FAILED LUMBAR SPINAL SURGERY

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The two major areas of surgery of the spine are decompressive and fusion procedures. Failure to alleviate signs and symptoms and subsequent deterioration following a fusion or decompression procedure presents a difficult problem for both surgeon and patient.

Failures following decompressive surgery vary from 5% to over 50%, with an average of about 15%

The incidence of pseudarthrosis for one or two level anterior fusion is around 20%. In posterior surgery 5% failure is for one level fusion, 20% for two levels, and upto 40% or greater for three or more levels, or fusion performed to the sacrum.

Approaches to the causes and treatment of failed lumbar surgery will be discussed.

There are many causes of failures of spinal surgery. These are the wrong patient, the wrong diagnosis and the wrong surgery, Included in the wrong preoperative diagnosis are improper indications.

It is simple to eliminate the wrong surgeon. Today, spinal surgery has been well established in many centers. Because of the increasing complexity of spinal surgery, and the increasingly sophisticated techniques and instrumentation, the spinal surgeon will need to have complete training in this field.

The wrong patient is a more complex problem, and can be divided in two general catagories : (1) the patient was chosen for treatment by fusion or decompression when the pathologic findings were such that the patient could not be expected to benifit from the operation, or(2) the patient's psychosocial circumstances and expectations simply precluded success. An example of the former is the utilization of spinal fusions for a patient with nonspecific, chronic, disabling low back pain, where the history, physical examination and imaging studies indicate no definite abnormality. In these circumstances, failure rates as high as 80% are recorded. Similary, the psychosocial

determinants of success and failure in spinal disease and surgery require emphasis as they relate to spinal surgery and indications.

The wrong operation in an even more complex issue, and ranges from inadequate imaging studies which led to misdiagnosis, all the way to a proper choice of surgical technique. An inadequate preoperative assessment combined with the failure to understand the objectives of the patient, together with failure to understand the objectives of the patient, together with failure to understand the impact of psychosocial problems on outcome, will result in a disaster.

A careful analysis of subjective pain camplaints, namely history taking, objective physical finding and confirmatory imaging studies help to localize the source of patient's complaints.

Though some failures can be described as being the result of the wrong patient, diagnosis and surgery, some complications occur which are beyond the surgeon's control including such things as arachnoiditis, extradural scarring or progressive degenerative disease

Goal in failed back surgery
- pain relief
- restore function
- patient satisfaction

Although surgery plays a major role it is not the only event leading to a successful outcome. The role of rehabilitation and postoperative care is almost equally as important. Surgery is one of the steps in the rehabilitative process.

CLASSIFICATION OF FAILURES OF DECOMPRESSIVE SURGERY

I. No improvement immediately following surgery with outright failure to improve mono or polyradiculopathy

A. Wrong preopertive diagnosis
1. Tumor
2. Infection
3. Metabolic disease
4. Psychosocial causes
5. Discogenic pain
6. Decompression done too late for disc sequestration (>6 mo)

B. Technical error
    1. Missed level(s)
    2. Failure to perform adequate decompression
        a. Missed fragment including foraminal disc
        b. Failure to recognize spinal stenosis as part of lumbar disc herniation
        c. Conjoined nerve root

II. Temporary relief but recurrence of pain

A. Early recurrence of symptoms (within weeks)
    1. Infection
    2. Meningeal cyst
B. Midterm (within weeks to months)
    1. Recurrent disc prolapse
    2. Battered root
    3. Arachnoiditis
    4. Patient expectation ill founded
C. Longer-term failures (within months to years)
    1. Recurrent stenosis or development of lateral stenosis from disc space collapse
    2. Instability

CAUSES OF FAILURE OF DECOMPRESSIVE SURGERY

Radicolopathy predominant	Low Back Pain Predominant
Neural tumors	Osseous tumors
Infection-----epidural abscess	Infections
	Discitis
	Osteomyelitis
Inadequate decompression	Discogennic pain
	Segmental instability
Missed fragment	
Foraminal disc	
Conjoined nerve root	
Recurrent disc prolapse	
Peridural fibrosis	
Meningeal cyst	
Arachnoiditis	

APPROACH TO THE PATIENT WITH A FAILED SPINAL DECOMPRERSSION

The clinical history is the most significant diagnostic measure in assessing probable causation of continuing symptoms.

1. no initial relief or worse--->wrong Dx or wrong op.
2. initial relief (sometimes accompanied by increased numbness or even weakness), followed by gradual on set of recurrent radiculopathy over weeks to month---->nerve root injury with subsequent scarring
3. complete relief of symptoms for months or years and develop sudden recurrent radiculopathy--> recurrent disc

Criteria for adequate decompression of the nerve root ability to immediately retract the root for a minimum of 5 mm. and a probe can be easily passed into the foramen.

CAUSES OF FAILURE AFTER SPINAL FUSION

	Predominant Symptoms	
Time of Appearance	Back Pain	Leg Symptoms
Early (weeks)	Infection	Nerve impingement by fixation devices or cement
	Wrong level fused	
	Insufficient levels fused	
	Psychosocial distress	
Midterm (months)	Pseudarthrosis	Fixation loose
	Disc disruption	
	Early adjacent disc degeneration	Early adjacent disc degeneration
	Inadequate reconditioning	
	Graft donor site	Graft donor site
Long term (years)	Late pseudarthrosis	Disc with pseudarthrosis
	Adjacent-level instability	Adjacent-level stenosis Acquired spondylolysis
	Abutment syndrome	Adjacent-level disc
	Compression fracture above fusion	Stenosis above fusion

APPROACH TO THE PATIENT WITH FAILURE FOLLOWING FUSION

A complete history and physical examination is essention. Historical records, operative reports and imaging studies need to be reviewed.

Psychosocial issues are of major importance in evaluating a patient with failed fusion, particularly those patients who have not had a pain - free interval and return to normal function prior to new onset of symptoms.

Pseudarthrosis

Is the most common cause of failure of spinal fusion, It is also the most difficult to establish as the source of failure, decease many patients with radiographic evidence of fusion failure have no symptoms. Conversely, repair of a pseudarthrosis often will not result in symptomatic relief..

For posterior surgery

One - level fusion incidence of pseudarthrosis is	5%
Two - level fusion incidence of pseudarthrosis is	20%
Three or more fusion incidence of pseudarthrosis is	40%
Or fusion performed to the sacrum	>40%

For anterior surgery

One or two level→ pseudarthrosis ~ 20%

However fusion rate is more successful with internal fixation device

Surgical treatment of failed fusion

Falled previous posterior surgery

- with adequate bone stock → Posterior decompression + refusion
- with wide laminectomy → anterior fusion with or with posterior decompression

Failed two or more previous posterior fusion

→ anterior fusion

Failed previous anterior surgery

→ Posterior surgery with instrumentation

Failed previous anterior + posterior surgery

→ anterior surgery

Combined anlerior and posterior surgery

For posterior decompression with inadequate bone stock for a fusion bed or for insertion of posterior device

Posterior Lumbar interbody fusion

Controversial
High risk of neurological injure, graft extrusion

Surgical Result of Repeat Fusion

Less predictable
In simple group of patients treated for pseudarthrosis, in whom the previous surgery was simple posterior fusion, a success rate of only 60% was obtained.

Alternative Nonsurgical Treatment

Vigorous rehabilitation program
Electrical stimulation
Pulsating electromagnetic coils - applied externally
Selective epidural nerve root - stimulation
- analgesic