the fourth.<sup>9</sup> Surgery designed to correct anatomical abnormalities or to restore sagittal alignment and balance (reversal of flat back syndrome) are more likely to be successful than simple revision of a prior surgery. The initial indications for surgery must thoroughly be reviewed and a specific pathology must be identified and reasonable chance of correcting it must be determined prior to undergoing another procedure.

## CONCLUSION

The key to understanding FBS is individualization of evaluation and therapy. Correlation of key anatomical abnormalities to a patient's clinical complaints is vital to a successful operation. Unfortunately, the diagnosis of FBS does not point to the actual cause for treatment failure. The treating physician must be aware that the etiologies of this syndrome are numerous and consist of several surgi-

cal and nonsurgical etiologies. Physicians treating patients with FBS must approach this complex problem in a very organized fashion and with a multidisciplinary perspective. In addition to structural abnormalities, psychosocial factors and complex peripheral and central processing of nociceptive information may contribute to low back pain.

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*Daniel Aghion, MD, is a fifth year neurosurgery resident at Rhode Island Hospital.*

*Pradeep Chopra, MD, is Director, Pain Management Center (SNAPA), and an Assistant Professor (Clinical) at the Warren Alpert Medical School of Brown University.*

*Adetokunbo A. Oyelese, MD, PhD, is an Attending Neurosurgeon and the Director for Spinal Disorders for the Department of Neurosurgery at Rhode Island Hospital, and an Assistant Professor of Neurosurgery at the Warren Alpert Medical School of Brown University.*

## Disclosure of Financial Interest

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

Neither Daniel Aghion, MD, Pradeep Chopra, MD, nor their spouses/significant others, have any financial interests to disclose.

## CORRESPONDENCE

Adetokunbo A. Oyelese, MD, PhD  
 Department of Neurosurgery  
 The Warren Alpert Medical School  
 of Brown University  
 593 Eddy Street, APC-6  
 Providence, RI 02903  
 phone: (401) 793-9128  
 fax: (401) 444-2661

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