

## Pilot Study

# A Retrospective Analysis of Spinal Canal Endoscopy and Laminectomy Outcomes Data

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Disability from back pain has continued to increase at a steady pace since the 1950's. While no study has associated chronic disability with physical factors, numerous studies have correlated chronic disability with psychological factors and surgical intervention.

Even though most common surgical interventions for spinal pain pertain to the herniated disc, numerous studies have indicated that only 1% of severe episodes of low back pain is attributable to herniated discs. With the advent of spinal canal endoscopy, an additional option is available for medical management of disc disease, which facilitates irrigation, dilution, and removal of inflammatory mediators, thus decreasing the chance of reactivity to chemical and biological mediators, and facilitating administration of corticosteroid medication with specificity to site of action.

This pilot study included two groups of patients, Group 1 with 22 patients treated via spinal endoscopy and Group 2 with 13 patients treated via laminectomy. After spinal canal endoscopy, only 31.8% of Group 1 patients were continued on opioid medication, whereas, 92.3% of Group 2 patients were continued on opioid medication after laminectomy. In addition, 72% from spinal canal endoscopy group and only 28% from laminectomy group returned to work.

In conclusion, this study suggested remarkable differences in outcomes when comparing patients who underwent spinal canal endoscopy to a similar population who underwent lumbar laminectomy.

**Keywords:** Spinal canal endoscopy, lumbar laminectomy, herniated disc, low back pain.

There has been no demonstrable increase in the prevalence or severity of low back pain in the general population for 40 years. Despite this plateau, several studies have shown that disability from back pain has increased at a steady pace since the 1950s (1, 2). Interestingly, no study has associated chronic disability with physical factors such as height, weight, mobility, strength, or severity of injury (3). In contrast, there are numerous studies correlating chronic disability with psychosocial factors such as anxiety, depression, drug and alcohol abuse, low job satisfaction, poor job performance, and altered family dynamics (4-8). Surprisingly, a factor strongly associated to chronic disability is surgical intervention (2, 9, 10). A well-designed study from Oregon related rising costs in Workers' Compensation to high rates of surgical failure (11).

The most common surgical interventions for spinal pain pertain to the herniated disc. However, numerous studies have indicated that only 1% of severe episodes of low back pain is attributable to herniated discs. The associated sciatica is usually self-limited and resolves with conservative care in 80% to 85% of the cases (12-16). Even in those patients with a herniated disc with neurologic deficit (numbness and weakness), there is equal resolution in conservatively treated patients compared with surgically managed ones (13, 14). A large-scale English study showed that 86% of patients with herniated disc with sciatica had good outcome with conservative, nonsurgical treatment (16). Another study demonstrated that 83% of patients advised to have urgent surgery could avoid surgical intervention and still achieve a good-to-excellent outcome (15). Even more fascinating was the fact that the discs most suitable to surgery showed the greatest tendency towards regression on follow-up magnetic resonance imaging (MRI) scan. In other developed countries, surgery is utilized less and only when there is evidence of a cauda equina compression or multiradicular symptoms. As a result, outcome is better. On the strength of clinical and epidemiological studies as outlined above, we must recognize that only between 15 to 50 of every 10,000 cases

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of acute low back pain should require surgery, while the remaining cases should be managed with conservative care. Thus, low back pain qualifies as a medical disease and not necessarily a surgical problem, even in cases of herniated disc.

To date, medical management for disc-related phenomena is the use of oral medications and exercise programs. With the advent of spinal canal endoscopy, additional options are now available for medical care of disc disease. Spinal canal endoscopy represents a platform that allows for the medical management of disc-related inflammation in the spinal canal. McCarron established that disc material, when placed into the spinal canal of dogs, causes an inflammatory response (18). This response is initiated by various inflammatory mediators including Phospholipase A. The patient's immune system will continue to respond in the presence of inflammatory mediators.

Spinal canal endoscopy, as currently practiced, can irrigate, dilute, and remove inflammatory mediators, decreasing the chance of reactivity to chemical and biologic mediators. In addition, spinal canal endoscopy can direct corticosteroid medication with specificity to site of action. Such directed injection serves to suppress components of the inflammatory response and becomes the first chemotherapy targeting disc-related inflammatory response.

**MATERIALS AND METHODS**

Data collection was performed within one geographical area of the country. The initial sample population consisted of 35 patients, ages 35 to 55 years, with radicular spinal pain determined through history, physical examination, and MRI. The patients were divided into two groups: Group 1 (n=22) was treated via spinal endoscopy

and Group 2 (n=13) was treated via laminectomy. Group 1 patients were treated with 8 weeks of physical therapy and oral analgesic medication prior to enrollment for spinal canal endoscopy. Group 2 patients were treated with 8 weeks of physical therapy, oral analgesic medication, and lumbar and caudal epidural steroid injections before data collection. While there were additional facets to the treatment regimes, this report restricts itself to the statistical analysis of the results.

Basic descriptive statistics consisted of generating contingency tables. Tables are arranged for ready comparison of each group's response. Preprocedure is self-explanatory. Postprocedure is an 8-week follow-up. Demographic data were not complete from the presented data. Hence, no analysis or correlation was conducted insofar as demographic factors were concerned.

This report consists of the results of statistical analysis of procedural response only, even though data is presented without exclusion. Multiple variables including demographic factors have not been analyzed. Any conclusions drawn beyond the presented data is at the discretion of the reader.

