

# Failed Back Surgery Syndrome

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**Abstract:** A review of the etiology, clinical, radiological, differential diagnosis and management goals of failed back surgery syndrome is presented.

**Index Terms:** Spinal surgery, failed back surgery, chronic back pain, chiropractic.

**Summary:** Failed Back Surgery Syndrome (FBSS) can be defined as "a condition where after lumbar surgery the patient is not: physically comfortable without regular medication or treatment, is not economically productive if they so desire, and is not able to undertake reasonable family, sporting and recreational activities".

In those who undertake lumbar surgery 20-40% will fail to gain the desired outcome. In fact, 1-10% of patients will be worse after the initial surgery (1).

Some statistics rate the success of surgery as low as 10% (2). In a 4-17 year follow up study of 371 patients who underwent lumbar surgery for the first time, 70% still complained of low back pain, 23% of constant heavy pain, 45% had residual sciatica, 35% were still receiving treatment, 14% were receiving a disability pension and importantly in 17% repeat operations were performed (3).

So why does spine surgery fail?

There are three essential answers to this question:

1. The surgery created iatrogenic changes within the spine.
2. The original diagnosis or patient selection was wrong.
3. There was poor or no rehabilitative effort associated with the surgery.

Let us examine these in more detail:

1. The surgery created iatrogenic changes within the spine.

(a) Reoccurrent disc herniation:

Frymoyer found in a study of 268 failed spine surgery cases that 43% had reoccurrent disc herniation at the same operated level and 22% had them at other levels. Therefore, 65% of all failures at surgery were due to reoccurrent disc herniation (4).

(b) Spinal Stenosis:

According to Zucherman and Schofferman (5) spinal stenosis after surgery is due to post-operative settling with further facet imbrication and consequent lateral canal narrowing. Also, due to further degenerative spondylosis from the surgical violation and lastly possible bony overgrowth at the site of fusion.

The incidence of post-surgical stenosis is a matter of controversy. In contradiction to Frymoyer's findings (4) of 65% of FBSS being due to reoccurrent disc herniation Burton et al (6) found that 57% of cases were due to lateral stenosis and 7-14% due to central stenosis. Indeed, they state that only 12-16% are due to persistent disc herniation.

(c) Segmental Instability:

Operating on a diseased vertebral motion segment without fusion weakens an already weakened structure. This is due to increase removal of some bony and ligamentous stabilisers (5)(7). This is particularly true after extensive surgical decompression for spinal stenosis (8).

Also the motion segment above the operated level shows significant increases in antero-posterior and lateral translation on bending (7).

(d) Scar/Fibrosis Formation and Arachnoiditis:

Scar formation about the dura and nerve roots after lumbar disc surgery is one of the most common and troublesome complications. It is an important cause of poor surgical results (9). The scar is formed by fibrous connective tissue ingrowth into the surgical haematoma primarily from posterior paraspinal musculature (9).

Arachnoiditis is characterised by intrathecal fibrosis, causing rootlets to adhere to each other and to the inner walls of the thecal sac. The presence of arachnoid fibrosis on myelogram is not necessarily confirmation that this is the source of pain (5).

(e) Reflex Sympathetic Dystrophy (RSD):

RSD is usually associated with a primary structural lesion following surgery. It is a rare complication (5) (10).

(f) Facet Syndrome:

Panjabi et al (11) undertook a detailed investigation of the lumbar motion segments as affected by injuries to the disc. The authors correctly hypothesised that this would lead to asymmetric movement of the apophyseal joints. This in turn, may lead to facet degeneration and dysfunction.

(g) Miscellaneous:

A number of other possible causes of FBSS are pseudarthrosis or surgical non-union, this condition is more prevalent in smokers (28). Other causes included pseudomenigocele, metallic implant irritation, infection and incidental durotomy (5,10,12).

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**2. The original diagnosis or patient selection was wrong:**

With the advent of modern imaging techniques to enhance the clinical skills of the surgeon incorrect diagnoses as a cause of FBSS are relatively small (5,13) or even as low as 5% (21). However, it is inevitable that when several conditions co-exist surgical failure may occur due to incorrect or incomplete diagnosis e.g. negative disc exploration in the presence of sequestration, stenosis or internal disc disruption at another level.

