

Feasibility of the Prone Transpsoas (PTP) Approach in the Obese and Morbidly Obese

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Disclosures

- M. Craig McMains, MD: Alphatec Spine
- Antoine Tohmeh, MD: Alphatec Spine, NuVasive
- Tyler Smith, MD: Alphatec Spine, NuVasive
- Bryan Lee, MD: Alphatec Spine
- Isaac Moss, MD: Alphatec Spine, Biedermann Motech, NuVasive, Orthozon, Spinal Simplicity, Spinewave, Stryker
- Gene Massey, MD: Alphatec Spine, DeGen Medical, Medtronic
- Kelli Howell, MS: Alphatec Spine, NuVasive

Background: LIF in the Obese

“Obese patients undergoing spine surgery have a **higher risk of developing postoperative complications** such as surgical site infection and venous thromboembolism... [however,] the **treatment effect associated with surgery is at least equivalent if not better in obese individuals...** primarily due to worse outcomes associated with nonoperative treatment... [we] **should attempt to develop strategies to minimize complications and improve outcomes in obese individuals...**”¹

The Effects of Obesity on Spine Surgery: A Systematic Review of the Literature

Keith L. Jackson II¹ John G. Devine²

Global Spine J 2016;6:394-400.

J Spinal Disord Tech Volume 23, Number 6, August 2010

Early Complications of Extreme Lateral Interbody Fusion in the Obese

William B. Rodgers, MD, Curtis S. Cox, MD, and Edward J. Gerber, MA, PA-C



The lateral interbody fusion (LIF) approach is thought to offer some **practical advantage** over anterior and posterior approaches in large patients, given the anterior falling away of the abdominal contents with gravitational pull of the pannus in lateral decubitus.

Feasibility has been demonstrated in published reports, with **equivalent complication profile compared to non-obese patients.**^{2,3}

¹Jackson KL 2nd, Devine JG. The Effects of Obesity on Spine Surgery: A Systematic Review of the Literature. *Global Spine J* 2016 Jun;6(4):394-400.

²Rodgers WB, Cox CS, Gerber EJ. Early complications of extreme lateral interbody fusion in the obese. *Clin Spine Surg* 2010 Aug 1;23(6):393-7.

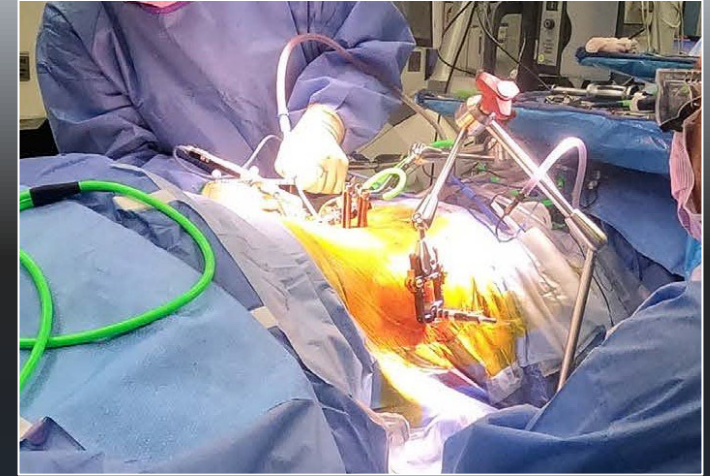
³Rodgers WB, Gerber EJ, Patterson J. Extreme lateral interbody fusion (XLIF) in the morbidly obese. *Spine J* 2010 Oct 1; GP171;313..

Background: LIF-PTP

Prone transpoas (PTP) LIF was introduced as a technique for single-position circumferential access to the spine with both the benefits of MIS lateral interbody reconstruction and posterior fixation and decompression as needed.

