

# Workers' Compensation Outcomes Following Minimally Invasive Transforaminal Lumbar Interbody Fusion performed in an Outpatient Surgery Center

Madhav Patel, Kevin C Jacob, James Nie<sup>1</sup>, Timothy J Hartman, Omolabake Oyeyayo<sup>1</sup>, Eileen Zheng, Keith R. Macgregor<sup>2</sup>, Kern Singh<sup>2</sup>

<sup>1</sup>Rush University Medical Center, <sup>2</sup>Midwest Orthopaedics At Rush

**INTRODUCTION:** While many spine studies have evaluated a Workers' Compensation (WC) population, few have investigated outcomes within an ambulatory surgical center (ASC) setting. We aim to assess postoperative outcomes between WC and non-WC patients undergoing minimally invasive transforaminal lumbar interbody fusion (MIS-TLIF) at an ASC.

**METHODS:** A single surgeon database was searched to locate patients undergoing single-level MIS TLIF at an ASC. Patients missing insurance status were excluded. Patients receiving surgery for trauma, infection, or cancer were also excluded. Patients were divided into two groups: WC vs. non-WC (private insurance). Demographic and perioperative characteristics were collected and compared with Student's t-test (continuous) and chi-squared test (categorical). Patient reported outcome measures (PROMs) were collected preoperatively and postoperatively. The following PROMs were used: VAS back, VAS leg, Oswestry Disability Index (ODI), 12-Item Short Form (SF-12) Physical Composite Score (PCS), and Patient Reported Outcome Measurement Information System physical function (PROMIS-PF). PROM scores were compared between groups using Student's t-test for independent samples. MCID achievement was determined based on change in PROM score from preoperative to postoperative meeting established cut-off values in literature. Achievement rates were compared between WC and non-WC groups with chi-squared test.

## RESULTS:

A total of 71 patients were included, 33 WC and 38 non-WC. Other than differences in age, gender, and ethnicity (p ≤0.021, all), no demographic characteristics significantly differed between groups. Almost half of the patients presented with degenerative spondylolisthesis (46.5%). Mean operative time was 122.0 minutes, mean estimated blood loss (EBL) was 42.8 milliliters (mL), and mean length of stay was 4.6 hours following surgery. Fusion rate at 1-year was 96.0% in the total cohort. Spinal pathology at presentation, perioperative measures, and fusion rates did not differ between groups. The WC cohort had significantly lower PROMIS-PF at 6-weeks/12-weeks, significantly higher VAS back from 6-weeks through 6-months, and significantly higher ODI from 6-weeks to 6-months (p ≤0.033, all). No differences were observed for VAS leg or SF-12 PCS. MCID achievement rates were significantly higher in the non-WC group for ODI at 6-weeks, 1-year, and overall, VAS back at 6-months and overall, and VAS leg at 12-weeks (p ≤0.033, all). Attainment rates were comparable between groups for PROMIS-PF and SF-12 PCS at all time points.

**DISCUSSION AND CONCLUSION:** Physical function PROMs and MCID achievements were largely comparable between WC and non-WC subjects. Leg pain scores were also similar between groups, but MCID attainment rates tended to be lower in the overall postoperative period for WC patients. In addition, WC suffered from higher back pain and disability, and lower overall MCID achievement rates for both.

Characteristic	Total (n=71)	WC (n=33)	Non-WC (n=38)	*p-value
Age (mean ± SD, years)	48.3±9.9	44.4±7.8	51.7±10.3	<b>0.001</b>
Gender				<b>0.021</b>
Female	35.2% (25)	21.2% (7)	47.4% (18)	
Male	64.8% (46)	78.8% (26)	52.6% (20)	
Ethnicity				<b>0.009</b>
Caucasian	58.4% (49)	38.7% (12)	75.7% (29)	
African-American	4.4% (3)	8.6% (2)	2.7% (1)	
Hispanic	30.9% (21)	51.6% (16)	13.5% (5)	
Asian	1.9% (1)	0.0% (0)	2.7% (1)	
Other	4.0% (3)	1.2% (1)	5.4% (2)	
Diabetic Status				0.058
Non-Diabetic	95.8% (68)	90.9% (30)	100.0% (38)	
Diabetic	4.2% (3)	9.1% (3)	0.0% (0)	
Smoking Status				0.127
Non-Smoker	92.9% (65)	87.9% (29)	97.3% (36)	
Smoker	7.1% (5)	12.1% (4)	2.7% (1)	
Hypertension Status				0.278
Non-hypertensive	78.6% (55)	84.4% (27)	73.7% (28)	
Hypertensive	21.4% (15)	15.6% (5)	26.3% (10)	
ASA Classification				0.650
1-2	27.3% (19)	30.0% (9)	25.0% (9)	
3	72.7% (52)	70.0% (21)	75.0% (27)	
CCI Score (Mean ± SD)	0.8±1.1	0.9±1.2	0.6±0.9	<b>0.038</b>
Insurance				<b>&lt;0.001</b>
Workers' Compensation	46.3% (33)	100.0% (33)	0.0% (0)	
Private	53.7% (38)	0.0% (0)	100.0% (38)	

WC = Workers' Compensation; non-WC = non-Workers' Compensation; ASA = American Society of Anesthesiologists; CCI = Charlson Comorbidity Index; SD = standard deviation. Boldface indicates significance.

