A CSORN Study: Comparison Between Primary and Revision Lumbar Decompression Outcomes

Samantha Visva[1,2], Dr. Abdullah AlDuwaisan[1-3], Dita Moravek[2,3], Dr. Eugene Wai[1-3], Dr. Stephen Kingwell[1-3], Dr. Alexandra Stratton[1-3], Dr. Philippe Phan[1-3], and the CSORN Investigators[4]

[1] Faculty of Medicine, Ottawa University, Ottawa, Ontario;
[2] Ottawa Hospital Research Institute, Ottawa, Ontario;
[3] Department of Surgery, The Ottawa Hospital, Ottawa, Ontario
[4] Canadian Spine Outcomes and Research Network, Markdale, Ontario, Canada

The Ottawa Hospital Research Institute | L'Hôpital d'Ottawa Institut de recherche

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Revision spinal surgeries confer clinical benefit but are not without risk, including increased susceptibility to **complications** and **adverse events** compared to primary patients[1]. To date, few studies have compared primary and revision decompressive groups to quantify a difference in health status and of these studies, none used a large national database[2,3].

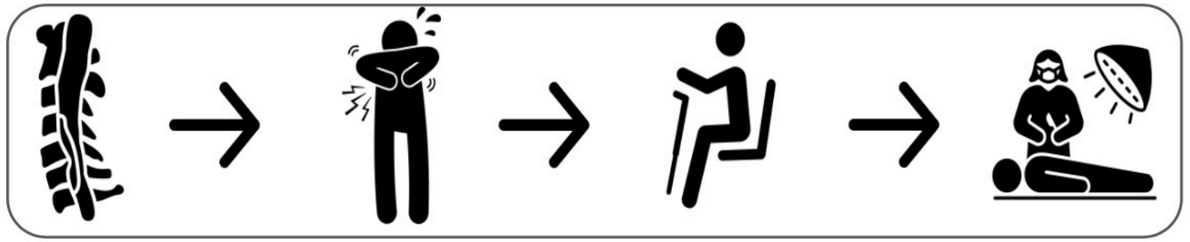

Figure 1: The increased pressure placed on spinal nerve roots in conditions such as spinal stenosis can cause motor and sensory deficits, illustrated by significant discomfort and limitations in daily activities and severe disability[4,5].

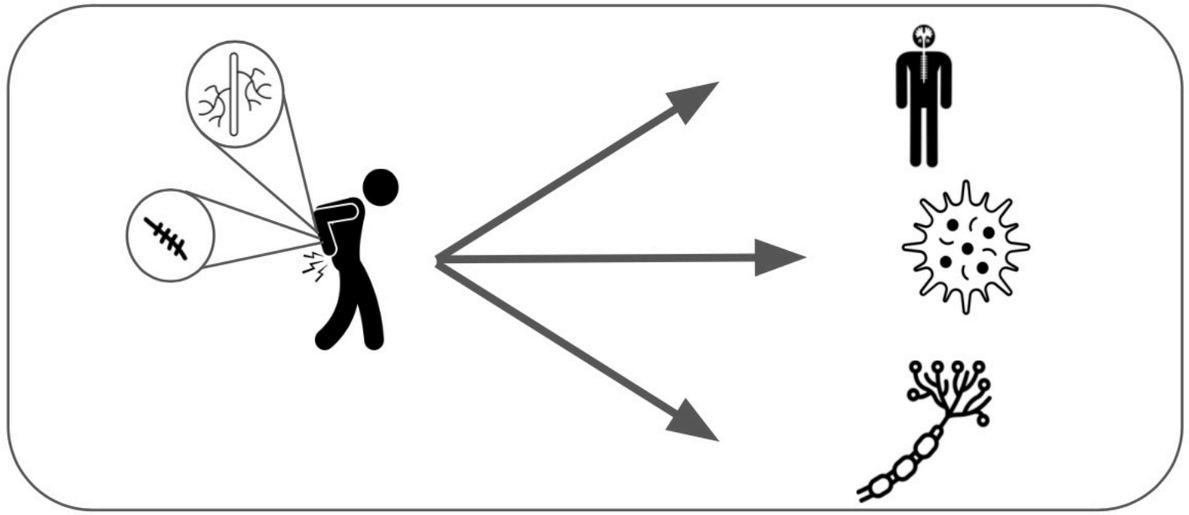

Figure 2: Patients may experience a recurrence of symptoms and disc herniation, requiring a revision procedure in 4-24% of patients[2,3,6,7]. Revision surgery can be more difficult to perform with scar tissue, epidural fibrosis and compromised vascular supply, increasing one's susceptibility to complications such as infection, dural tears, cerebrospinal fluid leaks and peripheral nerve root deficits[1].

Objectives:

1. Using the CSORN database, compare patient satisfaction and quality of life for patients undergoing primary versus revision lumbar decompression
2. To validate the CSORN database by comparing these results to the literature

Hypothesis: We hypothesize that revision patients experience worse clinical outcomes and less satisfaction than primary patients.

Using the Canadian Spine Outcomes and Research Network (CSORN), patient data was collected with procedural codes for primary and revision lumbar discectomy (LD), and lumbar laminectomy and laminotomy (LLL) with 1 and 2 year follow up.