Advantages

- ❑ Single-position surgery (avoid “flip time”)
- ❑ Less complicated initial positioning
- ❑ Increased lordosis gains via prone positional effect^{1,2}
- ❑ All benefits of lateral-approach interbody fusion
 - MIS anterior column access
 - Large stabilizing implant
 - Naturally lordosed disc space facilitates powerful segmental correction
- ❑ Allows for concomitant posterior procedures, as needed
 - Posterior fixation
 - Direct decompression
 - Releases/osteotomies
 - Hardware revision
 - L5-S1 P/TLIF



Multi-center Comparison of Early “Prone Lateral” Experience vs “PTP” Proceduralization: Learnings, Efficiencies, and Peri-op Outcomes^{3,4}

Results

- 120 prone lateral vs. 159 PTP
- 176 vs. 230 levels, 68% vs 65% @ L4-5
- Positioning time 37 vs. 13 min*
- Docking time 18 vs. 10 min*
- Retraction time 26 vs. 20 min*

Conclusion

Proceduralized “PTP” has advantages over “prone lateral” procedures performed using systems designed for lateral decubitus LIF.

*(p<0.01)



¹Harimaya K, et al. *Spine* 2009;34(22):2406-12.

²Benfanti PL, et al. *Spine* 1997;22(19):2299-303.

³Smith T, et al. *NASS J* 2021;6:100056.

⁴Tohmeh T, et al. *Manuscript submission pending* 2022.

Objective: Evaluate PTP Feasibility in the Obese

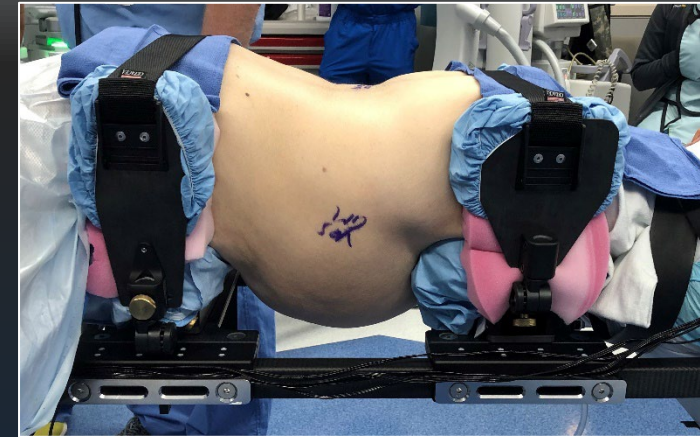
Question has been raised about the feasibility of the lateral trans-psoas approach in the prone position in patient of large body habitus.

- ✓ Belly hangs freely, allowing abdominal contents to migrate anteriorly.
- Girth splays making distance from skin to spine deeper.
- Does increased traverse of retroperitoneal space increase risk of peritoneal/bowel injury?

Methods:

Sub-analysis of prior prone lateral/PTP multi-center dataset

- ✓ Inclusion: recorded BMI
 - 155 total cases
 - BMI average: 31 (range: 18 – 51)
- ✓ Patients classified as
 - “non-obese” (BMI<30), n=74 (48%)
 - “obese” (BMI=30-39.9), n=62 (40%)
 - “morbidly obese” (BMI≥40), n=19 (12%)

