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Effect of Early Physiotherapy Intervention After Lumbar Spine Fixation: A Case Report

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ABSTRACT

Background: Spinal cord injury (SCI) is a serious condition with lasting effects on motor, sensory, and autonomic functions. In India, traumatic SCI frequently results from falls and disproportionately affects young adults. Early physiotherapy intervention after spinal fixation is crucial but underreported, especially in female patients.
Case Presentation: A young female sustained a traumatic lumbar spine injury due to a fall, resulting in bilateral facet dislocation at L1–L2, anterior translation of L1, and a wedge compression fracture of L3. Surgical fixation was performed, and physiotherapy was initiated within 24 hours postoperatively. A structured four-week rehabilitation protocol included neuromuscular facilitation, upper limb strengthening, supported sitting, wheelchair mobility, tilt table training, and sensory re-education. The physiotherapy plan was progressed weekly based on the patient's neurological status and tolerance.
Discussion: Initially classified as ASIA A on the (American Spinal Injury Association) ASIA scale. The patient progressed to ASIA B by week three, regaining pinprick sensations and showing palpable muscle contractions in lower limb muscles. Functional improvements included better postural control, independent transfers with assistance, and cardiovascular stability with weight bearing during tilt table sessions. Quality of life also improved based on quality-of-life index scoring.
Conclusion: Early, individualized physiotherapy post-lumbar spine fixation significantly improved neurological and functional outcomes in this case. The structured rehabilitation approach enhanced sensory recovery, motor activity and upright tolerance. This report highlights the value of early intervention leads to better recovery.

Keywords: Spinal cord injury, early physiotherapy, lumbar fixation, ASIA scale, paraplegia, rehabilitation, case report.

INTRODUCTION

Spinal cord injury (SCI) is a catastrophic event that can result in permanent disability, affecting sensory, motor and autonomic functions. Unlike communicable diseases, SCI is not a notifiable condition, leading to inconsistent and often imprecise incidence data, especially in developing nations. However, what is clear is the significant burden SCI imposes on individuals, families and healthcare systems—particularly in countries like India, where the injury disproportionately affects the young, working-age population.[1]

In emerging economies, the causes and patterns of traumatic spinal injury (TSI) differ markedly from those reported in high-income countries. In India, the leading cause

of SCI falls (64.3%), especially from heights of 10–30 feet, followed by road traffic accidents (29.8%).[2] Among trauma cases, the incidence of TSI is around 6.2%. The most commonly affected regions of the spine are the cervical (38.1%), lumbar (33.9%) and thoracic (27.79%) areas.[3] The male-to-female ratio is approximately 2.5:1, and a significant proportion (73.8%) of individuals with spinal fractures experience neurological deficits.[2]

SCI disrupts the spinal cord function as a conduit for motor and sensory signals. Depending on the injury level, patients may experience paraplegia or tetraplegia, with loss of voluntary movement, bladder and bowel control, sensation, vasomotor function and sexual function. Physiotherapy plays a critical role in the continuum of care, from the acute phase through long-term rehabilitation. Targeted interventions can improve motor control, restore functional independence, prevent complications such as pressure ulcers and contractures, and enhance quality of life.[1]

The most vulnerable regions for injury include C5–C7, T4–T7 and T10–L2. Injuries at the cervical or lumbar enlargements may result in flaccid paralysis and complete loss of reflexes.[1]

Physiotherapists must tailor interventions based on the neurological level, extent of injury and individual goals. Thus, SCI rehabilitation is not just about recovery—it is a journey of transformation. As physiotherapists, playing an active role in helping patients regain function and independence highlights the vital importance of skilled, evidence-based rehabilitation in spinal cord injury care. Physiotherapy helps in evaluating and addressing individual's overall function following spinal cord injury with emphasis on mobility, muscle strength, balance and posture. Early physiotherapy intervention and education following the onset of paraplegia can significantly reduce secondary complications, promote early independency and improve quality of life.[4]

Physiotherapy includes facilitatory techniques, transitional activities, transferring from bed to wheelchair, standing, gait training along with postural balance and the use of assistive devices. The overall goal in spinal cord injury with paraplegia is to restore normal functioning, prevent secondary complications and make the person independent.[1,4]

Therefore, this case report aims to contribute to the limited body of evidence on SCI in females by highlighting physiotherapeutic interventions, functional recovery patterns and the holistic rehabilitation process. By doing so, it supports the development of evidence-based physiotherapy protocols that can be applied to similar cases in the future. This study also emphasizes the importance of individualized care planning and the need for greater representation of female SCI patients in research and clinical documentation.

