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Original Article

Functional and Quality of Life Outcomes Following Early Versus Delayed Surgical Stabilisation in Thoracolumbar Fractures: A Prospective Cohort Study.

Reetesh Roshan¹, Raman Kumar¹, Nilesh Kumar Agrawal^{1*}, Santosh Kumar², Anurag Kumar³

¹Senior Resident, Department of Orthopaedics, IGIMS, Patna, Bihar, India.

²Professor and HOD, Department of Orthopaedics, IGIMS, Patna, Bihar, India.

³Junior Resident, Department of Orthopaedics, IGIMS, Patna, Bihar, India.

Abstract

Background:

Thoracolumbar fractures are common spinal injuries associated with substantial morbidity, functional disability, and impaired quality of life. Although early surgical stabilization has been suggested to improve outcomes, evidence comparing early and delayed intervention remains limited.

Objective:

To compare functional outcomes and quality of life following early versus delayed surgical stabilization in patients with thoracolumbar fractures.

Methods:

This prospective cohort study included 60 patients with thoracolumbar fractures undergoing surgical stabilization at a tertiary care center. Patients were categorized into early stabilization (within 72 hours of injury; n=30) and delayed stabilization (>72 hours; n=30) groups. Pain intensity was assessed using the Visual Analog Scale (VAS), functional outcome using the Oswestry Disability Index (ODI), and quality of life using the Short Form-36 (SF-36) questionnaire. Outcomes were compared using independent *t*-tests.

Results:

The mean age of participants was 39.3±10.9 years, and 70.0% were males. Patients undergoing early stabilization demonstrated significantly better outcomes than those receiving delayed surgery. Mean ODI scores were significantly lower in the early group (17.76±6.0 vs. 26.59±7.1; *p*<0.001). Similarly, VAS pain scores were lower (2.32±0.8 vs. 3.42±0.9; *p*<0.001), while SF-36 scores were significantly higher (79.21±8.0 vs. 69.81±9.2; *p*<0.001). Hospital stay was significantly shorter in the early stabilization group.

Conclusion:

Early surgical stabilization was associated with superior functional recovery, reduced pain, improved quality of life, and shorter hospitalization.

Recommendation:

Early surgical stabilization should be considered whenever clinically feasible to optimize recovery and improve patient outcomes following thoracolumbar fractures.

Keywords: Thoracolumbar fracture, early stabilisation, delayed surgery, functional outcome, quality of life.

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Corresponding author: Nilesh Kumar Agrawal

Email: nileshagrawal16@gmail.com

Senior resident, Department of Orthopaedics, IGIMS, Patna, Bihar, India.

Introduction

Due to the biomechanics of the transition from the rigid thoracic to the dynamic lumbar spine, thoracolumbar fractures make up around 90% of all spinal fractures.

These injuries can cause neurological impairments, persistent discomfort, and long-term disability. They are frequently caused by high-energy trauma, such as falls from heights and car crashes (1).



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In order to restore spinal alignment, provide mechanical stability, and facilitate early mobilization, surgical stabilization is crucial. Nonetheless, there is ongoing discussion on the best time to perform surgery. It has been proposed that early surgical stabilization can decrease problems, minimize hospital stays, and make rehabilitation easier. On the other hand, delayed surgery is occasionally carried out because of patient medical stabilization, related injuries, or logistical limitations (2). Quality of life and functional results are becoming more widely acknowledged as crucial markers of spinal trauma therapy success. Tools like the Short Form-36 (SF-36) questionnaire and the Oswestry Disability Index (ODI) offer useful data on patients' claimed recovery. Thus, the purpose of this study was to assess and contrast the quality of life and functional results of patients receiving early versus delayed surgical stabilization for thoracolumbar fractures (3).

Methods

Study Design

This hospital-based prospective cohort study was conducted to compare functional and quality of life outcomes among patients undergoing early and delayed surgical stabilization for thoracolumbar fractures. Patients were prospectively followed at 1, 3, 6, and 12 months after surgery.

