Comparison of Patient-Reported Outcomes and Inpatient Opioid Consumption Between the Lateral Transpsoas Lumbar Interbody Fusion and Alternative Approaches

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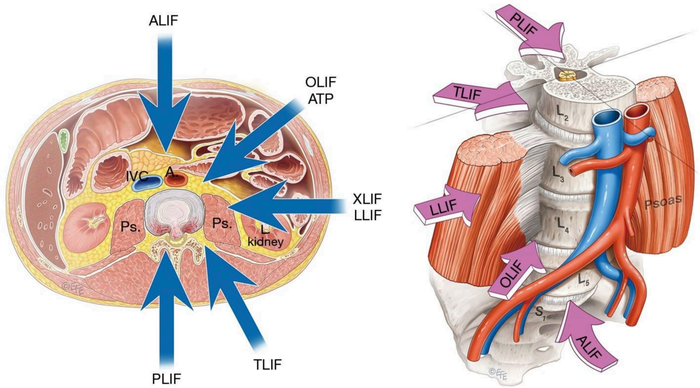
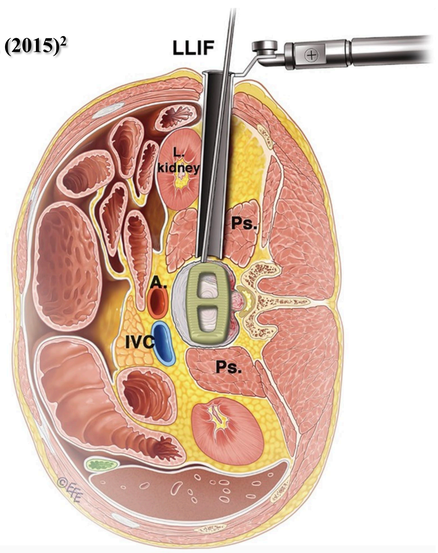
BACKGROUND

- The lateral transpsoas lumbar interbody fusion (LLIF), also known as extreme lateral interbody fusion (XLIF) or direct lateral interbody fusion (DLIF), has become increasingly utilized over the past 15 years.[1]
- This approach, while minimally invasive, is uniquely associated with **transient postoperative anterior thigh and inguinal dysesthesias and hip flexor weakness due to manipulation of the psoas muscle and interposed lumbar plexus**.[3]
- However, it is unclear whether this translates to higher postoperative **pain scores and opioid consumption**.

Figure 1: Lateral Transpsoas vs. Alternative Approaches for Lumbar Interbody Fusions



Mobbs et al. (2015)[2]



PURPOSE

- **Primary Aim:** To directly compare patient-reported outcome measures (PROMs), inpatient opioid utilization and pain ratings, and early postoperative complications among patients undergoing lumbar interbody fusion via the lateral transpsoas (X/DLIF) versus alternative approaches (ALIF/TLIF/360).

- **Hypothesis**: It was hypothesized that the lateral transpsoas (X/DLIF) approach, by virtue of psoas muscle and lumbar plexus manipulation, would be associated with higher acute pain scores and opioid requirements.

METHODS

- **Inclusion Criteria:** Patients ages 18-89 who underwent 1- or 2-level lumbar fusion between January 2018 and December 2023 for a primary diagnosis of spinal stenosis, spondylolisthesis, or degenerative disc disease were included.
- **Outcomes:**

1. Daily maximum pain scores and morphine equivalent daily dose **(MEDD)**
2. Oswestry Disability Index **(ODI)** and EuroQuol-5 Dimension **(EQ5D)**
3. Complications, ED visits, reoperation, and readmission.

