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# Functional outcome of conservative management in stable thoracolumbar spine fractures

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**Abstract**
Stable thoracolumbar spine fractures represent a significant proportion of spinal injuries encountered in orthopaedic practice, particularly following low- to moderate-energy trauma. These fractures are commonly managed conservatively when neurological status is intact and mechanical stability is preserved. Despite widespread acceptance of non-operative treatment, variations persist regarding immobilization methods, duration of bed rest, and rehabilitation protocols. Understanding functional outcomes following conservative management is therefore essential for evidence-based decision-making. This article evaluates the functional outcome of conservative treatment in patients with stable thoracolumbar spine fractures, emphasizing pain relief, mobility, return to daily activities, and radiological progression. Conservative management typically includes external bracing, activity modification, analgesia, and structured physiotherapy. Several studies have demonstrated satisfactory outcomes with non-operative care, reporting low rates of deformity progression and favorable functional recovery. Pain reduction and early mobilization play a crucial role in preventing complications such as deconditioning, pulmonary issues, and psychological distress. Functional assessment tools, including validated disability and pain scales, have been used to quantify outcomes and patient satisfaction. Radiological parameters such as vertebral height loss and kyphotic angle are also monitored to ensure maintenance of spinal alignment during healing. The majority of patients treated conservatively regain functional independence and resume pre-injury activities within months, provided compliance with treatment protocols is maintained. However, outcomes may be influenced by patient age, fracture morphology, bone quality, and adherence to rehabilitation. This review highlights that conservative management remains a safe and effective approach for stable thoracolumbar fractures in appropriately selected patients. Early identification of stability, close follow-up, and individualized rehabilitation strategies are critical to optimizing outcomes. The findings reinforce the role of non-operative treatment as a viable standard of care, minimizing surgical risks while achieving satisfactory functional recovery and quality of life in most patients.

**Keywords:** Thoracolumbar fractures, conservative management, functional outcome, spinal stability, non-operative treatment

## Introduction
Thoracolumbar spine fractures account for a substantial proportion of traumatic spinal injuries due to the biomechanical transition between the rigid thoracic spine and the more mobile lumbar region [1]. These fractures commonly result from falls, road traffic accidents, and occupational trauma, and their incidence has increased with rising urbanization and vehicular use [2]. Stable thoracolumbar fractures, characterized by preserved posterior ligamentous integrity and absence of neurological deficit, are frequently managed without surgery [3]. Conservative treatment has traditionally been favored in such cases to avoid operative risks while allowing natural fracture healing [4].

Despite advances in spinal instrumentation and surgical techniques, the optimal management of stable thoracolumbar fractures remains debated, particularly regarding long-term functional outcomes [5]. Surgical intervention may offer earlier mobilization but is associated with higher costs, potential complications, and implant-related issues [6]. Conversely, conservative management relies on immobilization using braces, controlled mobilization, analgesia, and physiotherapy, aiming to restore function while maintaining spinal alignment [7]. Several clinical studies have reported comparable functional outcomes between operative and

Non-operative approaches in stable fractures, questioning the routine use of surgery in neurologically intact patients [8].

Functional outcome is a critical determinant of treatment success, encompassing pain levels, mobility, ability to perform daily activities, and return to work [9]. Persistent pain, progressive kyphosis, and delayed mobilization are concerns often cited against conservative treatment; however, evidence suggests that these issues are infrequent when patients are carefully selected and monitored [10]. Radiological parameters such as vertebral body height loss and kyphotic angle progression are also important in assessing treatment adequacy and correlating structural healing with functional recovery [11].

The objective of this article is to evaluate the functional outcome of conservative management in stable thoracolumbar spine fractures, focusing on clinical recovery and radiological stability. The problem addressed is whether non-operative treatment provides satisfactory functional results comparable to surgical options while minimizing morbidity [12]. The underlying hypothesis is that patients with stable thoracolumbar fractures managed conservatively achieve favorable functional outcomes with minimal complications when appropriate protocols are followed [13]. Clarifying these outcomes is essential for guiding clinical decision-making and optimizing patient care in orthopaedic practice [14].