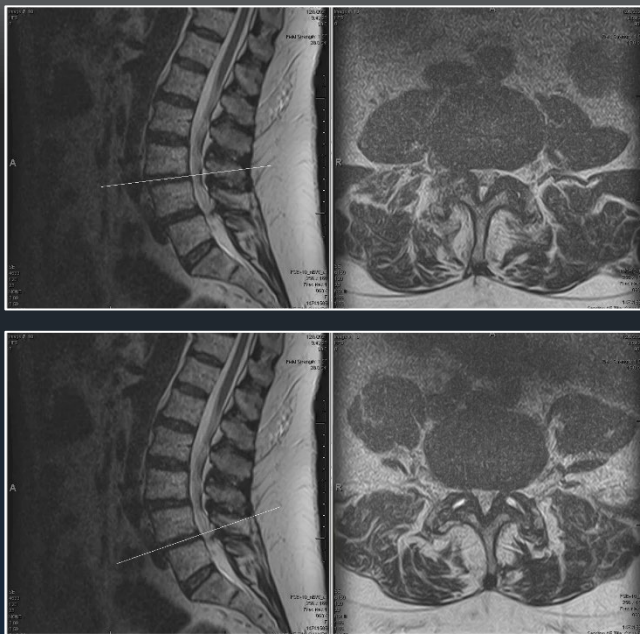


RESULTS

	Non-obese (BMI < 30)	Obese (BMI 30-39.9)	Morbidly Obese (BMI >= 40)	ANOVA
# Patients	74 (48%)	62 (40%)	19 (12%)	
# Levels	110	88	28	
Incl. L4-5	68%	61%	68%	p=0.7103
BMI	26.2	33.7	44.0	p<0.0001
Positioning time	25 min	26 min	22 min	p=0.7930
Fluoro to position	15 sec	15 sec	19 sec	p=0.4211
Blade length	140 mm	153 mm	165 mm	p<0.0001
Docking position	41%	41%	41%	p=0.9886
Docking time	9 min	10 min	11 min	p=0.3271
Retraction time	20 min	19 min	25 min	p=0.1808
Fixation (Perc / Open / Other)	72% / 13% / 14%	58% / 22% / 20%	68% / 11% / 21%	p=0.5633
Other Post. Procedures	57%	56%	57%	p=0.9872
EBL (in PTP)	46 cc	35 cc	30 cc	p=0.5771
EBL (total)	132 cc	135 cc	120 cc	p=0.9604
Fluoro (in PTP)	87 sec	79 sec	89 sec	p=0.5609
Fluoro (total)	163 sec	155 sec	177 sec	p=0.7834
Total PTP time	40 min	45 min	45 min	p=0.2924
Total OR time	106 min	100 min	94 min	p=0.6824
LOS	2.1 days	2.7 days	1.9 days	p=0.3065
Inadvertent ALL Release	1 (1.4%)	2 (3.2%)	1 (5.2%)	p=0.5795
Perforated Bowel	0 (0%)	0 (0%)	0 (0%)	P=1

Case Example: L3-5 PTP in 63F, BMI 49.8

Pre-op

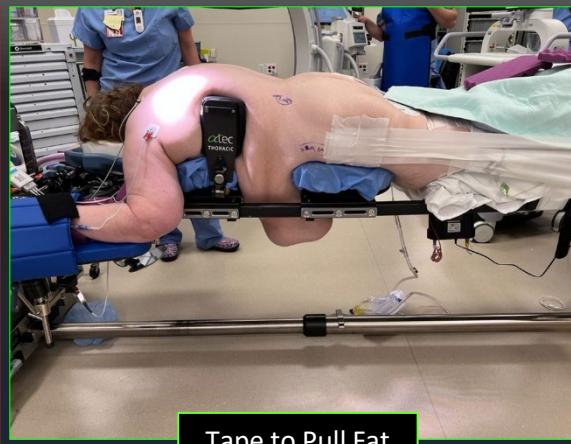


CLBP + L3 & L4 radic bilat
No DM or smoking hx
3/5 R hip flexor, 4/5 R quad
Diminished sensation R ant thigh
1+ R patellar reflex

