

Watching Your Back: The Effect of Muscle Flap Coverage on Outcomes and Resource Utilization Following Posterior Spinal Fusions

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Background

- Spinal degeneration and deformity have a prevalence of 27%¹
- \$34 billion is spent annually on posterior spinal fusions (PSF)²
- Wound closure with local muscle flaps has been associated with reduced complications (e.g., infection, dehiscence)³
- How do the costs of prophylactic muscle flap closures compare to the value saved by reduced complications?**

Methods

- Retrospective chart review of patients undergoing PSF
- Exclusion: infection, connective tissue disorder, Chiari malformation, spinal neoplasia, and acute trauma
- Costs derived from CMS Medicare fee schedules and Medical Expenditure Panel Survey (MEPS) data, adjusted for inflation
- Costs and outcomes compared between PSF procedures with muscle flap closure vs. conventional closure

Closure Type:	Conventional (n=280)	Flap (n=240)	p-value
Male	132 (47%)	116 (48%)	0.79
Age (years)	61.4 ± 14.1	57.7 ± 15.2	0.004*
BMI (kg/m^2)	28.1 ± 5.8	28.0 ± 5.8	0.81
Spondylosis	192 (69%)	180 (75%)	0.11
Scoliosis	88 (31%)	60 (25%)	0.11
# of vertebrae	7.1 ± 4.9	7.7 ± 4.7	0.11
Cervical	33 (12%)	45 (19%)	<0.001*
Thoracic	118 (42%)	164 (68%)	<0.001*
Lumbar	129 (46%)	31 (13%)	<0.001*

Table 1. Patient demographics, stratified by closure type.

*Statistically significant

Results

- 520 patients met the study criteria; 240 received flap closure
- Patients were similar in terms of gender, race, diagnosis, number of vertebrae, BMI, and substance use (**Table 1**)
- Flap patients were statistically younger and more likely to have cervical/thoracic fusions compared to lumbar fusions

