Temporal Trends in Recovery After Primary Versus Revision Lumbar Microdiscectomy: A Matched Cohort Study

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INTRODUCTION:

Recovery timelines following lumbar microdiscectomy—particularly when comparing primary and revision procedures—remain incompletely characterized in the literature. Addressing these differences is important for providing accurate counseling regarding the expected pace and extent of postoperative improvements in pain, functionality, and return to activities of daily living. This study aimed to compare the temporal trends in postoperative recovery, regarding pain, functionality, and return to activities, following primary versus revision lumbar microdiscectomy.

METHODS:

We conducted a retrospective matched cohort study of patients undergoing single-level lumbar microdiscectomy at a single institution, with a minimum of 1-year follow-up. Patients were matched for age, sex, body mass index, Charlson Comorbidity Index (CCI), and surgical level. Patient-reported outcomes (PROMs) included the Oswestry Disability Index (ODI), the 12-Item Short Form Physical Component Score (SF12-PCS), and Visual Analog Scales (VAS) for back and leg pain, collected preoperatively and at 2, 6, and 12 weeks, as well as at 6 months, 1 year, and 2 years postoperatively. Achievement of the minimally clinically important difference (MCID), improvement in global rating of change (GRC), and median time to return to driving, work, and opioid discontinuation were assessed. The Wilcoxon signed-rank test and Fisher's exact test were used for within- and between-group comparisons and to determine "plateau" timepoints.

RESULTS:

After matching, the final study population consisted of 435 patients, with 290 undergoing primary and 145 undergoing revision microdiscectomy. Both groups were well balanced with respect to baseline demographics and comorbidities (Table 1). Functional improvement, measured by ODI, plateaued at 6 months postoperatively in both groups, though the revision group had significantly worse ODI scores at 6 weeks and 1 year. SF12-PCS plateaued at 6 months for primary cases and at 1 year for revision cases, with revision patients having significantly lower SF12-PCS at 12 weeks, 6 months, and 1 year. For pain outcomes, VAS back pain plateaued at 12 weeks in the primary group and at 6 weeks in the revision group, while VAS leg pain plateaued at 2 weeks for primary and 12 weeks for revision procedures. The revision cohort reported worse VAS back pain at 6 months and worse VAS leg pain at both 6 weeks and 6 months (Table 2). The primary cohort achieved higher rates of MCID for ODI at 1 year, SF12-PCS at 6 months and 1 year, and VAS leg at 12 weeks (Table 3). There were no significant differences between groups in global rating of change at any timepoint. Median time to return to driving (15 days), work (18 to 18.5 days), and opioid discontinuation (4 to 5 days) was similar between cohorts.

DISCUSSION AND CONCLUSION: This study demonstrates that both primary and revision lumbar microdiscectomy yield rapid improvements in pain, with plateau occurring by 12 weeks postoperatively, while functional recovery continues through 6 months to 1 year. Although revision procedures are associated with generally lower PROM scores and MCID achievement, both groups show similar GRC improvements and comparable rates of return to work, driving, and opioid discontinuation.

Table 1: Preoperative demographics, comorbidities, and perioperative variables after matching.

Variable	Primary (n = 290)	Revision (n = 145)	p-value
Age	45.9 ± 14.6	47 ± 14.9	0.509
Sex (female)	129 (44.5%)	59 (40.7%)	0.474
Race (not white)	44 (15.2%)	26 (17.9%)	0.490
BMI	27.2 ± 5.7	27.2 ± 5.8	0.969
CCI	0.3 ± 0.9	0.3 ± 0.9	0.654
ASA	1.8 ± 0.5	1.9 ± 0.5	0.439
Hypertension	53 (18.3%)	28 (19.6%)	0.794
Diabetes	13 (4.5%)	7 (4.8%)	1.000
Dyslipidemia	71 (24.5%)	44 (30.8%)	0.167
Depression	31 (10.7%)	28 (19.6%)	0.017
Anxiety	42 (14.5%)	29 (20.3%)	0.131
Preoperative Opioid Use	112 (38.6%)	56 (38.6%)	1.000
Preoperative Symptom Duration (weeks)	80.3 ± 137.3	30.2 ± 64.6	< 0.001
Surgical Level			
L1L2	4 (1.4%)	1 (0.7%)	0.669
L2L3	4 (1.4%)	2 (1.4%)	1.000
L3L4	18 (6.2%)	11 (7.6%)	0.684
L4L5	113 (39%)	55 (37.9%)	0.917
L5S1	151 (52.1%)	76 (52.4%)	1.000
Operative Time (minutes)	63.3 ± 29.3	63.9 ± 34.5	0.699
Estimated Blood Loss (mL)	21 ± 12.1	19.3 ± 10.1	0.393
Perioperative LOS (hours)	16 ± 16.9	17.4 ± 20.8	0.811
Intraoperative Complications	0 (0%)	1 (0.7%)	0.333

