

Mobilization After Repaired Incidental Durotomy During Lumbar Fusion

Nishant

M. S. Ortho, D-Ortho F. A. G. E, Department of Orthopedic Surgery, Radha Devi Jageshwari Memorial Medical College & Hospital, Muzaffarpur
ORCID: 0000-0002-6206-7732

Abstract: ***Background:** Surgeons commonly prescribe flat bed rest after an incidental dural tear to protect a repair, but prolonged immobility may add medical complications and delay recovery. Published comparisons largely combine decompression with fusion, leaving the fusion-specific effect uncertain. **Methods:** This targeted narrative review examined a randomized lumbar decompression trial, observational thoracolumbar cohorts, meta-analyses, and a recent posterior lumbar interbody fusion cohort. It focuses on postoperative positioning after an intraoperatively recognized and repaired incidental durotomy, and distinguishes that state from an unresolved postoperative CSF fistula. It is not a registered systematic review. **Results:** In a 361-patient primary-repair cohort, revision for CSF leak or wound infection was similar with bed rest ≤ 24 hours and >24 hours (7.87% vs 8.41%); prolonged bed rest had more wound and medical complications and a longer stay. A six-study meta-analysis of 704 patients found fewer pulmonary complications with mobilization ≤ 24 hours (risk ratio 0.23, 95% CI 0.08–0.67), without statistically significant differences in CSF leak or reoperation; its intervals were compatible with clinically important differences. A small randomized decompression trial reported two CSF-leak revisions in each group. In a 2025 posterior open lumbar interbody fusion cohort, durotomy was associated with longer stay and early morbidity, but mobilization strategies were not randomized or directly compared. **Conclusion:** Routine flat bed rest beyond 24 hours after a secure repair lacks demonstrated benefit in the available mixed-procedure evidence and is associated with harms. A fusion-specific recommendation remains conditional: repair integrity, persistent leak signs, and reconstruction complexity should be recorded before extrapolating, and symptoms after mobilization require reassessment rather than an automatic fixed duration of bed rest.*

Keywords: incidental durotomy; lumbar fusion; early mobilization; bed rest; cerebrospinal fluid leak; pseudomeningocele

1. Introduction

Incidental durotomy during decompression and instrumented fusion disrupts an otherwise standard recovery pathway. A repaired tear may prompt a surgeon to prescribe a flat position for one or more days on the premise that reduced hydrostatic pressure protects the closure. Yet bed rest can delay walking and discharge, prolong catheter exposure, and contribute to ileus, urinary, respiratory, and thromboembolic concerns. Whether it prevents a clinically meaningful CSF leak after a competent repair is the central question.

The broad early-versus-late mobilization question has already been addressed by systematic reviews [3,4]. A narrower uncertainty persists for instrumented lumbar fusion: the wound dead space, interbody work, extensive decompression, revision scarring, and planned postoperative pathway differ from an isolated laminectomy. This review identifies which findings can be transferred cautiously and which outcomes need direct fusion-specific comparison. It does not claim the topic has never been published.

Scope and evidence identification

We examined accessible primary reports and published syntheses through 30 September 2026 [1–8]. We prioritized the actual denominator, repair status, timing definition, and leak-related outcome of each study. “Early” often means mobilization at or before 24 hours; “late” usually means more than 24 hours of flat bed rest, though protocols vary. This targeted narrative search had no registered protocol, duplicate screening, systematic risk-of-bias ratings, or pooled reanalysis. Full-text verification and an updated search are needed before submission.

Randomized evidence comes from decompression surgery

Farshad and colleagues randomized 60 patients with incidental durotomy during lumbar decompressive surgery to early ambulation or bed rest [1]. Ninety-four durotomies were identified among 1,429 operations before trial enrollment. Two patients in each allocated group underwent revision for persistent CSF leakage. The trial provides an important test of the traditional positioning assumption, but its small event count cannot establish equivalence, and its decompression population does not settle outcomes after instrumented interbody fusion. The quality and method of repair, surgeon judgment, and protocol adherence matter when transferring its result.

The large primary-repair cohort

Verma and colleagues retrospectively identified 420 incidental durotomies among thoracic and lumbar decompressions; 361 were primarily repaired and formed the bed-rest comparison [2]. Of those, 254 were prescribed bed rest for no more than 24 hours and 107 for more than 24 hours. Revision surgery related to CSF leak or wound infection occurred in 7.87% and 8.41%, respectively ($P=.86$). Wound complications were 8.66% and 15.89% ($P=.043$), and mean hospital stays were 4.47 and 7.24 days, respectively. Ileus, urinary retention and infection, pulmonary problems, and altered mental status were more common with prolonged bed rest. These observations argue against routine extended restriction after repair; they do not prove that early mobilization itself caused fewer complications.