Figure 2: Patient Inclusion/Exclusion Flow Diagram

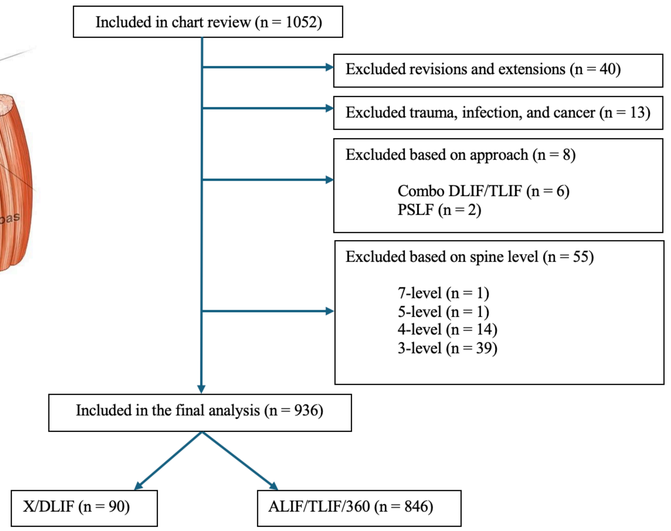


Table 1: Chi-Squared Analysis of Demographic and Procedural Characteristics

Variable	ALIF/TLIF/360 (n=846)	X/DLIF (n=90)	Total (n=946)	P-value
BMI	29.8 ± 5.5	30.5 ± 6.4	29.9 ± 5.6	0.435
Age	58 ± 13	62 ± 11	59 ± 13	0.003
Male	389 (46.0%)	42 (46.7%)	431 (46.0%)	0.901
Female	457 (54.0%)	48 (53.3%)	505 (54.0%)	
Never Smoker	363 (42.9%)	38 (42.2%)	401 (42.8%)	0.756
Former Smoker	359 (42.4%)	38 (42.2%)	397 (42.4%)	
Active Smoker	124 (14.7%)	14 (15.6%)	138 (14.7%)	
LACE	22.85 ± 18.95	21.29 ± 20.19	22.7 ± 19.0	0.014
CCI	2.04 ± 1.50	2.39 ± 1.48	2.07 ± 1.50	0.027
Inpatient	122 (85.6%)	84 (93.3%)	808 (86.3%)	0.051
Outpatient	122 (14.4%)	6 (6.7%)	128 (13.7%)	
Primary Diagnosis: Degenerative Disc Disease	333 (39.4%)	39 (43.3%)	372 (39.7%)	0.033
Primar Diagnosis: Spondylolisthesis	171 (20.2%)	8 (8.9%)	179 (19.1%)	
Primary Diagnosis: Spinal Stenosis	342 (40.4%)	43 (47.8%)	385 (41.1%)	
Length of Surgery	3.55 ± 1.42	3.24 ± 1.66	3.52 ± 1.44	0.037
TLIF	587 (69.4%)	0 (0.0%)	587 (62.7%)	<0.001
ALIF	127 (15.0%)	0 (0.0%)	127 (13.6%)	
360	132 (15.6%)	0 (0.0%)	132 (14.1%)	
X/DLIF	0 (0.0%)	90 (100.0%)	90 (9.6%)	
1-Level	631 (74.6%)	59 (65.6%)	690 (73.7%)	0.064
2-Level	215 (25.4%)	31 (34.4%)	246 (26.3%)	
IONM	619 (73.3%)	87 (96.7%)	706 (75.6%)	<0.001
Navigation	483 (57.1%)	39 (43.3%)	522 (55.8%)	0.012
Vascular Assistance	258 (30.5%)	0 (0.0%)	258 (27.6%)	<0.001
Nerve Block	14 (1.7%)	2 (2.2%)	16 (1.7%)	0.661

RESULTS

- Overall complication rates were low for both groups. No significant differences were observed for either individual or pooled complications in the univariable analysis. No cases of myocardial infarction, cardiac arrest, TIA, or wound dehiscence were observed in either group.
- In the multivariable analyses, the X/DLIF approach was not associated with significantly higher odds of 30-day or 90-day complications, ED visits, readmissions, or reoperation **(Table 2).** PROMs were also comparable between the groups at all time points, with no significant differences observed in 90-day or 1-year ODI and EQ5D **(Table 3).**

Table 2: Multivariable Binary Logistic Regression Analysis of Complications

Variable	OR	95% CI	P-value
90-day Any Complication	0.292	0.067-1.28	0.103
30-day ED	0.659	0.227-1.916	0.444
90-day ED	0.783	0.336-1.824	0.570
30-day Readmission	0.443	0.100-1.966	0.284
90-day Readmission	0.310	0.070-1.365	0.121
90-day Reoperation	0.293	0.038-2.275	0.240