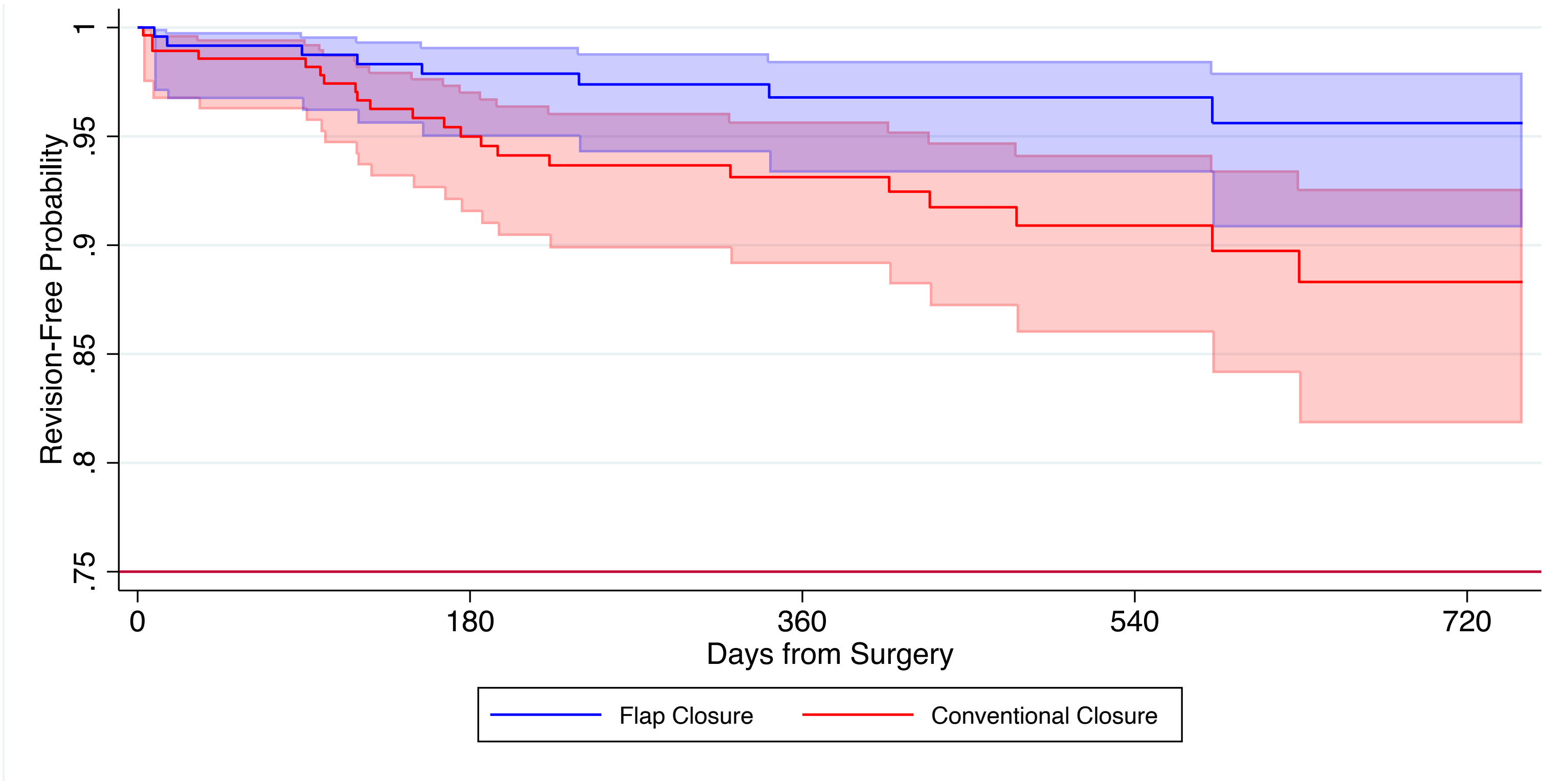


Figure 1. Time-to-event analysis of revision spine surgery

- Compared to conventional closures, flap closures had:
 - Decreased hardware failure (0% vs. 4%, p<0.001)
 - Decreased revision surgery (8.5% vs. 3.3%, p<0.03) (**Fig. 1**)
 - Decreased all-cause readmission and reoperation (**Table 2**)
 - Increased seroma (10% vs. 2%, p<0.001)
- No difference in infection, dehiscence, hematoma rates
- No difference in OR time, inpatient length of stay, inpatient rehabilitation rates or lengths between groups (**Table 2**)

Closure Type:	Conventional (n=280)	Flap (n=240)	p-value	Unit cost
Operative time (hr)	7.5 ± 2.6	7.1 ± 2.6	0.14	\$2,778
Length of stay (d)	6.2 ± 5.9	5.3 ± 5.1	0.075	\$6,175
Inpatient rehab usage	38 (14%)	25 (10%)	0.27	NA
Inpatient rehab length (d)	14.6 ± 11.7	10.5 ± 4.2	0.096	\$1,472
Outpatient follow up visits	3.6 ± 2.3	4.1 ± 2.6	0.027*	\$98
Readmission	49 (18%)	24 (10%)	0.014*	\$12,979
Reoperation	39 (14%)	18 (8%)	0.019*	\$27,142

Table 2. Peri- and postoperative resource use, stratified by closure type.

*Statistically significant

- In the multivariate model, flap closure was associated with a \$7,152 decrease in overall costs (p<0.02)**
- Model controlled for age, BMI, gender, diagnosis, number/region of vertebrae, and patient comorbidities

Conclusion

- Prophylactic muscle flap closure is associated with decreased hardware failures and all-cause readmissions and reoperations
- Perioperative resources do not differ between groups
- Muscle flap closure is associated with a \$7,152 reduction in costs per patient in the multivariate regression model

References

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