

## Introduction

While frequently prescribed to patients following fixation for spine trauma, the utility of spinal orthoses during the post-operative period is poorly described in the literature. In this study, we calculated rates of re-operation and performed a decision analysis to determine the utility of bracing following pedicle screw fixation for thoracic and lumbar vertebral fractures.

## Methods

Pubmed was searched for articles published over a 10 year period from 2005 to 2015 for terms related to pedicle screw fixation of thoracolumbar fractures. Abstracts were downloaded and reviewed if they were written in English and referred to case series composed primarily or exclusively of adult patients. Downloaded articles were reviewed by at least two authors and were excluded if they contained fewer than ten cases, lacked follow-up beyond the perioperative period, involved primarily osteoporotic fractures or did not involve pedicle screw fixation. Additionally, a database of neurosurgical patients operated on for thoracolumbar fractures within the authors’ institution from 2006 to 2015 was also used in the analysis.

Incidences of significant adverse events (wound revision for either dehiscence or infection or re-operation for non-union or instability due to hardware failure) were determined. Pooled means and variances of reported parameters were obtained using a random-effects, inverse variance meta-analytic model for observational data [1]. We assigned a utility of 1 for post-operative course that was uneventful. Utilities for surgical outcome and complications were assigned using previously published values [2].

## Results

The initial literature search yielded 225 abstracts for review, after which 56 articles were included in the study, yielding a total of 2182 patients. In 37 publications, encompassing 1436 cases, patients had postoperative brace application. In the remaining 19 studies (746 cases), patients were unbraced. The UPHS database provided an additional 44 braced and 80 unbraced subjects. After including patients from the institutional registry, together a total of 2306 patients were included in the final analysis, 1480 of whom were braced.

Baseline demographics and treatment related complications are listed in Table 1 for braced and non-braced patients. Non-braced patients were significantly older than braced patients (40.1±6.2 vs. 45.6±9.5, p=0.01). Braced vs. non-braced patients had similar rates for re-operation for non-union or hardware failure (1.7% vs. 1.5%, p=0.687), although non-braced patients trended toward a greater rate of wound complications (2.9% vs. 4.3%, p=0.082).

These two approaches yielded comparable utility scores (p=0.860). Using a postoperative brace had a utility of 0.997 (± 0.039), whereas not bracing was associated with a utility of 0.996 (± 0.041). Excluding the cost of the brace and assuming the same levels are fused in both cohorts, there are no significant differences between braced and non-braced subjects.

## Conclusions

Bracing following operative stabilization of thoracolumbar fractures does not significantly improve stability, nor does it increase wound complications. In this study, not bracing following spine surgery for traumatic thoracolumbar fractures has been shown to be equally effective as bracing. Large, prospective randomized studies are needed to further evaluate the utility of bracing following fixation for thoracolumbar trauma.

	Braced	Non-braced	P-value
Age (yrs)	40.14±6.24	45.61±9.45	0.011
Proportion female	0.302±0.121	0.345±0.125	0.211
Follow-up (mos)	36.25±34.60	31.47±6.02	0.544
Reoperation rate for wound revision/infection	0.029±0.025	0.043±0.024	0.082
Reoperation rate for non-union or hardware failure	0.017±0.020	0.015±0.013	0.687

## References

- Einarson TR. Pharmacoeconomic applications of meta-analysis for single groups using antifungal onychomycosis lacquers as an example. **Clin Ther.** 1997; 19: 559-569.
- Lega BC, Danish SF, Malhotra NR, Sonnad SS, Stein SC. Choosing the best operation for chronic subdural hematoma: a decision analysis. **J Neurosurg.** 2010; 113: 615-21.