

# Outcomes After Lumbar Discectomy Differentiated by Specialty: A NSQIP Analysis

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## Introduction

Lumbar discectomy is the most common spinal surgical procedure as it is performed more than 480,000 times annually by orthopedic and neurological surgeons (1,2). Previous studies have examined preoperative risk factors and the impact of outpatient versus inpatient hospital setting for postoperative complications in lumbar discectomies. However, the impact of surgical specialty on these variables has not been examined. Using the American College of Surgeons National Quality Improvement Program (ACS-NSQIP) to analyze perioperative patient data, we present the largest set of lumbar discectomy cases investigated to identify the impact of surgeon specialty on 30-day postoperative outcomes.

#### Methods

All patients who underwent a singlelevel lumbar discectomy between 2005 and 2014 were selected using a single primary current procedural terminology code from the ACS-NSQIP database. After excluding patients who underwent emergent and more expansive operations, propensity-score matching was performed, using RStudio (RStudio Inc, Boston, MA) and MatchIt package (3,4), to reduce confounding preoperative differences. Chisquared test, Fisher's Exact test, and independent T-tests were used to determine if surgeon subspecialty had an impact on differences seen in 30day postoperative complications. Statistics were calculated using SPSS Statistics v24 (IBM, Armonk, NY), with significance set at p < 0.05. Inclusion and exclusion criteria are displayed in Figure 1.



Global Exclusions = surgeon specialty, emergency status, and post-op diagnosis.

#### Results

28,863 patients underwent lumbar discectomies from 2005-2014. 12,659 cases met inclusion criteria. 3,733(29.4%) operations were performed by orthopedic surgeons, while 8,926 (70.6%) were performed by neurosurgeons. A propensity-score matched sample of 7,464 total cases was analyzed for impact of surgeon specialty on 30-day postoperative outcomes. Baseline characteristics for the two groups are shown in Table 1.

Table 1: Baseline Characteristics					
Demographics					
Age	47.39	47.19	0.41		
BMI	29.71	29.61	0.39		
Hispanic Ethnicity	168 (4.5%)	159 (4.3%)	0.61		
Race: White	3401 (91.1%)	3378 (90.5%)	0.40		
Non-White	331 (8.9%)	354 (9.5%)			
Sex: Male	2023 (54.2%)	2132 (57.1%)	0.011		
Female	1709 (45.8%)	1600 (42.9%)			
Perioperative factors					
ASA Classification status ≥3	799 (21.4%)	791 (21.2%)	0.86		
Bleeding Disorders	31 (0.8%)	27 (0.7%)	0.59		
Diabetes Treated w Medication	397 (10.6%)	381 (10.2%)	0.58		
Dyspnea	89 (2.4%)	104 (2.8%)	0.17		
Functionally Dependent Prior to Surgery	34 (0.9%)	38 (1.0%)	0.81		
History of COPD	82 (2.2%)	82 (2.2%)	0.79		
Hypertension Requiring Medication	1159 (31.1%)	1169 (31.3%)	0.46		
Admission Status: Inpatient	1285 (34.4%)	1246 (33.4%)	0.46		
Post-Op Dx: 722.10	3563 (95.5%)	3554 (95.2%)	0.52		
722.52	169 (4.5%)	178 (4.8%)			
Current Smoker within 1 year	886 (23.7%)	890 (23.9%)	0.90		
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Post-op Dx 722.10 = Displacement, lumbar intervertebral disc without myelopathy; 722.52 = Degeneration of lumbar or lumbosacral intervertebral disc

# Results cont.

After propensity matching, a significant difference in patient sex was observed, with female patients making up 45.8% of neurosurgery cases versus 42.9% of orthopedic cases (p=0.011). All other baseline variables did not differ significantly between the two groups. 30-day postoperative outcomes are illustrated in Table 2. Orthopedic surgeons and neurosurgeons were found to be similar in all postoperative outcomes, except for a greater frequency of blood transfusions (0.3%, n = 11) in orthopedic versus neurosurgery patients (0.1%, n = 3; p = 0.032). There were no significant differences in mortality, readmission, or reoperation rates.

Outcomes					
Death	2 (0.1%)	0	0.50		
Return to OR	72 (1.9%)	75 (2.0%)	0.80		
Readmission	85/2649 (3.2%)	75/2580 (2.9%)	0.53		
Discharged to Destination Other Than Home	36/3087 (1.2%)	42/3209 (1.3%)	0.61		
Discharged >1 Postoperative Day	478 (12.8%)	523 (14.0%)	0.13		
υπ	10 (0.3%)	12 (0.3%)	0.67		
Wound Complications	41 (1.1%)	40 (1.1%)	0.91		
Superficial SSI	21 (0.6%)	17 (0.5%)	0.52		
Deep Incisional SSI	9 (0.2%)	16 (0.4%)	0.16		
Dehisence	12 (0.3%)	7 (0.2%)	0.25		
Hematological Complications	17 (0.5%)	23 (0.6%)	0.34		
Pulm Embolism	8 (0.2%)	6 (0.2%)	0.59		

Table 2, 20 day Destancestive

SSI = Surgical Site Infection; DVT = Deep Venous Thrombosis; UTI = Urinary Tract Infection

## Discussion

Previous studies have shown that spinal fusions and elective spine surgeries overall have higher transfusion rates for orthopedic surgery patients (1,6) while no difference in outcomes for the two specialties is seen in ACDF's (5). Number of RBC units transfused is an independent predictor of worse clinical outcomes, including longer hospital & ICU stays and increased complication & mortality rates (8). Transfusions are independently associated with higher risk of complications after lumbar discectomy (1) and spine surgeries overall (9). Average cost of managing procedure-related complications after lumbar discectomy is \$3,939 (2). Given the high costs and risks associated with transfusions, causes underlying differences in transfusion rates between the two specialties should be further investigated.

# Conclusion

Lumbar discectomies hold a low complication profile in the hands of both orthopedic and neurological surgeons. In propensity-score matched cohorts, orthopedic surgeons had higher rates of blood transfusions; however, the actual number of transfusions was very low for both specialties. There are limitations associated with the NSQIP database towards capturing complications of neurological injury and cerebrospinal fluid leaks.

## References

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