CASE REPORT

A young female patient presented with a history of sustained injury over her back one month prior, resulting from a fall at her home while she was brushing her teeth a pillar from front fall on her due to which she hit the ground directly on her back. Pain was sharp, shooting in nature with (Numeric Pain Rating Scale) NPRS of 10/10 rendering her unable to bear weight on both her lower limbs. There is no loss of consciousness, vomiting and head injury. With the same complains they visited to the hospital in supine lying on stretcher where investigations were done in form of CT-scan and MRI. Investigations showed displaced fracture of right transverse processes of L2 and L4 vertebrae, wedge compression fracture of L3 vertebral body with 50% height reduction, disruption of L1-L2 disc with anterior translation of L1 over L2 vertebra and dislocation of both facetal joint for which surgical intervention was indicated and underwent lumbar fixation to restore spinal alignment, stabilize the affected segments and prevent further neurological damage. There was no prior

history of neurological, orthopedic, or systemic illnesses or previous surgeries. Following surgery, a detailed Physiotherapy evaluation was performed on the first day of reference. Sensory testing assessed dermatome-wise in lower limbs, deep tendon reflexes, manual muscle testing to determine strength of key lower limb muscle groups and passive joint range of motion.

This comprehensive post-surgical assessment and effective active discussion with neurosurgeon helped us to establish a baseline rehabilitation, guiding a safe and progressive physical therapy program aimed at restoring early functional recovery, mobility, sensation and quality of life.

Fig.1- Pre-op LS spine X-ray (Lateral view)

Fig.2a- Post-op Lumbar fixation (AP view)

Fig.2b- post-op Lumbar fixation (Lateral view)

PROTOCOL-[4]

Table 1- Week wise physiotherapy protocol

Weeks	Physiotherapy Management	Progression
Week 1	Facilitatory technique in form of stroking (5-7 strokes per muscle), quick stretches (4-5 stretch), log rolling, supported high sitting with TLSO brace (Fig.3), upper limb strengthening exercise by weights (5 repetitions per joint). Advised relatives about the strengthening exercises and positioning every 2 hours.	Patient started log rolling on her own by using upper limb strength and with the help of her relatives. Prevent pressure ulcers.
Week 2	Continue above with Kegel's exercise, high sitting knee extension, functional reach exercise, weight bearing on upper limb (1 minutes on each side), weight shifting in high sitting, wheelchair mobilization by pivot transfer	Pelvic floor muscle strengthening Balance improved in high sitting Pin prick sensations began to start
Week 3	Continue above with supported sit to stand by two-person support and one to lock the knees to prevent buckling (5 times), gradually progressed to parallel bar	Able to take her weight on her upper limbs during pivot transfer Started taking weight over her lower limbs and pelvis Reduced forward bending from pelvis
Week 4	Continue above with patient shifted on tilt table starting with 45 degrees and gradually progressed to 90 degrees (Fig.4) Duration for tilt table- starting from 5 minutes to 20 minutes with vitals monitoring Strengthening exercises of upper limb on the tilt table (Fig.5) (10 repetitions per joint)	Improved sensations Able to do weight shifts with bilateral weight shifting on both her lower limbs Increased upper limb strength. Weight bearing on upper limb increased to 2 minutes on each side

Fig.3- Wheelchair support for patient Regaining lower limb function

Fig.4- Progression on tilt table positioning to enhance postural control

Fig.5- Upper limb strengthening on tilt table

DISCUSSION

In this case study, a young female patient who suffered a catastrophic spinal cord injury demonstrates the benefits of early physiotherapy intervention after lumbar spine stabilisation. The patient's functional recovery, improved sensory perception, and general quality of life were all much enhanced by the prompt start of therapy following surgery.[1]

Severe motor and sensory deficits are frequently the result of traumatic spinal injuries, especially those affecting the lumbar area. In this instance, the patient had bilateral facet dislocation at L1–L2, anterior translation, and a wedge compression

fracture of L3, all of which increased the probability of neurological impairments.[1]

Significant improvements were observed over the four-week period

- According to ASIA, the patient progressed from a complete SCI (ASIA A) at the level of L2 to a sensory incomplete injury (ASIA B) by week 3.
- Return of sensations and palpable contractions were seen. This pattern of sensory return preceding motor return and the caudal spread of motor function are consistent with expected neurological recovery after SCI.
- Heart rate and blood pressure remained within normal limits across all tilt angles [6] up to 90 degrees, which indicates no postural hypotension reflecting improved cardiovascular adaptation and tolerance to upright posture, which is critical for mobilization and gait training.[7]
- On QoL index score showed improvement after 4 weeks with higher satisfaction and increased perceived importance.
- Also vitals were pre and post stable.