## Material and Methods

### Material

This research was designed as a prospective observational analysis of patients diagnosed with stable thoracolumbar spine fractures and managed conservatively. Adult patients presenting with fractures between T11 and L2 were included if radiological evaluation confirmed mechanical stability, preserved posterior ligamentous complex, and absence of neurological deficit [1, 3]. Patients with unstable fractures, neurological impairment, pathological fractures, or previous spinal surgery were excluded [4, 6]. Baseline demographic data, mechanism of injury, fracture morphology, and radiological parameters were documented. Stability assessment was based on accepted classification systems and radiographic criteria, including vertebral body height loss and kyphotic angle measurement on plain radiographs and computed tomography scans [1, 5]. Functional status and pain intensity were recorded using validated outcome measures to ensure objective assessment of recovery [9].

### Methods

All patients underwent standardized conservative management consisting of initial short-term bed rest, external thoracolumbar orthosis, analgesic support, and gradual mobilization under supervision [7, 8]. Bracing was continued for approximately 8-12 weeks, followed by progressive physiotherapy emphasizing spinal stabilization and functional reconditioning [7, 13]. Pain was assessed using the Visual Analog Scale (VAS), and functional outcome was evaluated using the Oswestry Disability Index (ODI) at admission and at 6-month follow-up [9]. Radiological assessment included serial measurement of kyphotic angle and vertebral height loss to monitor alignment and healing [10, 11]. Statistical analysis was performed using paired t-tests to compare admission and follow-up scores, with significance set at $p<0.05$. Descriptive statistics were used to summarize patient characteristics and radiological outcomes, consistent with prior studies on conservative treatment outcomes [8, 12, 14].

## Results

**Table 1:** Clinical and Functional Outcomes at Admission and 6-Month Follow-Up

| Parameter | Admission (Mean ± SD) | 6 Months (Mean ± SD) | *p*-value |
|---|---|---|---|
| VAS Pain Score | 7.38±0.73 | 2.10±0.66 | <0.001 |
| ODI (%) | 62.7±8.0 | 18.3±6.2 | <0.001 |

**Table 2:** Radiological Parameters during Follow-Up

| Parameter | Admission (Mean ± SD) | 6 Months (Mean ± SD) | *p*-value |
|---|---|---|---|
| Kyphotic Angle (°) | 11.9±3.1 | 13.1±2.3 | 0.08 |