Study Area and Setting

The study was conducted at Indira Gandhi Institute of Medical Sciences (IGIMS), Sheikhpura, Patna, Bihar, India, a tertiary care teaching and referral hospital serving patients from Bihar and neighboring states. The institute provides comprehensive trauma, orthopedic, neurosurgical, intensive care, radiological, and rehabilitation services. IGIMS caters to both urban and rural populations and includes multiple specialty and superspecialty departments with dedicated trauma and orthopedic units managing complex spinal injuries.

Study Duration

The study was conducted from January 2024 to December 2025, including patient recruitment, surgery, and follow-up.

Study Population

A total of 60 patients diagnosed with thoracolumbar fractures requiring surgical stabilization were enrolled.

Study Size

Sample size was calculated using the formula:
$$n = Z^2P(1-P)/d^2$$

Assuming a prevalence of favorable functional outcome following early stabilization of 50%, a 95% confidence interval, and absolute precision of 13%, the minimum sample size was estimated to be 57 participants. To compensate for possible losses during follow-up, 60 patients were included. Consecutive sampling was employed, and all eligible patients presenting during the study period were recruited until the required sample size was achieved.

Bias

Selection bias was minimized by consecutively recruiting all eligible patients. Information bias was reduced by using standardized outcome assessment tools, including VAS, ODI, and SF-36 questionnaires. Follow-up evaluations were performed according to a predefined schedule, and identical assessment procedures were applied to both groups.

Data Collection

Patients were categorized into early stabilization (within 72 hours of injury) and delayed stabilization (>72 hours after injury) groups. Functional outcome was assessed using the Oswestry Disability Index (ODI), pain intensity using the Visual Analogue Scale (VAS), and quality of life using the Short Form-36 (SF-36) questionnaire at scheduled follow-up visits.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using **SPSS version 26.0**. Continuous variables were expressed as mean $\pm$ standard deviation, whereas categorical variables were presented as frequencies and percentages. An independent *t*-test was used to compare means between groups. Chi-square test was used for categorical variables where appropriate. A *p*-value <0.05 was considered statistically significant.

Ethical Considerations

Ethical approval for the study was obtained from the Institutional Ethics Committee of Indira Gandhi Institute of Medical Sciences (IGIMS), Patna, Bihar, India, before commencement of the study. The study was conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from all participants before enrollment. Patient confidentiality and privacy were maintained by anonymizing collected data and restricting access to study records.

Results

During the study period, 72 patients with thoracolumbar fractures were assessed for eligibility. Six patients did not



meet the inclusion criteria, and six patients were excluded because of incomplete follow-up. Consequently, 60 patients completed follow-up and were included in the final analysis.

Table 1 presents the baseline characteristics of study participants. The mean age was comparable between the

early and delayed surgery groups (38.4 ± 11.2 vs. 40.1 ± 10.7 years; $p=0.41$). Males constituted the majority in both groups. Road traffic accidents were the commonest mechanism of injury, and no statistically significant differences were observed in baseline characteristics between groups.

Table 1: Baseline Characteristics

Variable	Early Surgery (n=50)	Delayed Surgery (n=50)	p-value
Mean age (years)	38.4 ± 11.2	40.1 ± 10.7	0.41
Male (%)	68%	70%	0.82
Road traffic accident	62%	58%	0.67
Fall from height	38%	42%	0.69

No statistically significant differences were observed in baseline characteristics between the groups.

Table 2 demonstrates the functional and quality of life outcomes among the two groups. Patients undergoing early surgical stabilization had significantly lower VAS pain scores and ODI disability scores, as well as

significantly higher SF-36 quality of life scores. Hospital stay was also significantly shorter among patients treated early ($p<0.001$)

Table 2: Functional and Quality of Life Outcomes

Outcome	Early Stabilisation	Delayed Stabilisation	p-value
VAS Pain Score	2.32 ± 0.8	3.42 ± 0.9	<0.001
ODI Functional Score	17.76 ± 6.0	26.59 ± 7.1	<0.001
SF-36 QoL Score	79.21 ± 8.0	69.81 ± 9.2	<0.001
Hospital Stay (days)	6.05 ± 1.5	9.36 ± 2.0	<0.001

Patients who underwent early stabilisation demonstrated significantly better functional outcomes and quality of life.