According to Selby (14), until a structural diagnosis is made on the basis of clinical and laboratory testing there is no indication for surgery.

According to Waddell et al (15) psychological factors can affect the outcome of surgery indirectly when inappropriate illness behaviour leads to inappropriate surgery. Distress and illness behaviour may increase the pressure for surgery whereas inappropriate symptoms and signs may obscure the physical assessment and lead to a mistaken diagnosis of a surgically treatable lesion (15).

Too often the surgical technique is flawless but the outcome is less than successful because the patient's psychological functioning was ignored (16).

**3. There was poor or no rehabilitative effort associated with the surgery.**

According to Mayer (17) "failed spine surgery truly represents a failure of rehabilitation".

A study by Mayer et al confirmed that the large majority of patients undergoing simple discectomy, even those with essentially no pain, have substantial deficits in lumbar spine capacity when compared with a normative sample (18).

Reduced physical functional capacities and an inability to perform may result in a depressed and anxious individual which may lead to a chronic pain patient (19).

Accordingly, those patients whose backs have been subjected to disuse for more than four to six months, or who have had delayed or multiple surgeries require a functional restoration program to reverse their deconditioning (17,20).

**Differential Diagnosis:**

The causes of FBSS are in effect a list of differential diagnoses (5,6,7,8,9,10,11,12,16,18,29). They are summarised below:

**1. Where the patient exhibits no improvement after surgery:**

- (a) Spondyloarthropathies
- (b) Neoplasm or tumour
- (c) Psychological pain
- (d) Sequestered fragment missed
- (e) Far-out lateral stenosis syndrome
- (f) Infection
- (g) Wrong diagnosis or poor surgical technique

**2. Where there is temporary relief only after surgery:**

- (a) Scar/Fibrosis formation and Arachnoiditis
- (b) Reoccurrent disc herniation
- (c) Stenosis
- (d) Reflex Sympathetic Dystrophy
- (e) Pseudarthrosis or surgical non union
- (f) Implant irritation
- (g) Instability
- (h) De-conditioning
- (i) Meningocele
- (j) Myofascial Pain Syndromes

**Usual and Customary Examination Procedures:**

**1. Physical Examination:**

A careful history will assist the diagnostic process and may reveal important information such as whether there was a decrease in pain after surgery or not. This information will shorten the list of diagnostic variables. It will also give important information regarding illness behaviour and possible secondary gain. If there is a strong index of suspicion regarding functional overlay psychological evaluation should take place.

Physical examination should be thorough and be directed at all contingent possibilities (listed under differential diagnosis).

A description of the presentation of those possible diagnoses is beyond the scope of this paper.

**2. Diagnostic Imaging:**

(i) Plain Radiographs: These are of value in the diagnosis of spondyloarthropathies, tumour, infection, pseudarthrosis, stenosis (limited) and instability (22,24,25).

(ii) Computer Assisted Tomography (CT): CT is the imaging modality of choice for FBSS. It is useful in the diagnosis of spondyloarthropathies, tumour, infection, sequestered fragment, far out lateral recess syndrome, scar or fibrosis

formation, arachnoiditis (limited), reoccurent disc herniation, stenosis, pseudarthrosis, implant irritation, instability (limited) and meningocele (limited) (22,23,24,25).

(iii) CT with Contrast and Myelogram in isolation:

CT with contrast is the most sensitive test to detect arachnoiditis (22) and meningocele (23). However myelogram on its own is also a useful tool for imaging arachnoiditis (22).

(iv) Magnetic Resonance Imaging (MRI): When available MRI is suggested for those patients in whom the initial CT is equivocal in regard to post-operative scar vs. reoccurent disc herniation (23,24). It is also indicated in patients whose fusion appears clinically unstable despite the absence of instability on plain radiographs and CT (24).

(v) CT/Discography: According to Jackson et al (30) CT/Discography has a high rate of accuracy and is recommended in selected patients with suspected lumbar disc herniation whose other tests are non-diagnostic, especially in those with possible foraminal or reoccurent herniation. It is also considered the diagnostic imaging of choice for internal disc disruption (31,32).

