

# Surgery for lumbar canal stenosis

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## ABSTRACT

In a prospective, consecutive study the frequency of common symptoms and signs in 53 operated patients with central spinal stenosis were determined. The diagnoses were established by one or more of plain radiograph, radiculogram and CT scan and all were confirmed at operation.

Patients were grouped into degenerative and developmental stenosis. The indication for surgery was leg pain and intermittent claudication; no patient had an operation for back pain alone. Fusion was carried out in 2 patients.

Overall, 72% of the patients had an excellent-good result. 46 of these patients were further followed up by questionnaire. There was no deterioration of clinical results.

**Key words:** spinal stenosis, central laminectomy, facetectomy, intermittent claudication.

## INTRODUCTION

In most cases of low back pain the exact underlying cause remains uncertain. Stenosis of the lumbar spinal canal can produce symptoms of nerve compression, in

common with disc disease, but the natural history of this condition is not yet established. Controversies exist with regard to criteria for classification and also with regard to treatment.<sup>11,14,15</sup> Total laminectomy with medial facetectomy is commonly the treatment of choice for central stenosis in the lumbar region.<sup>3</sup> Total laminectomy may result in instability of the spine if an arthrodesis of appropriate lumbar segments is not carried out simultaneously.

This prospective study was undertaken to assess the results of decompressive surgery of central spinal stenosis with or without associated lateral recess stenosis. Spinal fusion was warranted in only 2 patients.

## MATERIALS AND METHODS

This study included 53 of 55 consecutive patients with central lumbar stenosis who required surgery. Two patients were lost to follow up and have been excluded. All the cases were performed by the senior surgeon (VC) between 1980 and 1983 at Kasturba Medical College, Manipal, India. There were 30 developmental and 23 degenerative spinal stenosis. There were 44 men and 9 women, ranging in age from 20 to 68 years with a mean age of 36 years for developmental and 52 years for degenerative stenosis. We excluded patients who had rheumatoid arthritis, previous spinal surgery and patients with spondylolisthesis.

A detailed assessment of each patient was made taking particular note of symptoms and signs of the spinal disease (Tables 1 and 2). Anteroposterior and

**Table 1**  
Signs and symptoms of 53 patients

	Developmental (n = 30)	Degenerative (n = 23)
<b>SYMPTOMS</b>		
Backache	26 (87%)	23 (100%)
Leg pain	18 (60%)	11 (48%)
Weakness (limbs)	9 (30%)	10 (43%)
Incontinence	2 (8%)	2 (8%)
Claudication	24 (80%)	12 (52%)
<b>SIGNS</b>		
Limited ROM spine	18 (60%)	18 (78%)
Straight leg raise (30 - 70°)	19 (63%)	10 (43%)
Neurology	22 (73%)	19 (83%)
Reflex deficit		
Ankle	7 (23%)	12 (52%)
Knee	1 (4%)	5 (21%)
Sensory deficit	10 (33%)	18 (78%)
Single dermatome	6 (20%)	5 (21%)
Multiple dermatome	4 (13%)	13 (57%)
Motor	10 (33%)	16 (69%)
Single	8 (26%)	6 (26%)
Multiple	2 (7%)	10 (43%)
Lax Anal Sphincter		1 (4%)
Bladder Incontinence		2 (8%)

*VERY that does represent*

*QUERY 0(0%) ?*

*uggestion:*

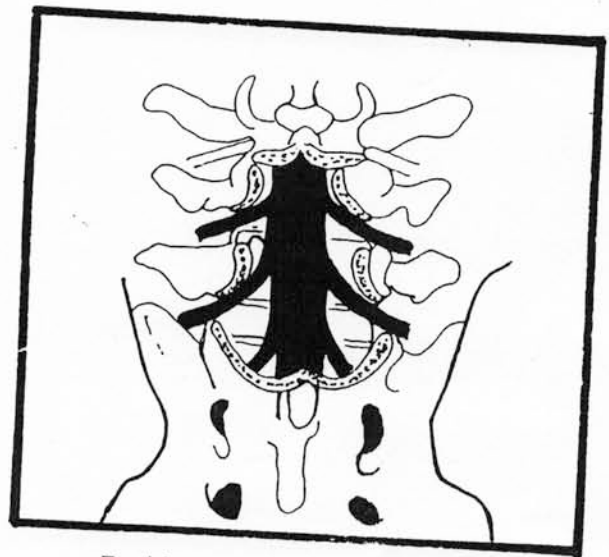
*Maybe we can omit these, since they are only summation of their sub-items.*