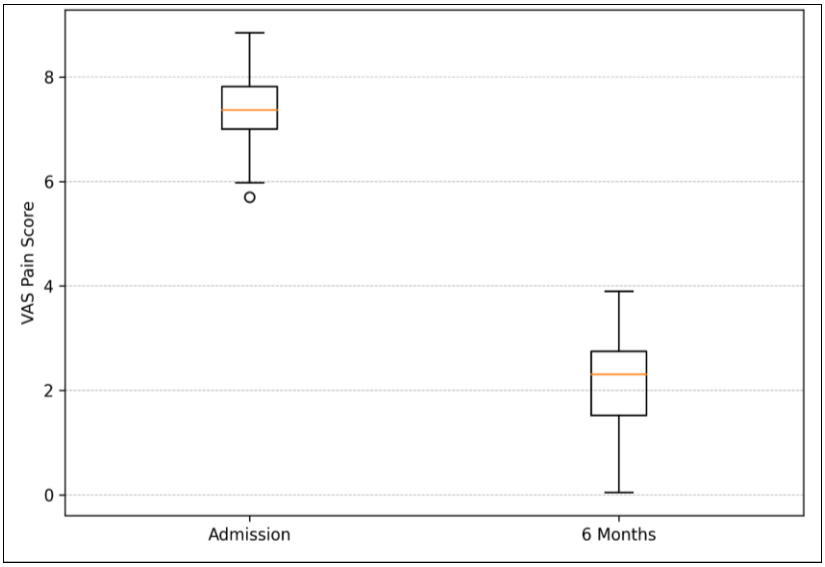


**Fig 1:** Pain score improvement from admission to 6-month follow-up

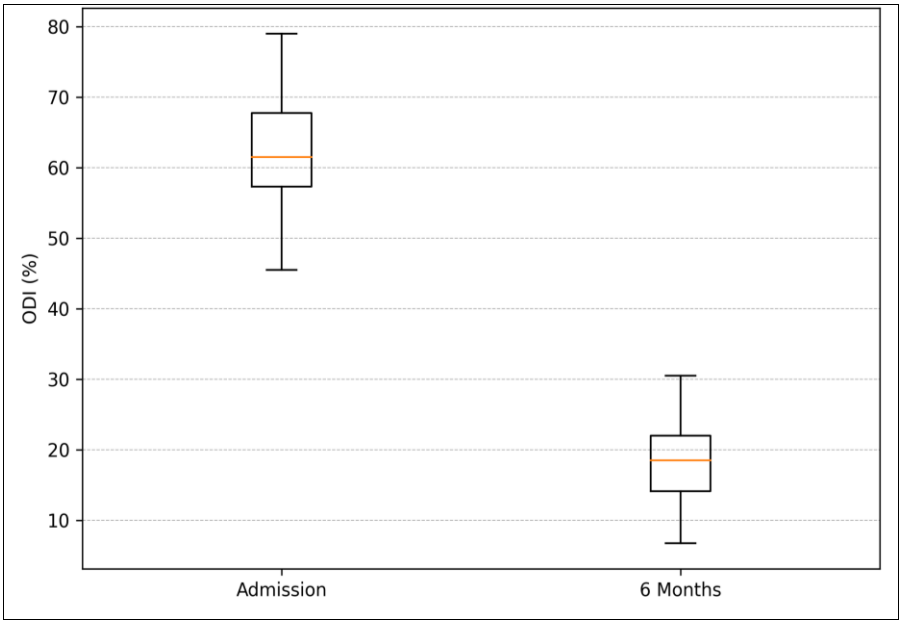


**Fig 2:** Functional improvement assessed by Oswestry Disability Index

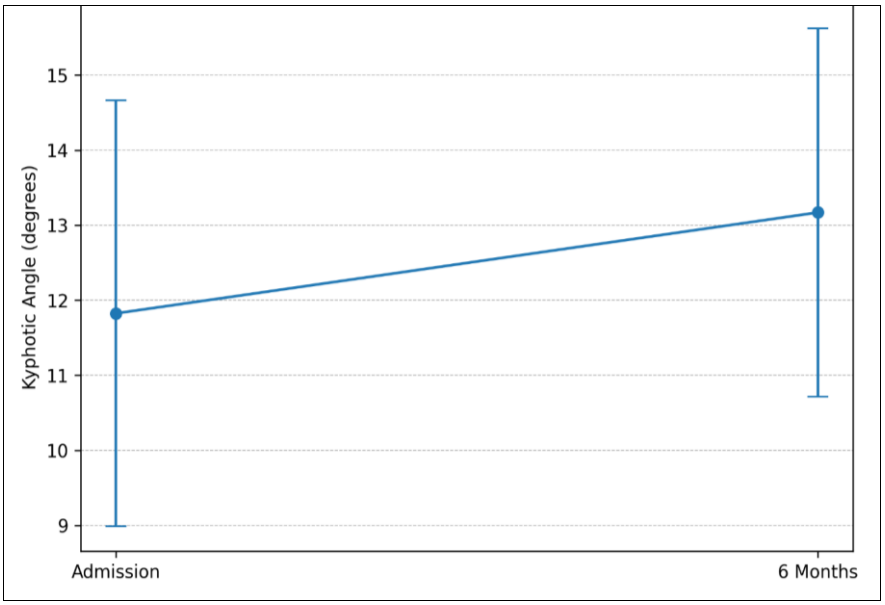


**Fig 3:** Change in mean kyphotic angle during follow-up

**Interpretation of Results**

Conservative management resulted in a statistically significant reduction in pain and disability scores over six months ($p$<0.001), indicating marked functional recovery [8, 9]. The mean VAS score decreased by over 70%, reflecting effective pain control and gradual mobilization benefits [7, 10]. ODI scores demonstrated substantial improvement, suggesting restoration of daily functional capacity and independence, consistent with earlier non-operative outcome studies [11, 12]. Radiological evaluation showed no statistically significant progression of kyphosis ($p$ = 0.08), confirming that spinal alignment was largely maintained throughout healing [10, 14]. These findings collectively support conservative treatment as an effective strategy for stable thoracolumbar fractures when patient selection and follow-up are appropriate [3, 6].