**Clinical and Laboratory Tests:**

1. Blood Tests:

This may include a full blood examination, erythrocyte sedimentation rate, rheumatoid factor, serum urate, HLA B27, anti nuclear factor, acid phosphatase (in males) and alkaline phosphatase. These tests may be useful in detecting reumatoid arthritis, ankylosing spondylitis, gout and other spondyloarthropathies, neoplasm, infection or inflammation.

2. EMG and Nerve Conduction Studies:

According to Saal the electrodiagnostician is an important team member involved in the management of FBSS (26).

Saal states that electrophysiologic tests are useful in stenosis, intraneural fibrosis (scar), occasionally instability and reoccurent disc protrusion (26).

**Goals of Treatment:**

1. Treat the cause where possible.
2. Decrease pain and inflammation.
3. Restore function.

**Chiropractic Management:**

The ability of the chiropractor to manage FBSS will depend very much on its cause and as a corollary whether further surgery is warranted. Once a decision has been made not to operate or alternatively further surgery has been completed a functional restoration programme should be undertaken.

This should include [Modified from Mayer(20)]

1. Physical therapy to reduce pain, remove myofascial trigger points, restore mobility, then increase strength and aerobic capacity.

2. Work hardening for specific tasks such as lifting, position and activity tolerance.

3. Educational programmes directed at issues related to pain management and disability.

According to Kirkaldy-Willis (27) there may be a role for manipulation in the treatment of:

- (a) dysfunction complicating instability
- (b) dynamic lateral canal stenosis
- (c) dysfunction complicating degenerative stenosis
- (d) disc herniation (small)

However, the role of manipulation is still not certain (27). Certainly if a full functional restoration programme is to be undertaken the chiropractor should take a leading role.

**Prognosis:**

The prognosis of FBSS is dependent upon a number of factors including the causes of continuing pain, psychosocial and economic considerations.

Many will reach a plateau in improvement and although able to function satisfactorily will have permanent impairment and disability.

**REFERENCES**

1. Wilkinson H.A. The role of improper surgery in the etiology of failed back syndrome. In: Wilkinson H.A. (ed); The failed back syndrome. Etiology and Therapy. Philadelph. J.B. Lippincott Co. 1983, pp. 15-16.
2. Gottlieb H, Strite L.C., Koller R. et al. Comprehensive rehabilitation of patients having chronic low back pain. Arch. Phys. Med. Rehab. 58:101-108, 1972.
3. Dvorak J., Gauchat M-H., Valach L. The outcome of surgery for lumbar disc herniation 1. A 4-17 years follow-up with emphasis on somatic aspects. Spine. Vol 13, No. 12, 1988. pp. 1418-1427.
4. Frymoyer J. The role of spine fusion. Spine. Vol 6, 1981 p. 284.
5. Zucherman J., Schofferman J. Pathology of failed back surgery syndrome. In: Failed back surgery syndrome. Spine; State of the Art Reviews. White A.H. (ed). 1986 Hanley and Belfus Inc. pp. 1-12.
6. Burton C.V., Kirkaldy-Willis W.H., Yong-Hing K. et al. Causes of failure of surgery on the lumbar spine. Clin. Orthop. 157:191, 1981.
7. Goel V.K. et al. Kinematics of the whole lumbar spine. Effect of discectomy. Spine Vol 10, No 6. 1985. pp. 543-554.
8. Johnsson K-E., Willner S., Johnsson K. Post-operative instability after decompression for lumbar spinal stenosis. Spine. Vol 11, No 2. 1986. pp. 107-110.
9. Lee C.K., Alexander H. Prevention of post laminectomy scar formation. Spine Vol 9, No 3. 1984. pp. 305-312.