**Table 2**  
Intermittent claudication (n = 36)

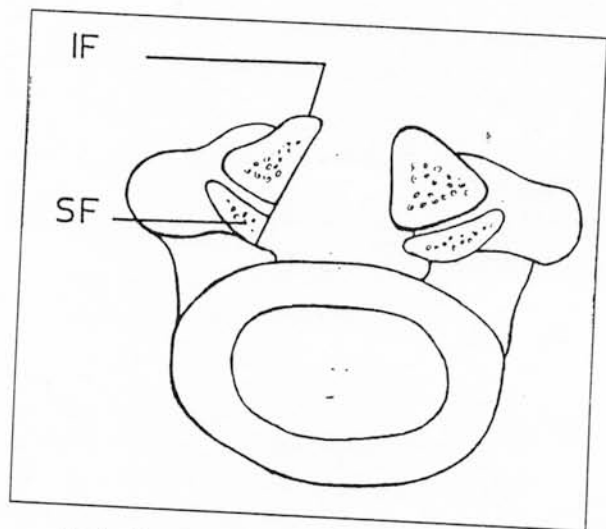
DESCRIPTION	
Pain	60%
Numbness	21%
Weakness	19%
SITE	
Calf only	6%
Calf and thigh	90%
Thigh only	4%
RECEIVED BY	
Squatting	93%
Sitting	83%
Leaning	80%

**Treatment**

All patients were given a trial of conservative treatment which included bilateral skin traction, analgesics, moist heat and flexion abdominal exercises for 3 to 6 months. The indications for operative treatment were claudication pain which caused significant functional disability, and which had not been relieved by conservative treatment; a progressive neurological deficit; and the cauda equina syndrome. The surgical treatment consisted of a central laminectomy alone in 13 patients and was extended laterally (additional partial facetectomy: Figs. 1 and 2) to decompress the nerve roots in the rest of the 38 patients. Although the level of decompression was suggested by radiculogram,



Total facetectomy and foraminotomy



Central laminectomy and partial facetectomy

lateral roentgenograph were obtained using a standardised technique. Lumbar canal was measured at each vertebral level using the technique of Jones and Thompson<sup>6</sup> and Eisenstein.<sup>1</sup> Absolute anteroposterior diameter less than 10 mm was the criteria used for radiological diagnosis.<sup>9</sup> Stenosis was further confirmed by radiculogram in 47 patients and CT in 6 patients.

**Figures 1 & 2** Showing the amount of bone removed in central laminectomy and partial facetectomy.

it was determined mainly by findings at surgery. Decompression was carried out at one level in 4 patients, at 2 levels in 25, at 3 levels in 15 and at 4 levels in 9. 14 had discectomy for associated disc lesions. In 2 patients, who had complete facetectomy on either side, posterolateral spinal fusion was performed. In all the patients more than one of the following findings were present: thickened lamina, ligamentum flavum, absence of dural pulsation, adherent dura, hypertrophied facet joint.

### Follow-up

In 1985, all patients were examined by one of the authors (VP). The mean follow-up was 3.5 years (range, 2 - 5 years). In 1988, a questionnaire was sent to all patients and 46 patients completed the form. Three patients had died and 4 patients were not traced.

### RESULTS

The results were graded as follows:

Excellent	Returned to normal working and recreational activities. Experienced little or no discomfort.
Good	Returned to work but may have minimal restriction. May have complaints of back pain lasting for few days after unaccustomed heavier work, but not occurring more than once or twice a year.
Fair	Better after surgery. Back to light employment. Backache or leg pain is present. Needs physiotherapy.
Poor	Not returned to work. No better than preoperative or more symptomatic.

Symptoms and signs in these patients were bizarre. Most typical symptoms were backache, sciatic type of pain in the legs and intermittent claudication (Table 1). Neurogenic claudication was present in 67% and other symptoms were described as pain by 60%, numbness by 21% or weakness by 19%. Claudication was present in calf only in 6%, thigh in 4% and entire leg in 90% (Table 2).