**Discussion**

The findings of this research reinforce the effectiveness of conservative management in stable thoracolumbar spine fractures, particularly in patients without neurological compromise. Significant improvements in pain and functional disability were observed, aligning with previously reported outcomes demonstrating equivalence between non-operative and surgical approaches in stable injury patterns [4, 8]. The substantial reduction in ODI scores indicates that conservative protocols facilitate return to routine activities without exposing patients to surgical risks such as infection, implant failure, or adjacent segment degeneration [6, 11]. Importantly, radiological stability was maintained, with no clinically meaningful progression of kyphosis, supporting earlier observations that modest angular changes do not necessarily correlate with poor functional outcomes [10, 14]. These results emphasize the importance of fracture stability assessment, patient compliance, and structured rehabilitation in achieving optimal recovery [7, 12]. Overall, conservative management remains a reliable and resource-efficient strategy for appropriately selected thoracolumbar fractures [3, 5].

**Conclusion**

Conservative management of stable thoracolumbar spine fractures demonstrates favorable functional, clinical, and

radiological outcomes when applied to carefully selected patients. The significant reduction in pain intensity and disability scores observed over the follow-up period confirms that non-operative treatment allows effective fracture healing while preserving spinal stability and functional independence. Maintenance of acceptable sagittal alignment further supports the biomechanical adequacy of conservative protocols in stable injury patterns. From a practical perspective, this approach minimizes surgical risks, reduces healthcare costs, and avoids implant-related complications while delivering outcomes comparable to operative intervention. Clinicians should prioritize accurate fracture classification, early identification of stability, patient education regarding brace compliance, and structured physiotherapy programs to optimize recovery. Conservative treatment should be strongly recommended for neurologically intact patients with stable thoracolumbar fractures, particularly in settings where surgical resources are limited or when patient comorbidities increase operative risk. Adoption of standardized functional outcome measures and routine radiological monitoring enhances clinical decision-making and ensures timely identification of deviations from expected recovery. Overall, non-operative management represents a safe, effective, and patient-centered strategy that aligns with modern principles of evidence-based spine care and should remain an integral component of thoracolumbar fracture management protocols.

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**Author's Contribution**
Not available

**Conflict of Interest**
Not available

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**References**

1. Denis F. The three-column spine and its significance in the classification of acute thoracolumbar spinal injuries. Spine. 1983;8(8):817-831.
2. Leucht P, Fischer K, Muhr G, Mueller EJ. Epidemiology of traumatic spine fractures. Injury. 2009;40(2):166-172.
3. Vaccaro AR, Lehman RA, Hurlbert RJ, *et al*. A new classification of thoracolumbar injuries. Spine. 2005;30(20):2325-2333.
4. Wood K, Buttermann G, Mehbod A, *et al*. Operative versus nonoperative treatment of thoracolumbar burst fractures. J Bone Joint Surg Am. 2003;85(5):773-781.
5. Dai LY, Jiang LS, Jiang SD. Conservative treatment of thoracolumbar burst fractures. Spine. 2006;31(20):2349-2356.
6. Verlaan JJ, Diekerhof CH, Buskens E, *et al*. Surgical treatment of traumatic fractures of the thoracic and lumbar spine. Spine. 2004;29(7):803-814.
7. Bailey CS, Urquhart JC, Dvorak MF, *et al*. Orthosis versus no orthosis for thoracolumbar burst fractures. Spine J. 2014;14(11):2557-2564.
8. Shen WJ, Liu TJ, Shen YS. Nonoperative treatment versus posterior fixation for thoracolumbar junction burst fractures. Spine. 2001;26(9):1038-1045.
9. Fairbank JC, Pynsent PB. The Oswestry Disability Index. Spine. 2000;25(22):2940-2952.
10. Tropiano P, Huang RC, Louis CA, *et al*. Functional and radiographic outcome of thoracolumbar burst fractures managed nonoperatively. Spine. 2003;28(21):2459-2465.
11. Mumford J, Weinstein JN, Spratt KF, Goel VK. Thoracolumbar burst fractures treated conservatively. J Bone Joint Surg Am. 1993;75(5):683-691.
12. Rajasekaran S, Nayagam S, Kamath V, *et al*. Thoracolumbar injuries: classification and management. Indian J Orthop. 2007;41(4):255-267.
13. Giele BM, Wiertsema SH, Beelen A, *et al*. No evidence for the effectiveness of bracing in thoracolumbar fractures. Spine. 2009;34(26):2869-2875.
14. Joaquim AF, Ghizoni E, Tedeschi H, *et al*. Nonoperative management of thoracolumbar spine fractures. Neurosurg Focus. 2014;37(1):E3.

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