



Early Outcomes Of Muscle Flap Closures In Complex Spine Surgeries: A Propensity-matched Cohort Analysis

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Introduction

Plastic surgery closure with muscle flaps after complex spinal reconstruction has become increasingly more common. Existing evidence for this practice consists of small, uncontrolled, single-center cohort studies. We aimed to compare 30-day postoperative wound-related complication rates between flap closure and traditional closure after posterior thoracolumbar fusions (PTLFs) for non-infectious, non-oncologic pathologies using a national database.

Methods

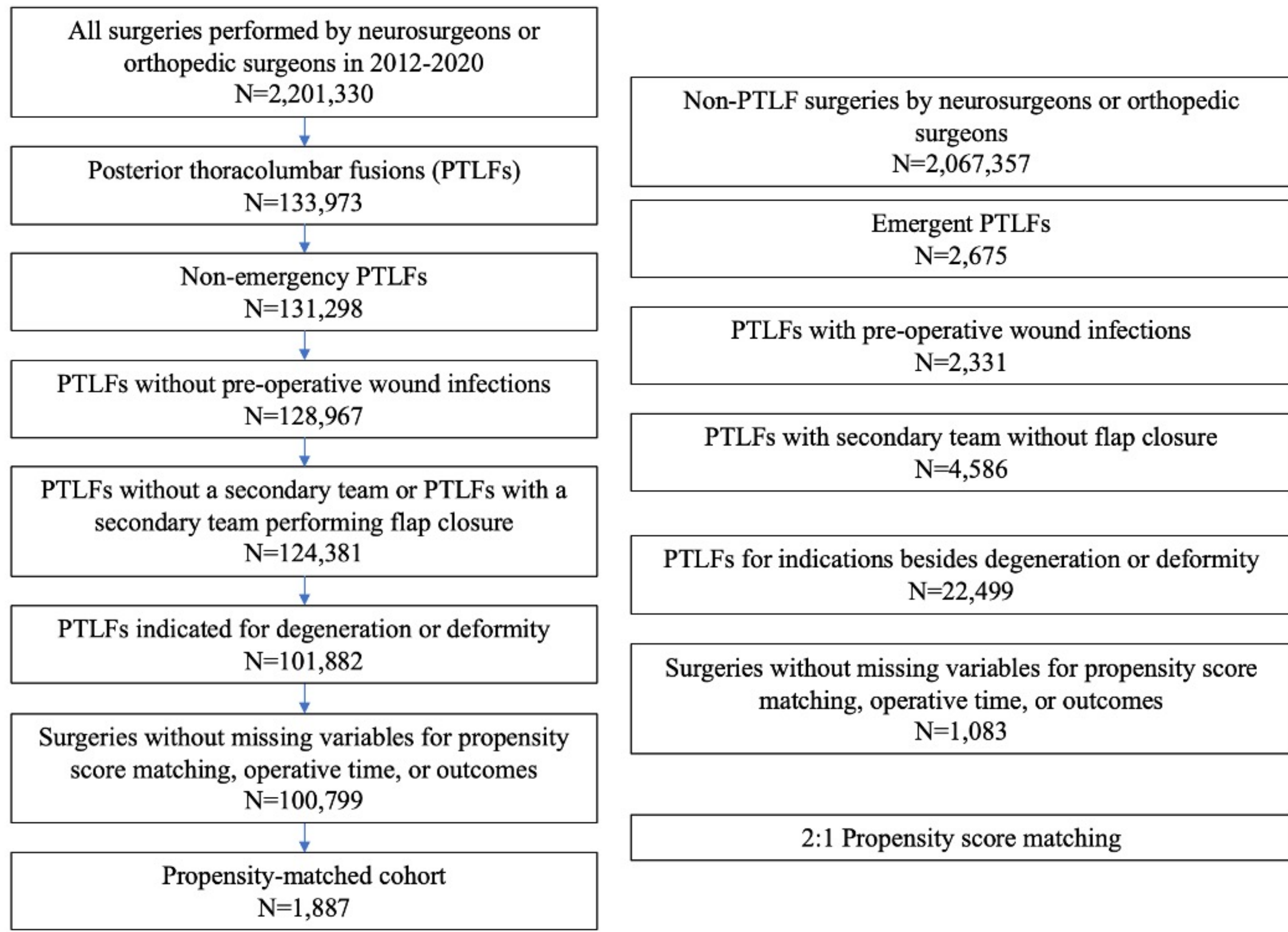


Table 1. Odds of 30-day outcomes after posterior thoracolumbar fusions with flap closure vs. traditional closure in subgroups of the matched cohort