Physical findings were remarkable for their relative paucity. Straight leg raising test produced pain in 29 patients of which half were bilateral. Bilateral and multiple nerve root involvement was not uncommon. Very often, fifth lumbar and first sacral nerve roots were involved. Two patients, with disturbance of the bladder, had decompression on the same day.

The spinal index was positive in 35 patients (66%) and the absolute anteroposterior diameter was less

than 10 mm at one or more levels in 50 patients. 47 patients who had radiculogram showed more than one of these findings: segmental or uniform canal narrowing, anterior or posterior indentations.

All 53 were reviewed in 1985 (Table 3). Overall, 90% had relief from intermittent claudication, 36% from backache and 76% from radiating pain. Neurology improved in 60% after surgery.

The results were satisfactory (excellent or good) in 70% of the patients in developmental and 74% in degenerative stenosis. Of the 15 fair to poor results: damage to nerve root at surgery occurred in 2, associated medical problem in 3 (namely motor neurone disease, tuberculosis and osteomalacia in one each); in 2 it was thought to be related to segmental instability and chronic arachnoiditis was suspected in 2. In the rest, inadequate decompression may be the cause of failure. Developmental stenosis had more subjective improvement in low back pain than degenerative. In degenerative stenosis there were 2 poor results. In one, further deterioration of neurology occurred and in the other there were increasing symptoms. Both patients declined to undergo further assessment. None had a re-exploration of the spine.

Of the 53 patients, 46 who were reassessed by questionnaire in 1988 showed improvement in their subjective disability (Table 3). Good to excellent results were present in 36 patients (78%).

**Table 3**  
Changes in results in 53 patients from 1985 to 1988

Type	Excellent		Good		Fair		Poor	
	'85	'88	'85	'88	'85	'88	'85	'88
Developmental	2	3	19	18	9	5	0	0
Degenerative	2	0	15	15	4	4	2	1

### DISCUSSION

In general, there is a significant overlap between the symptoms and signs of disc herniation and lateral recess and central spinal stenosis.<sup>7,10</sup> We agree with the earlier reports that the symptoms of central spinal stenosis usually develop over a long time and most commonly involve spinal claudication.

There are a few reports of conservative treatment of spinal stenosis. Johnsson et al.<sup>5</sup> reported the course of 32 untreated patients with spinal stenosis. The mean period of observation was 49 months and about 75% of the patients had intermittent claudication. In the

follow-up survey, symptoms in 70% of the cases were unchanged, 15% showed improvement, and 15% worsened. Although the majority of non-operation patients remain unchanged, those with marked stenosis can deteriorate despite conservative treatment.<sup>11</sup> This group represents only a small fraction of spinal canal stenosis as patients with minimal symptoms may never see a specialist in a referral hospital.<sup>7</sup>

Plain roentgenograph are often used as a screening test for patients treated for low back pain. Although useful in suspecting spinal canal stenosis, they cannot be relied on to provide useful information for the surgeon considering spinal decompression. 50 of 53 patients in our study had an absolute canal diameter less than 10 mm at one or more vertebral level.

The primary objective of spinal stenosis surgery is relief of leg pain and neurogenic claudication.<sup>3,13,15</sup> To accomplish this, neural elements must be adequately decompressed. The extent of decompression is guided by clinical findings and results of radiculogram or CT scanning and operative findings. In this study indication for spinal fusion is creation of instability intra-operatively following bilateral total facetectomy. Indeed, the authors' study suggests that such instability is rare (2/53 patients intra-operatively and 2 others found at follow-up). Routine postoperative radiological assessment of instability was not performed on

asymptomatic patients postoperatively.

Our results are almost similar in both groups of stenosis and agree with earlier reports.<sup>2,12,13</sup> We eliminated the possible observer bias by having the criteria for success not determined by the operating surgeon.

Katz et al.<sup>8</sup> concluded that the short term results of operation for degenerative stenosis were gratifying but with progressive deterioration in the results over time. Herno et al.<sup>4</sup> concluded that the results of laminectomy improved during the course of longitudinal follow-up of 7 and 13 years. In this study, both short term and long term results after wide laminectomy without fusion were good. This is in accordance with Katz's results but in accordance with Herno's results. Postoperative symptomatic instability occurred in a small proportion. We conclude that the need for routine spinal fusion is questionable.

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