Intra-op



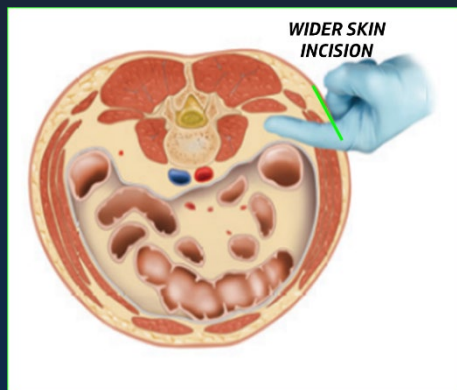
Pre-Tape



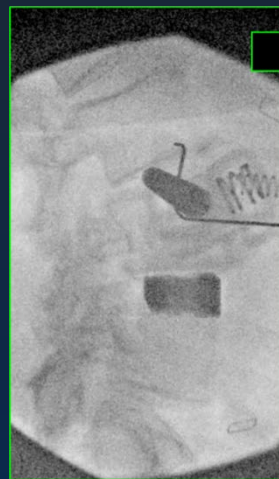
Tape to Pull Fat



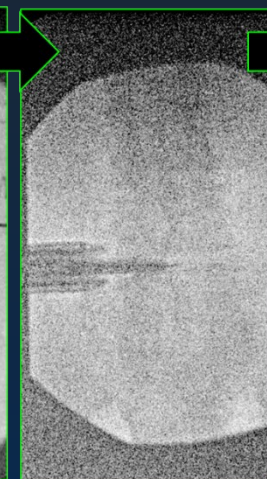
Post-Tape (160 mm Retractor used)