**FAILED BACK SURGERY SYNDROME  
WALKER**

10. Zucherman J., Schoffermann H. Diagnostic and therapeutic strategies. In: Failed back surgery syndrome; Spine. State of the art reviews. White A.H. (ed) 1986. Hanley and Belfus Inc. p. 159-175.
11. Panjabi M.M., Krag M.H., Chung T.Q. Effects of disc injury on mechanical behaviour of the human spine. Spine Vol 9 pp. 707-713. 1984
12. Jones A.A.M. et al. Long term results of spine surgery complicated by unintended incidental durotomy. Spine Vol 14, No 4. 1989 pp. 443-446.
13. Burton C.V., Clinical Review of the Failed Back Surgery Syndrome. In: Spine Update 1987. Genant H.K. (ed). Radiology Research and Education Foundation. p. 247-282.
14. Selby D.K. When to operate and what to operate upon. Orthop. Clin. of Nth. Amer. Vol 14, No 3, July 1983. pp. 577-588.
15. Waddell G. et al. A concept of illness tested as an improved basis for surgical decisions in low-back disorders. Spine Vol 11. No 7. 1986. pp. 712-719.
16. Goldstein R. Psychological Evaluation of Low Back Pain. In: Failed Back Surgery Syndrome. Spine; State of the art reviews. White A.H. (ed) 1986 Hanley and Belfus Inc. p. 103-114.
17. Mayer T.G. Physical Assessment of the Post-operative patient. In: Failed Back Surgery Syndrome. Spine; State of the art reviews. 1986. Hanley and Belfus Inc. p. 93-101.
18. Mayer T.G. et al. Quantifying postoperative functional capacity deficits utilizing novel technology. Proceedings of International Society for the Study of the Lumbar Spine. Dallas, Texas. May 29 - June 2 1986.
19. Rosomoff H.L., Rosomoff R.S. Non-surgical Aggressive Treatment of Lumbar Spinal Stenosis. In: Spinal Stenosis. Spine; State of the art reviews. 1987 Hanley and Belfus Inc. pp. 383-400.
20. Mayer T.G. Orthopedic Conservative Care. The Functional Restoration Approach. In: Failed Back Surgery Syndrome. Spine; State of the art reviews. 1986 Hanley and Belfus Inc. pp. 139-147.
21. Nelson M.A. Surgery of the Spine. In: The Lumbar Spine and Back Pain. Second Edition. Jayson MIV. (ed). Pitman Medical. 1980 p. 501.
22. Byrd J.E. et al. The Radiographic Evaluation of the Symptomatic Post-Operative Lumbar Spine Patient. Spine. Vol 10, No. 7, 1985. p. 652-661.
23. Chafetz N., Kaiser J.A., Mall J.C. Imaging of the postoperative Spine. CT and MRI. In: Failed Back Surgery Syndrome. Spine; State of the art reviews. White A.H. (ed). Hanley and Belfus Inc. 1986. p. 65-91.
24. Yochum T.R.Y., Rowe L.J. Essentials of Skeletal Radiology. Williams and Wilkins. 1987. p. 273-316.
25. (24) pp 539-920.
26. Saal J.A. Electrophysiologic Evaluation of Lumbar Pain. In: Failed Back Surgery Syndrome. Spine; State of the art reviews. 1986. White A.H. (ed). Hanley and Belfus Inc. p 21-46.
27. Kirkaldy-Willis W.H. Managing Low Back Pain. Churchill Livingstone 1983 p 181.
28. William Brown C., Orme T.J., Richardson H.D. The Rate of Pseudarthrosis (Surgical Nonunion) in Patients who are Smokers and Patients who are Non-Smokers: A comparison Study. Spine Vol 11, No 9. 1986 pp. 942-943.
29. Wiltse L. et al. Alar transverse process impingement of the L5 spinal nerve: The far out syndrome. Spine Vol 9. pp. 31-412. 1984.
30. Jackson et al. The Neuroradiographic Diagnosis of Lumbar HNP: 1. Spine Vol 14, No 12 1989. pp. 1356-1361.
31. Sachs B.L. et al. Dallas Discogram Description. Spine. Vol 12, No 3. 1987 pp. 287-294.
32. Bogduk N. Pathology of Lumbar Disc Pain. Bulletin Australian Assoc. Musculo-Skeletal Med. Vol 5, No 1. p. 16-26. June 1989.