

# Does Depression or Anxiety Affect Patient-reported Outcomes and Satisfaction Following Operative Treatment for Cervical Myelopathy or Radiculopathy?

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## Introduction

Preoperative depression and anxiety have been reported to lead to worse surgical outcomes. Better understanding of predictors of patient-reported outcomes could improve selection of patients with the greatest opportunity for successful outcomes.

## Methods

Patients undergoing surgery for cervical radiculopathy or myelopathy over a four-year period were enrolled into a prospective registry. Baseline and 12-month PROs included: NDI, SF-6D, VAS-NP, VAS-AP, Zung depression scale (ZDS), and Modified Somatic Perception Questionnaire (MSPQ). Patients with ZDS>33 were characterized as depressed, and patients with MSPQ>12 as anxious. Mean absolute and change-score between groups were compared using Student's t-test. Chi-square test was used to compare proportions between groups for patients who achieved MCID and patients who were satisfied. Multivariable linear regression was used to determine the effect of depression and anxiety on NDI% change score controlling for 13 independent variables.

**Table 1: 12-month absolute patient-reported outcome scores**

Radiculopathy (n=170)						
Patient Reported Outcome Measure	Depressed	Non-depressed	P-value	Anxious	Non-anxious	P-value
NDI%	27.8±19.0	16.3±14.6	<0.001	34.5±21.1	20.3±16.3	<0.001
SF-6D	0.68±0.17	0.81±0.10	<0.001	0.64±0.19	0.76±0.14	<0.001
VAS-NP	3.83±3.03	2.60±2.67	0.008	4.20±2.94	3.01±2.91	0.049
VAS-AP	2.18±3.12	1.49±2.31	0.125	3.03±3.43	1.60±2.59	0.008

  

Myelopathy (n=262)						
Patient Reported Outcome Measure	Depressed	Non-depressed	P-value	Anxious	Non-anxious	P-value
NDI%	33.8±19.4	17.0±14.9	<0.001	36.1±20.8	23.1±17.8	<0.001
SF-6D	0.63±0.18	0.78±0.13	<0.001	0.62±0.18	0.72±0.17	<0.001
VAS-NP	4.34±3.15	2.18±2.51	<0.001	4.74±3.21	2.93±2.89	<0.001
VAS-AP	3.49±3.35	1.43±2.36	<0.001	3.71±3.26	2.20±2.99	0.001

All scores given as mean ± SD  
 NDI = Neck Disability Index  
 SF-6D = Short-Form 6D  
 VAS-NP = Visual Analog Scale, Neck Pain  
 VAS-AP = Visual Analog Scale, Arm Pain

## Results

In total, 170 patients with radiculopathy and 262 with myelopathy met inclusion criteria. In radiculopathy patients, 12-month absolute scores were significantly worse in depressed patients for all measures except VAS-AP. No difference in mean change scores was observed in depressed patients: NDI% (21.79 vs. 18.03, P=0.201), SF-6D (0.109 vs. 0.102, P=0.791), VAS-NP (3.11 vs. 2.53, P=0.260), VAS-AP (3.94 vs. 3.03, P = 0.134). Myelopathy patients demonstrated similar results for both absolute and change scores. No difference in proportion of patients achieving MCID was observed except for NDI%, in which depressed patients achieved MCID significantly more (P=0.016). Multivariable linear regression demonstrated neither depression nor anxiety is significantly associated with NDI% change score.

**Table 2: 12-month patient-reported outcome change scores**

Radiculopathy (n=170)						
Patient Reported Outcome Measure	Depressed	Non-depressed	P-value	Anxious	Non-anxious	P-value
NDI%	21.8±20.3	18.0±15.7	0.201	21.9±23.1	19.9±17.4	0.568
SF-6D	0.11±0.19	0.10±0.10	0.791	0.11±0.18	0.11±0.15	0.936
VAS-NP	3.11±3.41	2.54±2.89	0.260	3.22±3.65	2.79±3.10	0.477
VAS-AP	3.94±4.14	3.03±3.37	0.134	4.00±4.01	3.47±3.84	0.468

  

Myelopathy (n=262)						
Patient Reported Outcome Measure	Depressed	Non-depressed	P-value	Anxious	Non-anxious	P-value
NDI%	17.4±19.8	11.3±17.2	0.009	19.4±21.5	13.1±17.7	0.021
SF-6D	0.10±0.17	0.06±0.15	0.037	0.11±0.19	0.08±0.15	0.170
VAS-NP	2.22±3.53	2.16±3.11	0.889	2.22±3.59	2.19±3.27	0.954
VAS-AP	2.26±4.11	3.10±3.94	0.095	2.89±3.96	2.55±4.09	0.559

All scores given as mean ± SD  
 NDI = Neck Disability Index  
 SF-6D = Short-Form 6D  
 VAS-NP = Visual Analog Scale, Neck Pain  
 VAS-AP = Visual Analog Scale, Arm Pain

## Conclusions

Despite having worse absolute pain and disability one year following surgery, patients with depression and anxiety have statistically similar 12-month change scores, achievement of MCID for patient-reported outcomes, and satisfaction with surgery compared to those without. These patients should not be dismissed as potential candidates for surgery as they stand to gain measurable clinical benefit.

## Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the relationship between psychological distress and patient-reported outcomes, 2) Discuss, in small groups, the utility of identifying depression and anxiety in their patients prior to spine surgery, 3) Identify ways in which to implement these predictive factors into practice.

## References

1. Alvin MD, Miller JA, Sundar S, et al. The impact of preoperative depression on quality of life outcomes after posterior cervical fusion. Spine J 2014; 15:79-85.
2. He J, Xiong W, Li F, et al. Depression influences pain and function after cervical disc arthroplasty. J Neurosurg Sci 2014; Epub ahead of print.

**Figure 1: Change score in NDI% for radiculopathy patients in depressed vs. non-depressed patients**

