



# Preoperative Predictors of 3 Month and 1 Year Change in Quality of Life (EQ-5D) Following Multilevel Lumbar Laminectomy and Fusion

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## Introduction

There is a paucity of data examining patient characteristics that affect improvement in quality of life following lumbar laminectomy and fusion.

## Learning Objectives

The abstract examines preoperative characteristics that are significantly associated with patient improvement in quality of life (EQ-5D). Through this study, we learn that preoperative back disability (ODI), back pain (NRS-Back), anxiety (MSPQ), age, and complications all have an effect on a patients quality of life in the short-term (3-months), long-term (1-year), or both.

## Methods

332 patients undergoing lumbar laminectomy and fusion in 3 or fewer levels were included in this study. Patient demographics, perioperative data, and 90-day postoperative complications were gathered from the medical record. Preoperative, 3-month, and 12-month EQ-5D, ODI, NRS-back pain, NRS-leg pain, ZUNG depression rating, and MSPQ anxiety rating were collected prospectively via our spinal outcomes registry. Multivariate linear regression analysis was performed to assess the association between EQ-5D change scores at 3-months and 1-year with age, gender, BMI, ASA grade, blood loss, primary vs. revision surgery, use of an interbody fusion, history of smoking, history of diabetes, 90-day complications, preoperative ZUNG depression rating, preoperative MSPQ anxiety rating, preoperative NRS-back/leg pain, and preoperative ODI as covariates.

Table 1. Baseline Patient Characteristics (n = 332)

Age (years)	59.7 ± 11.5
Male (%)	147 (44)
Tobacco use (%)	177 (53)
Diabetes (%)	77 (23)
BMI	30.8 ± 6.3
ASA Grade	2.7 ± 0.5
Indication for surgery, n (%)	
Deformity	15 (5)
Fracture	5 (2)
Herniated disc	29 (9)
Pseudoarthrosis	13 (4)
Spondylolisthesis	149 (45)
Spondylosis	5 (2)
Stenosis	112 (34)
Baseline PROs	
EQ-5D	0.54 ± 0.21
ODI	49.6 ± 14.5
NRS-Back pain	7.1 ± 2.3
NRS-Leg pain	6.7 ± 2.8
ZUNG	36.9 ± 9.7
MSPQ	6.8 ± 4.9

## Predictors of EQ5D Change Score at 3-months

Model	Coefficients*						
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	-.535	.167		-3.208	.001	-.863	-.207
Age	.005	.002	.230	3.560	.000	.002	.008
Gender	.000	.031	.001	.013	.989	-.061	.062
BMI	.003	.003	.068	1.173	.242	-.002	.008
ASA Grade	-.026	.030	-.051	-.850	.396	-.065	.034
Blood Loss	1.715E-5	.000	.025	.423	.673	.000	.000
Primary vs. Revision	.026	.032	.046	.824	.410	-.036	.088
Interbody Fusion	.015	.034	.028	.454	.650	-.051	.082
Number of Levels	-.031	.024	-.083	-1.334	.183	-.078	.015
Smoker	.029	.031	.052	.927	.355	-.032	.090
Diabetes	-.039	.038	-.060	-1.029	.304	-.113	.035
Preop ZUNG	.001	.002	.032	.424	.672	-.003	.005
Preop MSPQ	-.009	.004	-.166	-2.447	.015	-.017	-.002
90 day complication	-.024	.021	-.052	-1.136	.257	-.065	.018
Preop NRS-Back	.024	.007	.200	3.247	.001	.009	.038
Preop NRS-Leg	-.001	.006	-.006	-.096	.924	-.012	.011
Preop ODI	.005	.001	.251	3.415	.001	.002	.007

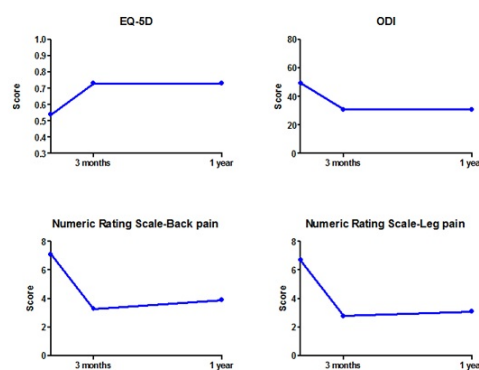
a. Dependent Variable: EQ5D3MonthChange

## Predictors of EQ5D Change Score at 1-year

Model	Coefficients*						
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	-.352	.150		-2.349	.019	-.647	-.057
Age	.004	.001	.161	2.537	.012	.001	.006
Gender	-.013	.028	-.025	-.445	.657	-.068	.043
BMI	-.002	.002	-.052	-.913	.362	-.007	.002
ASA Grade	-.001	.027	-.002	-.029	.977	-.054	.053
Blood Loss	-2.329E-5	.000	-.037	-.639	.524	.000	.000
Primary vs. Revision	.047	.028	.090	1.635	.103	-.009	.103
Interbody Fusion	.037	.030	.073	1.208	.228	-.023	.096
Number of Levels	.017	.021	.048	.786	.433	-.025	.058
Smoker	.028	.028	.055	.995	.320	-.027	.083
Diabetes	-.028	.034	-.047	-.821	.412	-.095	.039
Preop ZUNG	.001	.002	.033	.449	.654	-.003	.005
Preop MSPQ	-.013	.003	-.259	-3.887	.000	-.020	-.007
90 day complication	-.052	.019	-.147	-2.761	.006	-.090	-.015
Preop ODI	.006	.001	.348	4.813	.000	.004	.008
Preop NRS-Leg	.007	.005	.081	1.391	.165	-.003	.016
Preop NRS-Back	.009	.007	.081	1.347	.179	-.004	.022

a. Dependent Variable: EQ5D1YearChange

## PROs Change Over 1-year



## Results

Univariate analysis revealed significant improvement at 3 and 12-month follow-up for EQ-5D, ODI, NRS-back pain, and NRS-leg pain ( $p < 0.001$ ). Multivariate analysis at 3-months demonstrated that increased age ( $p < 0.001$ ), increased preoperative NRS-back pain ( $p = 0.001$ ), and worse preoperative ODI ( $p = 0.001$ ) resulted in greater improvement in EQ-5D, whereas increased anxiety (MSPQ,  $p = 0.015$ ) resulted in less improvement in EQ-5D. Multivariate analysis at 1-year demonstrated that increased age ( $p = 0.012$ ) and worse preoperative ODI ( $p < 0.001$ ) resulted in greater improvement in EQ-5D, whereas increased anxiety (MSPQ,  $p < 0.001$ ) and 90-day complications ( $p = 0.006$ ) resulted in less improvement in EQ-5D at 1 year.

## Conclusions

Significant improvement occurs in all outcomes measures at 3-months and 1-year following lumbar laminectomy and fusion. Additionally, it appears that older patients and those with higher levels of back specific disability (ODI) have greater gains in quality of life at both 3-months and 1-year after surgery. Patients with higher anxiety preoperatively appear to have decreased improvement in quality of life at both 3-months and 1-year postoperatively.