* one intraoperative complication was a durotomy, which was repaired without further complication

Table 2: PROMs at each timepoint.

Time Point	ODI	SF12-PCS	VAS Back	VAS Leg
Comparison Between Timepoints				
Primary				
Preoperative	44 [24]	29.7 [10.7]	6.0 [5]	7 [3]
2 Weeks	26 [26]	34.3 [10.3]	2.0 [2]	2 [4]
6 Weeks	20 [23.6]	37.7 [13.4]	2.0 [2.5]	1 [3]
12 Weeks	12 [17.8]	42.7 [14.6]	1.0 [2]	1 [2]
6 Months	10 [18]	46.6 [15.5]	1.0 [2]	1 [2]
1 Year	10 [15.9]	47.6 [16.9]	1 [3]	1 [2.8]
2 Years	8 [16]	47.8 [16.6]	1 [2.8]	1 [3]
Revision				
Preoperative	42 [28]	30.8 [10.2]	5 [4]	7 [4]
2 Weeks	30 [24]	33.6 [8.4]	2 [2]	2 [4]
6 Weeks	24 [17.9]	34.8 [14]	2 [2.5]	3 [4.5]
12 Weeks	14 [23.1]	38.7 [12.6]	1 [3]	1 [3]
6 Months	14.8 [26.5]	40.5 [15.4]	2 [4]	2 [4]
1 Year	14 [22]	42.1 [15]	2 [4]	2 [3.1]
2 Years	8 [22.8]	48 [16.8]	1 [2]	0.5 [2]
Comparison Between Cohorts (p-values)				
Preoperative	0.700	0.891	0.323	0.658
2 Weeks	0.991	0.861	0.757	0.647
6 Weeks	0.022	0.103	0.125	0.041
12 Weeks	0.074	0.040	0.639	0.090
6 Months	0.054	0.012	0.048	0.020
1 Year	0.047	0.042	0.220	0.127
2 Years	0.880	0.454	0.413	0.829

Wilcoxon Signed Rank test between time points (data presented as median [interquartile range];
Wilcoxon ranked sum test between cohorts. Bolded p-values are significant (p < 0.05).

Table 3: MCID achievement rates.

Time Point	ODI	SF12-PCS	VAS Back	VAS Leg
Comparison Between Timepoints				
Primary				
2 Weeks	58.6%	41.8%	63.5%	63.5%
6 Weeks	65.1%	56.6%	66.9%	78.3%
12 Weeks	72.0%	70.8%	73.2%	87.3%
6 Months	77.5%	79.6%	68.9%	80.7%
1 Year	80.0%	81.9%	63.2%	77.4%
2 Years	71.7%	69.6%	60.0%	81.4%
Revision				
2 Weeks	49.1%	36.7%	51.9%	69.2%
6 Weeks	62.7%	46.5%	60.8%	71.6%
12 Weeks	65.5%	56.9%	64.9%	70.2%
6 Months	66.7%	61.9%	68.2%	79.5%
1 Year	61.0%	59.5%	61%	80.5%
2 Years	68.0%	78.3%	73.1%	76.9%
Comparison Between Cohorts				
2 Weeks	0.306	0.592	0.22	0.587
6 Weeks	0.772	0.198	0.382	0.324
12 Weeks	0.397	0.082	0.300	0.007
6 Months	0.165	0.036	1.000	1.000
1 Year	0.021	0.012	0.850	0.825
2 Years	0.796	0.583	0.330	0.769