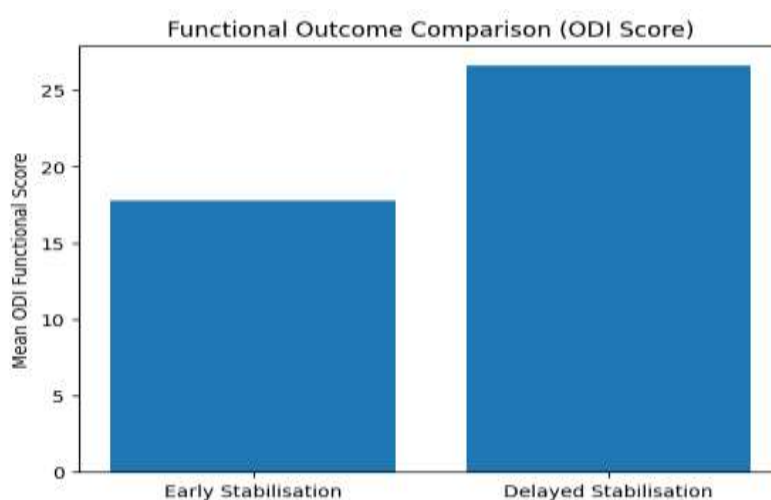


Figure 1: Functional Outcome Comparison (ODI Score)



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Discussion

The impact of surgical scheduling on functional recovery and quality of life in patients with thoracolumbar fractures was assessed in this observational study. The findings showed that, in comparison to patients who had delayed surgery, those who had early surgical stabilization had noticeably better outcomes. Reduced pain scores, enhanced functional status, and improved quality of life were linked to early stabilization. These results could be explained by the early surgical intervention's capacity to promote early recovery, lessen extended immobilization, and restore spinal stability. The results indicate that patients undergoing early surgical stabilisation had significantly lower ODI scores compared with those who received delayed surgery. Lower ODI scores reflect better functional recovery and reduced disability. Early stabilisation likely facilitates earlier mobilisation, improved spinal stability, and faster rehabilitation, leading to improved overall functional outcomes in thoracolumbar fracture patients (4).

Better functional recovery was shown by the early surgery group's significantly lower mean ODI score. Previous studies have revealed similar results, indicating that early surgical stabilization decreases long-term impairment and permits earlier mobilization.

Additionally, the early stabilization group's pain scores were noticeably lower (5). The higher VAS scores shown in the delayed surgery group may be explained by the fact that persistent pain after thoracolumbar fractures is frequently linked to extended instability and delayed rehabilitation. Patients who received early treatment had considerably higher scores on the SF-36 quality of life questionnaire. These results were probably influenced by better mobility, less pain, and a quicker return to regular activities (6).

Additionally, individuals who received early surgery had far shorter hospital stays. Patients gain from fewer hospital stays, but healthcare expenses and resource use also decline.

This study does, however, have several shortcomings. Only one site and a small sample size were used for the study (7), (8).

Generalizability

Since IGIMS is a major tertiary referral center catering to diverse trauma populations from Bihar and neighboring states, the findings may be generalizable to similar tertiary care institutions managing thoracolumbar fractures. However, caution should be exercised when extrapolating these findings to primary care settings or highly specialized spinal centers.

Conclusion

Comparing early surgical stabilization of thoracolumbar fractures to delayed surgery, the former leads to considerably superior functional outcomes, lower pain scores, greater quality of life, and a shorter hospital stay. When it is therapeutically possible, these results support the practice of early surgical intervention.