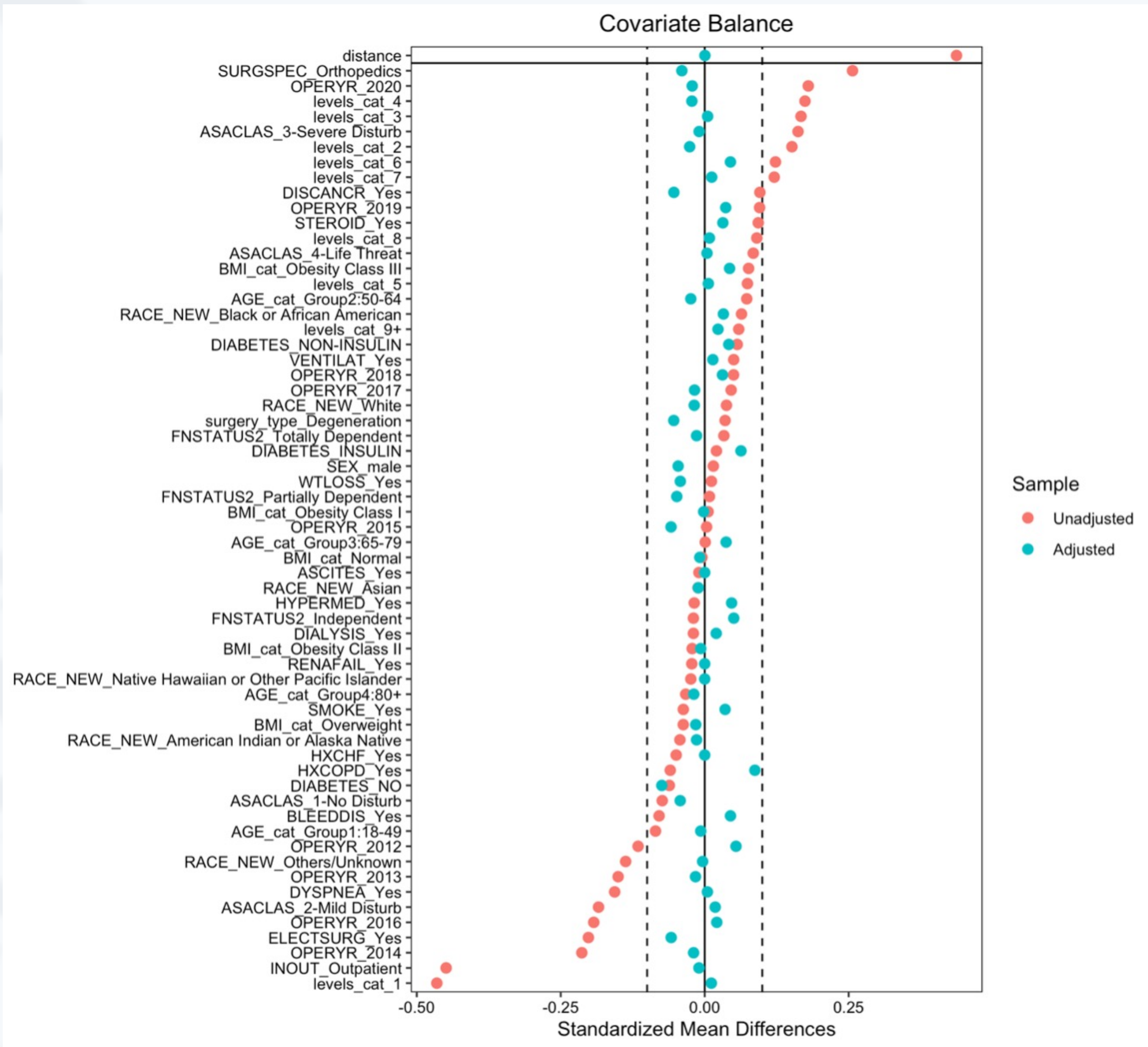
Variable	Total	%	Traditional Closure	%	Flap Closure	%	p Value	AOR	p Value
n	1,887		1,257	66.6	630	33.4			
Wound Complication	37	2.0	26	2.1	11	1.7	0.76	0.74 (0.33 to 1.51)	0.42
Superficial SSI	18	1.0	12	1.0	6	1.0	1.00	1.04 (0.35 to 2.78)	0.95
Deep SSI	14	0.7	10	0.8	4	0.6	0.92	0.61 (0.16 to 1.96)	0.43
Wound Dehiscence	8	0.4	7	0.6	1	0.2	0.38	0.25 (0.01 to 1.49)	0.20
Readmission	117	6.2	76	6.0	41	6.5	0.77	0.91 (0.60 to 1.37)	0.66
Reoperation	71	3.8	40	3.2	31	4.9	0.08	1.27 (0.76 to 2.1)	0.36
Death	15	0.8	11	0.9	4	0.6	0.78	0.67 (0.18 to 2.07)	0.52
Non-wound Complication	399	21.1	215	17.1	184	29.2	<0.001	1.20 (0.93 to 1.55)	0.16
Prolonged LOS	223	11.8	105	8.4	118	18.7	<0.001	1.84 (1.36 to 2.48)	<0.001

Abbreviations: SSI, surgical site infection. LOS, length of stay. Prolonged LOS is defined as hospital stay duration in the 90th percentile. All models are adjusted for operative time.

Results

100,799 PTLFs met our inclusion criteria. The use of flap closure with PTLF remained low but more than doubled from 2012 to 2020 (0.38% vs. 0.97%; p=0.002). A higher proportion of flap closures had higher ASA classifications and higher number of operated spine levels (all p<0.001). 1,907 PTLFs (630 for flap closure; 1,257 for traditional closure) were included in the propensity-matched cohort. **Figure 1** demonstrates a good covariate balance between the two treatment groups after propensity-score matching with Standardized Mean Difference <10% across all baseline characteristics. Unadjusted 30-day wound complication rates were 1.7% for flap and 2.1% for traditional closure (p=0.76). After adjusting for operative time, wound complication, readmission, reoperation, mortality, and non-wound complication were not associated with flap use (all p>0.05). Flap closure was associated with prolonged length of stay after the surgery (p<0.001).

Figure 1. Covariate balance after propensity score matching



Conclusions

Plastic surgery closure was performed in patients with a higher comorbidity burden, suggesting consultation in sicker patients. Although higher rates of wound and non-wound complications were expected for the flap cohort, our propensity-matched cohort analysis of flap closure in PTLFs resulted in non-inferior odds of wound complications compared to traditional closure.