**RESULTS**

Data analysis compared the two groups for the significance of their responses to opiate use and return-to-work rates following their respective procedures (Tables 1 and 2). Neuromedication use was not tested due to the 100% response rates following each group's respective procedure. Figure 1 illustrates postprocedure opiate usage. The chi-square analysis was performed using summarized data with two nominal variables (procedure at two levels and response at two levels for each procedure). Using a sig-

**Table 1.** Contingency Table for Opiate Usage Rate Comparison

Contingency	Spinal Endoscopy				Open Laminectomy			
	Preprocedure		Postprocedure		Preprocedure		Postprocedure	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate
No	8	36.4%	15	68.2%	0	0%	1	7.7%
Yes	14	63.6%	7	31.8%	13	100%	12	92.3%
<b>Totals</b>	22	100%	22	100%	13	100%	13	100%

**Table 2.** Contingency Table for Return-to-Work Rates

Contingency	Spinal Endoscopy		Open Laminectomy	
	Count	Rate	Count	Rate
No	6	27.3%	9	69.2%
Yes	16	72.7%	4	30.8%
<b>Totals</b>	<b>22</b>	<b>100%</b>	<b>13</b>	<b>100%</b>

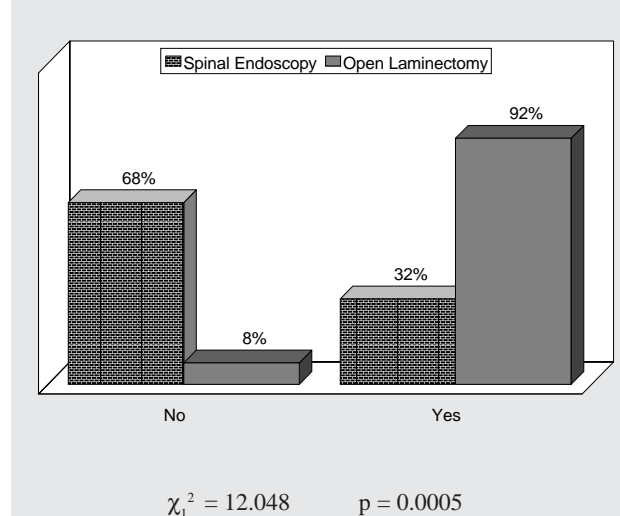
nificance level of 0.05, the responses are significantly independent between treatment groups. A similar approach was used to compare the return-to-work rates (Fig. 2).

In Group 1, 14 of the 22 patients were receiving opioid medication pre-procedure. In Group 2, all 13 patients were receiving opioid medication preprocedure. After spinal canal endoscopy (Group 1) 7 patients (31.8%) continued on opioid medication. After laminectomy (Group 2) 12 patients (92.3%) continued on opioid medication.

Neuropathic medication was used in all 22 patients from Group 1 before and after spinal canal endoscopy. In Group 2, three patients were on neuropathic medication preprocedure, and 13 were on neuropathic medication postprocedure.

Sixteen patients (73%) from Group 1 returned to work and four patients (27%) from Group 2 returned to work.

**Fig. 1.** Graph Showing Postprocedure Opiate



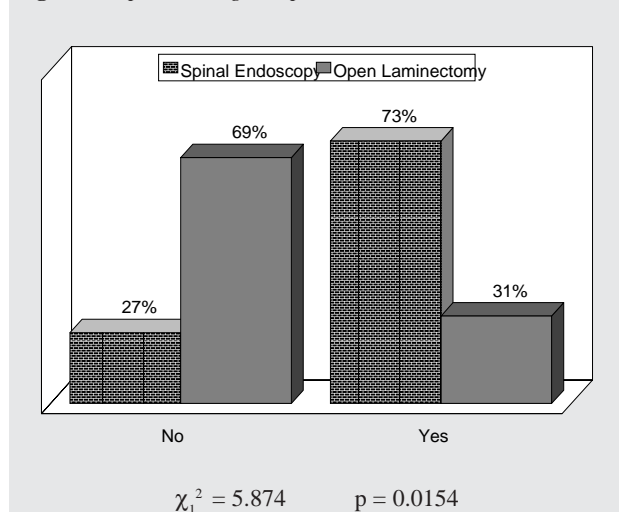
**DISCUSSION**

A relatively small number of postlaminectomy patients returned to work compared to the medically managed spinal canal endoscopy group. The reasons for this are multifaceted: (1) the nontraumatic nature of spinal canal endoscopy compared to laminectomy; (2) the short recovery times of spinal canal endoscopy compared to laminectomy; and (3) the medical management of patients (nonsurgical candidates) using several modalities including medication and spinal canal endoscopy. Although similar retrospective and preliminary data have been collected before and have indicated that spine disability is associated with laminectomy (2, 9, 10), these data suggest that avoidance of laminectomy and adherence to a medical protocol featuring spinal canal endoscopy are associated with high return to work. This represents a substantial savings in health care and disability expenditure. The cost savings, when extrapolated to an entire population, suggest that substantial dollars can be saved by adherence to medical programs that emphasize medical care and spinal endoscopy. It is estimated that one year of disability costs the system \$15,171 (18). Disability savings alone (not even considering costs of surgery, hospitalization, and recovery) on 100 patients can exceed one million dollars. Add to this, the savings related to not performing surgery and the total savings are many millions of dollars.

**CONCLUSION**

This pilot study suggests a remarkable difference in outcomes when comparing medically managed patients with the benefit of spinal canal endoscopy to a similar popula-

**Fig. 2.** Graph Showing Postprocedure Return-to-Work Rates



tion of postlaminectomy patients. A prospective study is now required to quantify the outcomes and cost savings of spinal canal endoscopy compared to laminectomy.

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