Limitations

The study was conducted at a single tertiary care center with a relatively small sample size, thereby limiting external validity. The observational design precludes establishing causality. Potential confounding factors such as fracture severity, associated injuries, and rehabilitation adherence were not fully adjusted, which may have influenced outcomes. Additionally, the relatively short follow-up period may not capture long-term functional recovery. These limitations may have affected the precision and generalizability of the study findings.

Recommendations

Early surgical stabilization should be considered whenever medically feasible in patients with thoracolumbar fractures. Establishing institutional protocols for early intervention and strengthening rehabilitation services may improve patient outcomes. Future multicenter studies with larger sample sizes and longer follow-up durations are recommended.

Acknowledgement

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List of Abbreviations

- ODI – Oswestry Disability Index
- VAS – Visual Analogue Scale
- SF-36 – Short Form-36 Health Survey
- IGIMS – Indira Gandhi Institute of Medical Sciences
- QoL – Quality of Life
- SPSS – Statistical Package for the Social Sciences

Source of Funding

No external funding was received for this study.

Conflict of Interest

The authors declare no conflict of interest.



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Data Availability

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Author Contributions

RR: Conceptualization, data collection, statistical analysis, manuscript drafting.

RK: Data interpretation, literature review, manuscript revision.

NKA: Study design, supervision, critical review.

SK: Supervision, final approval of manuscript.

AK: Data collection, follow-up assessment, manuscript preparation.

References

1. Christopher Paul O'BoyniCk, Mark F. KurD BVD, Alexander R. VaCCaro anD MGF. Timing of surgery in thoracolumbar trauma: Is early intervention safe? *Neurosurg Focus*. 2014;37(1):1-7.
<https://doi.org/10.3171/2014.5.FOCUS1473>
2. Alves R. Functional outcome of conservative management in stable thoracolumbar spine fractures. *Natl J Clin Orthop*. 2025;9(4):17-20.
<https://doi.org/10.33545/orthor.2025.v9.i4.A.493>
3. Pouw MH, Hosman AJF. Early versus late surgical decompression in acute traumatic spinal cord injury: does it impact the quality of life? Patient distribution. *Spinal Cord* [Internet]. 2025;64(December):142-50.
<https://doi.org/10.1038/s41393-025-01165-y>
4. Nigro L, Tarantino R, Donnarumma P, Rullo M, Santoro A, Delfini R. Delayed surgery in neurologically intact patients affected by thoraco-lumbar junction burst fractures: to reduce pain and improve quality of life. *J Spine Surg*. 2018;4(2):397-402.
<https://doi.org/10.21037/jss.2018.05.02>
5. Li P, Huang Y, Liang Z, Gan L, Wei B, Ye Z, et al. Clinical efficacy and therapeutic value of delayed surgery in patients with symptomatic old thoracolumbar fractures. *BMC Surg*. 2021;21(290):1-10.
<https://doi.org/10.21203/rs.3.rs-234578/v1>
6. Ndlovu S, Masunda S, Oladeji E, Lashin A, Kaddah A. Early versus late surgical stabilisation of unstable thoracolumbar spine fractures in adult polytrauma patients: A systematic review and. *Heal Sci Rev* [Internet]. 2025;14(January):100217.
<https://doi.org/10.1016/j.hsr.2025.100217>
7. Dhar S. Evaluation of Functional and Neurological Outcomes Following Spinal Instrumentation in Traumatic Spinal Injuries. *Int J Pharm Qual Assur*. 2025;16(12):626-32.
8. Mathijs A M SUIJKERBUIJK, Daan CRANENBROEK, Sara I VAN AMEIJDEN, Pim W VAN EGMOND, Margot C W JOOSEN, Mariska A C DE JONGH and REG. Return to work following traumatic fractures of the thoraco- lumbar spine without spinal cord injury: a scoping review. *Acta Orthop*. 2026; 97:83-90.
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