Characteristic	Total (n=71)	WC (n=33)	Non-WC (n=38)	*p-value
Spinal Pathology				
Degenerative	46.5% (33)	45.5% (15)	47.4% (18)	0.872
Spondylolisthesis				
Infused	35.2% (25)	30.3% (10)	39.5% (15)	0.420
Central	22.7% (16)	27.3% (9)	18.4% (7)	0.373
Foraminal	91.8% (65)	93.9% (31)	89.5% (34)	0.609
Stenosis	81.7% (58)	81.8% (27)	81.6% (31)	0.979
Shunt				
Operative Time (Mean ± SD, min)	122.0±20.2	125.1±22.0	119.5±18.6	0.261
Estimated Blood Loss (Mean ± SD, mL)	42.8±24.1	38.0±22.3	46.9±22.2	0.160
Length of Stay (Mean ± SD, hours)	4.6±1.4	4.9±1.7	4.4±1.1	0.284
Postoperative VAS pain (Mean ± SD, 0-10)	5.0±2.5	5.1±2.4	4.8±2.7	0.738
Postoperative PCSI (Mean ± SD, 0-10)	22.0±17.1	24.2±17.6	20.3±16.7	0.336
MCID Achievement	86.0% (24)	91.7% (11)	100.0% (13)	0.288

WC = Workers' Compensation; non-WC = non-Workers' Compensation; PCSI = postoperative day, mL = milliliters; SD = standard deviation; HNP = recurrent herniated nucleus pulposus; MCID = end morphine equivalent. \*p-values calculated using Student's t-test for continuous variables and chi-square analysis for categorical variables. Boldface indicates significance.

PROM	WC Mean ± SD	Non-WC Mean ± SD	*p-value
PROMIS PF			
Preoperative	36.4±4.4	38.0±4.4	0.386
6-weeks	32.1±5.8	40.5±7.0	<b>0.004</b>
12-weeks	36.9±7.6	43.0±6.4	<b>0.033</b>
6-months	39.8±8.3	45.4±6.3	0.055
1-year	41.2±8.9	44.2±5.6	0.454
SF-12 PCS			
Preoperative	30.2±5.8	33.2±7.5	0.112
6-weeks	31.4±7.8	34.7±8.5	0.257
12-weeks	31.0±7.8	36.4±7.8	0.088
6-months	33.1±10.1	40.1±11.2	0.083
1-year	36.5±12.1	35.8±10.8	0.888
VAS Back			
Preoperative	6.7±2.3	5.8±2.7	0.209
6-weeks	5.7±1.7	2.4±2.0	<b>&lt;0.001</b>
12-weeks	5.1±1.9	2.6±2.0	<b>0.001</b>
6-months	5.3±2.6	2.9±2.3	<b>0.008</b>
1-year	4.2±2.6	4.5±2.5	0.308
VAS Leg			
Preoperative	5.3±2.9	5.0±2.9	0.716
6-weeks	4.3±3.0	1.6±2.3	0.003
12-weeks	3.5±2.8	2.4±2.6	0.338
6-months	3.5±2.8	2.2±2.6	0.165
1-year	2.6±1.9	3.2±2.6	0.220
ODI			
Preoperative	44.2±13.8	41.4±19.9	0.536
6-weeks	47.8±15.9	28.7±17.4	<b>0.001</b>
12-weeks	38.3±12.9	24.1±15.3	<b>0.006</b>
6-months	37.3±17.8	21.8±16.4	<b>0.008</b>
1-year	30.6±16.3	24.9±25.5	0.377

WC = Workers' Compensation; non-WC = non-Workers' Compensation. \*p-values calculated using paired sample t-test to determine preoperative to postoperative improvement in each cohort. †p-values calculated using Student's t-test to compare mean PROMs between both cohorts. Boldface indicates significance.

PROM	WC % (n)	Non-WC % (n)	*p-value
ODI			
6-weeks	5.3% (1)	33.3% (7)	<b>0.027</b>
12-weeks	26.7% (4)	52.6% (10)	0.127
6-months	36.8% (7)	66.7% (14)	0.059
1-year	11.1% (3)	62.5% (5)	<b>0.027</b>
Overall	34.6% (9)	65.5% (19)	<b>0.022</b>
PROMIS-PF			
6-weeks	16.7% (1)	40.0% (6)	0.306
12-weeks	25.0% (2)	58.3% (7)	0.142
6-months	42.9% (3)	50.0% (7)	0.757
1-year	0.0% (0)	66.7% (4)	0.058
Overall	45.5% (5)	60.0% (12)	0.436
SF-12 PCS			
6-weeks	33.3% (4)	50.0% (11)	0.350
12-weeks	18.2% (2)	50.0% (7)	0.100
6-months	45.5% (5)	54.6% (6)	0.670
1-year	50.0% (2)	40.0% (2)	0.764
Overall	55.6% (10)	64.0% (16)	0.576
VAS Back			
6-weeks	36.8% (7)	61.9% (13)	0.113
12-weeks	46.7% (7)	68.4% (13)	0.201
6-months	29.4% (5)	70.6% (12)	<b>0.016</b>
1-year	44.4% (4)	57.1% (4)	0.614
Overall	38.5% (10)	70.4% (19)	<b>0.020</b>
VAS Leg			
6-weeks	33.3% (6)	55.0% (11)	0.180
12-weeks	28.6% (4)	66.7% (12)	<b>0.033</b>
6-months	50.0% (8)	37.5% (6)	0.476
1-year	55.6% (5)	42.9% (3)	0.614
Overall	36.0% (9)	61.5% (16)	0.068

WC = Workers' Compensation; non-WC = non-Workers' Compensation. \*p-values calculated using chi-square analysis. Boldface indicates significance.