The ASIA impairment scale,[5] an established neurological classification tool, served as a reliable outcome measure for this case. The improvements in both motor and sensory domains underscore the neuroplastic potential facilitated by physiotherapeutic interventions when initiated early with also improving more in post assessment quality of life.

Early physiotherapy post-fixation surgery aimed at:

- Preventing complications such as joint stiffness, pressure sores, and deconditioning,
- Improving muscle strength
- Promoting neuromuscular facilitation,
- Improve sensory component and
- Restoring functional independence and quality of life.

The Physiotherapy protocol was carefully designed and progressively structured, beginning with facilitatory techniques, upper limb strengthening, and supported high sitting. This progressed to functional mobility training, pivot transfers, weight shifting and tilt table sessions, demonstrating the importance of gradual load-bearing and postural control.[4]

From a broader perspective, this case emphasizes several key aspects for clinical implementations:

1. Importance of Early Rehabilitation: Initiating therapy in the acute post-operative phase helped in early mobilization, maintenance of joint integrity, prevention of disuse atrophy, and psychological reassurance.
2. Individualized, Progressive Protocols: Tailoring therapy to the patient's neurological level and physical capacity ensured safe and effective progression without exacerbating the injury.
3. Female Representation in SCI Cases: The case also adds to the underrepresented data on SCI in females, particularly in low-to-middle-income countries like India, where epidemiological data is scarce.

Despite the positive outcomes, long-term follow-up would be essential to monitor continued neurological recovery and reintegration into daily life.

CONCLUSION

This case report highlights the critical impact of early, structured physiotherapy in enhancing functional recovery after lumbar spine fixation for traumatic spinal injury in a young female patient. Initiated on the first post-operative day, the rehabilitation program—which included neuromuscular facilitation, upper limb strengthening, supported weight-bearing, and tilt table training—led to significant improvements in motor strength, sensory function, mobility, and ASIA scores over four weeks. It also helped prevent complications such as deconditioning and orthostatic hypotension. The case underscores the importance of early, individualized rehabilitation in spinal cord injury management, particularly in low-resource settings, and advocates for

more gender-inclusive research and multidisciplinary approaches to optimize outcomes and restore independence.

Declaration by Authors

Ethical Approval: Approved [IEC/BU/2025/C.49/376/2025]

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REFERENCES

1. Bromley I. *Tetraplegia and Paraplegia: A Guide for Physiotherapists*. 6th ed. Edinburgh: Churchill Livingstone; 2006.
2. Kanna RM, Peddireddy S, Shetty AP, Rajasekaran S. Patterns of Traumatic Spinal Injuries in the Developing World: A Five-Year Longitudinal Review. Asian Spine J. 2022 Oct;16(5):658-665. doi: 10.31616/asj.2021.0301.
3. Kimmatkar N, Kantharaju H. "Demographics of Traumatic Spinal Fractures in Indian Population Presenting to Tertiary Care Centre". SVOA Orthopaedics 2022, 2:4, 83-88.
4. Jacob VC, Paranjape AA, Sharma A. *Neurorehabilitation of Spinal Cord Injury: A Guidebook for Therapists and Patients*. Mumbai (IN): NeuroGen Brain & Spine Institute; [publication date unknown, circa 2020s].
5. Roberts TT, Leonard GR, Cepela DJ. Classifications in brief: American Spinal Injury Association (ASIA) Impairment Scale. Clin Orthop Relat Res. 2017 May;475(5):1499-1504. doi:10.1007/s11999-016-5133-4.
6. Zysko D, Jamil RT, Anilkumar AC. Tilt Table. [Updated 2023 Jun 20]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK482320/
7. Welch R. Tilt-table therapy in rehabilitation of the trauma patient with brain damage and spinal injury. Nurs Clin North Am. 1970 Dec;5(4):621-30.

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