Measures: Quality of life (QOL), including the Oswestry Disability Index (ODI), EQ-5D and SF-12, and patient satisfaction was determined for primary versus revision cohorts.

Statistical Analysis: Improvement in QOL measures between preoperative and follow up scores were compared using mean differences [95% CI], which were compared to their respective MCIDs.

	ODI	EQ-5D	SF-12 MCS	SF-12 PCS
MCID*	12.8 points[8,9]	0.17 points[8]	10.1 points[10]	2.5 points[10]

Variables	Primary (n=1054)	Revision (n=66)	p-value
Age (yr)	57.54 (16.03)	66.76 (11.86)	<0.001
Female (%)	39	43	0.53
Married (%)	79	74	0.35
BMI	28.2 (5.6)	29.6 (5.5)	0.056
Smoking (%)	9	15	0.204
Meds (%)	91	89	0.67
Comorbidities per Patient	2.6 (1.8)[A]	3.5 (1.8)[A]	<0.001

Table 1: Baseline characteristics between primary and revision groups. Age, BMI and Number of Comorbidities were significantly different between primary and revision groups.
[A] Top 3 Co-morbidities: Back/Neck Pain, High Blood Pressure, Osteoarthritis

	Discectomy		Laminectomy + Laminotomy	
	Primary	**Revision**	**Primary**	**Revision**
Preop ODI	48.44 ± 15.334	41.06 ± 8.640	45.96 ± 16.081	43.53 ± 15.379
1 Yr ODI	21.67 ± 18.684	28.95 ± 16.542	23.86 ± 19.349	29.16 ± 17.210
2 Yr ODI	21.39 ± 18.447	24.20 ± 18.890	24.12 ± 18.680	28.59 ± 18.162
1 Year ODI Change	-26.53 ± 20.241 *	-13.26 ± 17.100 *	-21.90 ± 19.695 *	-13.97 ± 15.506 *
Mean Difference	-13.264		-7.936	
p-value	0.005		<0.001	

Table 2: Comparison of preoperative and follow up ODI scores for revision and primary LD and LLL patients. Positive change in ODI is demonstrated via decreasing value. Thus, with improvement, the 1 year ODI change will be negative. All patients exceeded the ODI MCID.

	Discectomy		Laminectomy + Laminotomy	
	Primary	**Revision**	**Primary**	**Revision**
Preop EQ-5D	.5062 ± .21946	.6499 ± .15748	.5364 ± .21655	.5878 ± .20014
1 Yr EQ-5D	.7839 ± .18833	.6963 ± .17501	.7663 ± .19108	.7232 ± .16788
2 Yr EQ-5D	.7909 ± .18680	.7270 ± .23722	.7716 ± .18234	.6883 ± .21019
1 Year EQ Change	.2762 ± .24552 *	-.0523 ± .20537	.2322 ± .24887 *	.1477 ± .19964
Mean Difference	.22386		.08452	
p-value	<0.001		0.004	

Table 3: Comparison of preoperative and follow up EQ-5D scores for revision and primary LD and LLL patients. Only primary patients met the EQ-5D MCID.

	Discectomy		Laminectomy + Laminotomy	
	Primary	**Revision**	**Primary**	**Revision**
Preop MCS	46.7071 ± 8.18337	49.1316 ± 7.69162	48.7379 ± 8.06600	51.1851 ± 7.12066
1 Yr MCS	51.3993 ± 7.27306	50.0830 ± 8.80625	52.2184 ± 7.19151	51.9445 ± 7.09207
2 Yr MCS	52.2400 ± 7.05485	53.7412 ± 6.86343	52.1933 ± 6.88372	52.8047 ± 6.38391
1 Year MCS Change	4.7631 ± 8.85353	.4672 ± 9.42316	3.5117 ± 8.37762	.4641 ± 7.03902
Mean Difference	4.29589		3.04754	
p-value	0.039		0.007	

Table 4: Comparison of preoperative and follow up SF-12 Mental Composite Scores (MCS) for revision and primary LD and LLL patients. Primary patients demonstrated greater improvement than revision, however, neither group met the MCS MCID.

	Discectomy		Laminectomy + Laminotomy	
	Primary	**Revision**	**Primary**	**Revision**
Preop PCS	31.8300 ± 8.31971	33.9017 ± 8.45355	32.6839 ± 8.33098	32.3914 ± 8.34759
1 Yr PCS	45.6967 ± 9.29977	44.5957 ± 8.58481	43.8263 ± 9.81845	41.9123 ± 8.80257
2 Yr PCS	45.8868 ± 9.36037	45.7418 ± 10.81244	43.6969 ± 9.60698	39.9763 ± 11.44299
1 Year PCS Change	13.8702 ± 10.43648 *	10.9055 ± 9.78157 *	11.1946 ± 10.68140 *	9.2647 ± 9.26632 *
Mean Difference	2.96466		1.92994	
p-value	0.224		0.184	

Table 5: Comparison of preoperative and follow up SF-12 Physical Composite Scores (PCS) for revision and primary LD and LLL patients. Primary patients experienced greater clinical improvement, however, all primary and revision patients exceeded the PCS MCID.