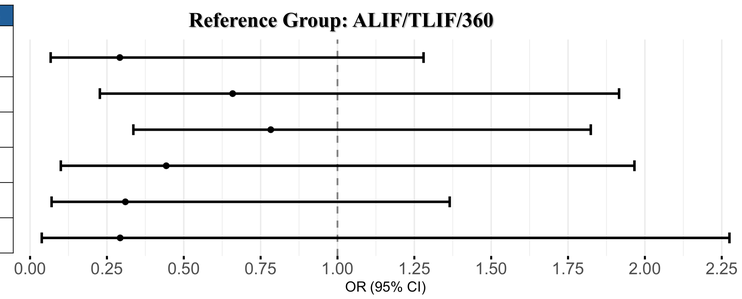
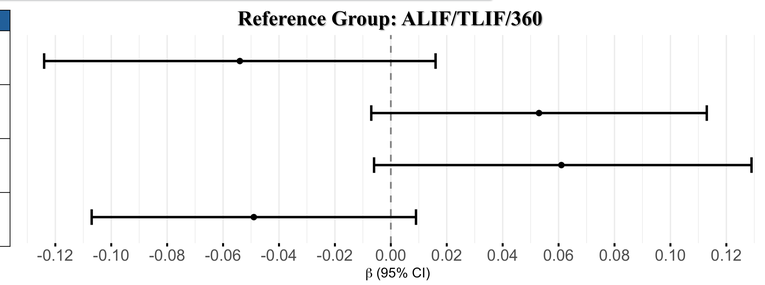


Table 3: Multivariable Linear Regression Analysis of Patient-Reported Outcome Measures

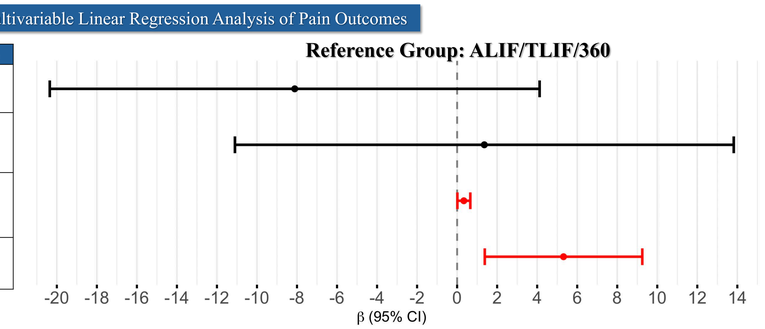
Variable	Beta	95% CI	P-value
90-day ODI	-0.054	-0.124-0.016	0.132
365-day ODI	0.053	-0.007-0.113	0.082
90-day EQ5D	0.061	-0.006-0.129	0.075
365-day EQ5D	-0.049	-0.107-0.009	0.099



- For acute postoperative pain scores and opioid consumption, the X/DLIF group had significantly higher average daily maximum pain and average daily opioid consumption. No significant differences were observed in total MEDD or length of hospital stay in the adjusted models **(Table 4).**

Table 4: Multivariable Linear Regression Analysis of Pain Outcomes

Variable	Beta	95% CI	P-value
Length of Hospital Stay (hours)	-8.114	-20.353-4.121	0.193
Total MEDD (mg)	1.359	-11.102-13.821	0.831
Average Daily Max Pain Score (1-10)	0.336	0.012-0.659	0.042
Average MEDD (mg)	5.316	1.381-9.252	0.008



CONCLUSION

- Compared to lumbar fusions that do not traverse the psoas, the lateral transpsoas approach demonstrated similarly low rates of major complications but was associated with **significantly higher acute pain levels and inpatient opioid consumption postoperatively** compared to alternative approaches.
- From a clinical standpoint, surgeons be aware that a lateral transpsoas approach, despite its less invasive nature externally, shorter operative time and hospital stay, and decreased blood loss, may lead to **increased early postoperative pain compared to TLIF, ALIF, or 360˚ lumbar fusions.**
- Thus, in patients who are opioid-sensitive, pain-intolerant, or otherwise at risk for difficult postoperative pain control, such as those with high baseline pain levels or significant medical comorbidities, choosing an approach that avoids the X/DLIF corridor may reduce postoperative pain burden. This study supports the emerging view that **approach selection should be tailored to the individual patient's needs and risk profile.**

CORRESPONDENCE

Scan QR code for references

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