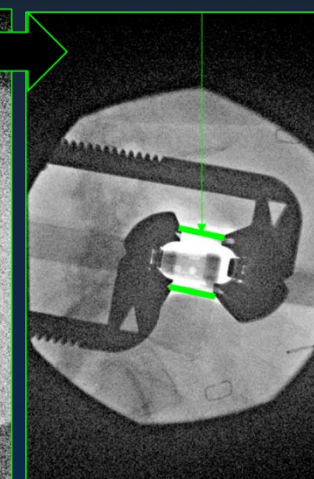
WIDER SKIN
INCISION



Initial Dilator
Posterior to Midline



Posterior Shim First



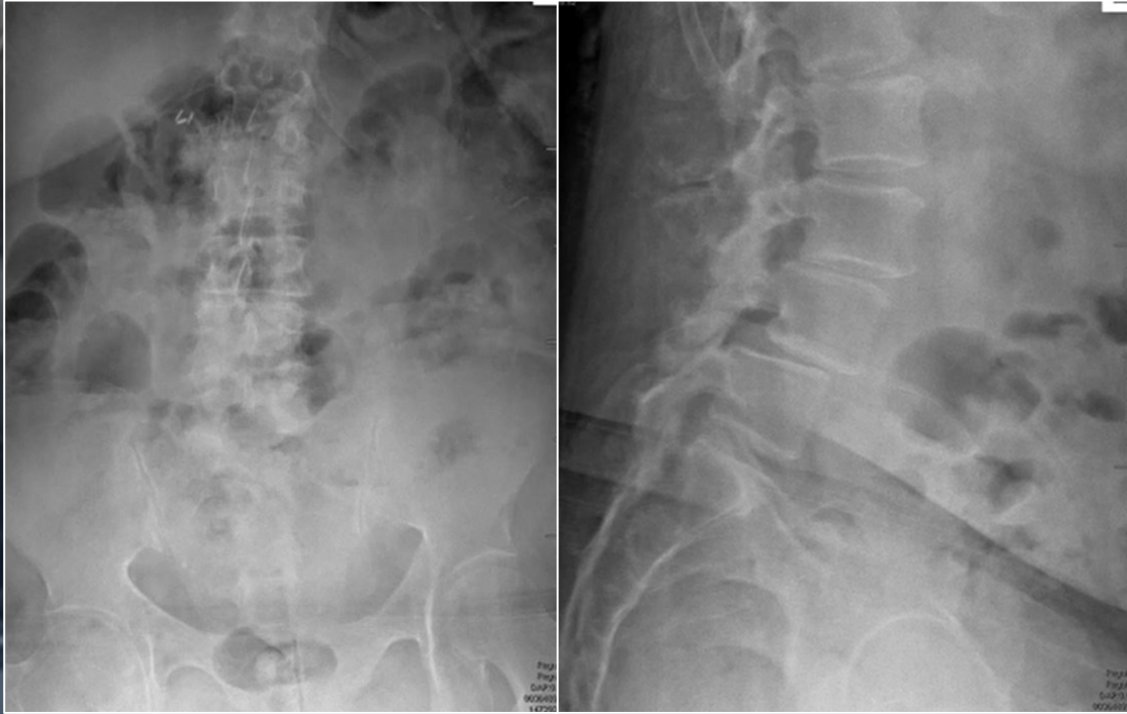
Open All Anterior and
Use Two Shims

Quickly Place
Fat Guards

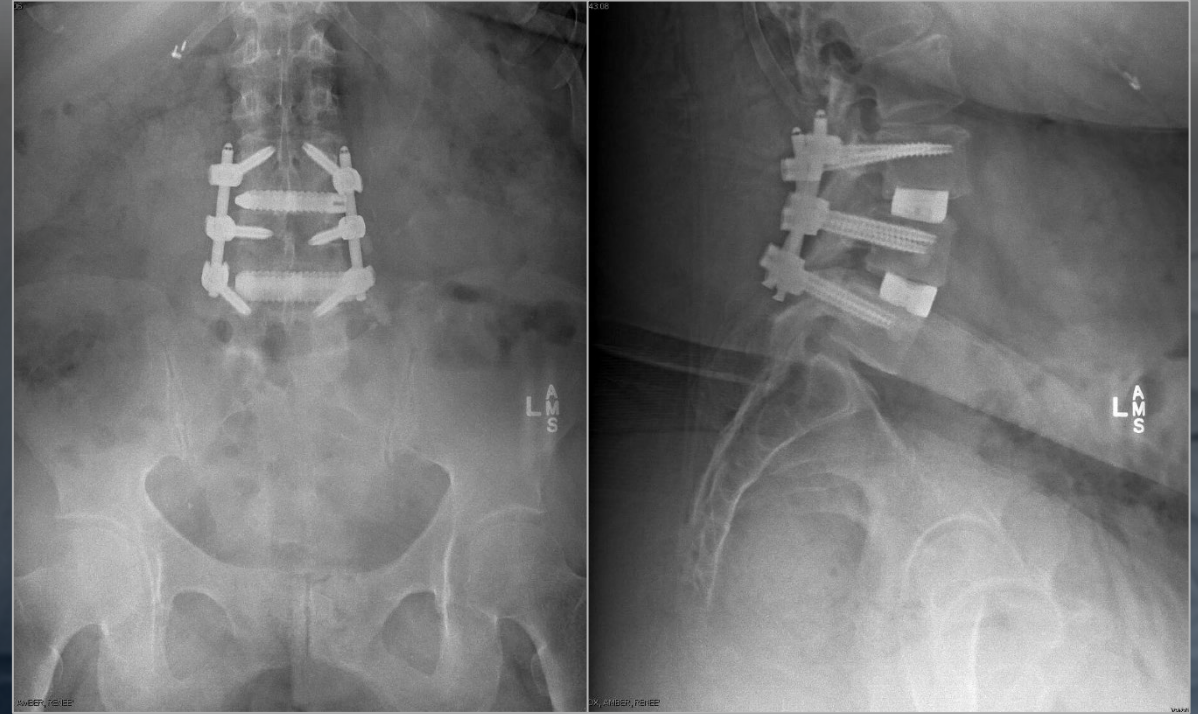


Case Example: L3-5 PTP in 63F, BMI 49.8

Pre-op



Post-op



CONCLUSION

Prone transposas (PTP) surgery is equivalently feasible in patients of varying body habitus, including the morbidly obese. Overall health should clearly be considered prior to any surgical intervention, but size alone does not preclude successful lateral access to the spine in prone decubitus.