Treatment selection can run in both directions. A surgeon may keep a patient flat because the tear was large or the

repair seemed tenuous, making the prolonged-rest group intrinsically higher risk. Conversely, patients who develop a leak or medical problem may stay in bed longer, making the recorded duration a consequence of a complication. Procedure extent, instrumentation, drain use, and actual first walking time need adequate capture. The revision endpoint also combines CSF-leak and wound-infection indications, so it should not be read as a pure dural-repair failure rate.

What the pooled evidence does and does not show

Gomes and colleagues pooled six studies with 704 patients, comparing bed rest ≤ 24 hours with >24 hours [3]. Early mobilization was associated with fewer pulmonary complications (risk ratio 0.23; 95% CI 0.08–0.67). There were no statistically significant differences in CSF leak (risk ratio 1.34; 95% CI 0.83–2.14), additional repair (1.29; 0.76–

2.20), orthostatic headache (0.72; 0.27–1.90), or pseudomeningocele (1.29; 0.20–8.48). The broad intervals, especially for pseudomeningocele, do not exclude clinically important harm or benefit. The same patients can appear in different reviews; multiple syntheses should not be treated as independent confirmatory datasets.

Najjar and colleagues also found similar major complication and reoperation rates, with shorter stays and fewer minor complications under early mobilization in a review of repaired open lumbar and thoracic tears [4]. Its published correction should be consulted alongside the original article when extracting numerical estimates. The direction of the overall message is consistent, but populations, definitions, repair methods, and study quality differ. No pooled estimate establishes a secure-repair rule for every complex fusion.

Evidence	Population and comparison	Finding	Boundary for fusion
Farshad 2020 [1]	Randomized lumbar decompression, early walk versus bed rest	Two CSF-leak revisions in each group	Few events; no dedicated fusion contrast
Verma 2022 [2]	361 primary repairs, ≤ 24 versus >24 h bed rest	Similar revision; more medical and wound events with prolonged rest	Observational, mixed thoracic/lumbar decompressions
Gomes 2023 [3]	Six studies, 704 durotomies	Lower pulmonary events with early mobilization; imprecise leak outcomes	Procedure mix and overlapping evidence
Huan 2025 [5]	Posterior open interbody fusion, durotomy versus none	Longer stay and more early burden after durotomy	No early-versus-late mobilization comparison

The fusion-specific evidence gap

In a two-center posterior open lumbar interbody fusion cohort, Huan and Lei reported incidental durotomy in 36 of 415 patients (8.7%) [5]. Durotomy was associated with a mean stay 2.9 days longer, greater costs, and higher 30-day readmission; early back pain and disability were worse, while several later patient-reported outcomes converged. Patients with postoperative CSF leakage had delayed drain removal and were advised bed rest. The paper asks whether durotomy affects recovery, not whether a prescribed bed-rest interval prevents failure of an otherwise secure repair. The manuscript and tables show slightly different analytic denominators after exclusions; use the cohort's 36/415 incidence separately from comparisons reported on the analyzed subset.

A separate lumbar decompression series including many instrumented fusions can describe the incidence and risk factors of durotomy, but the presence of fusion alone does not make it a mobilization trial [6]. Conversely, a cohort selected for a demonstrably watertight repair may favor early activity but cannot automatically represent tears that cannot be closed primarily. The transfer problem is especially acute for revision fusion, a large ventral or inaccessible tear, extensive dead space, a persistent high-output drainage pattern, or a symptomatic postoperative collection. These features should be described, rather than grouped under a single “durotomy” exposure.

A conditional postoperative approach

At the operation, record tear location and size, whether neural tissue was involved, closure method, adjuncts, intraoperative leak test if used, and the surgeon's assessment of closure integrity. Record the intended position and mobilization time as a clinical decision, not as a surrogate measure of repair quality. After a secure repair, supervised sitting and walking within the first day are consistent with

the studied early group, provided the patient is otherwise stable; no evidence requires a universal immediate walk. A patient with a tenuous closure or active leak signs warrants an individualized plan and repeated examination.

Monitor for postural headache, nausea, photophobia, new radicular or neurologic symptoms, wound drainage, swelling, and positional symptom recurrence during progressive mobilization. A transient headache is not synonymous with a failed repair, while persistent clear drainage or enlarging collection deserves a directed evaluation. Distinguish intracranial hypotension symptoms, pseudomeningocele, cutaneous fistula, and an unrelated postoperative headache before choosing imaging, observation, temporary position restriction, or repair. The literature does not define a validated headache threshold or exact number of flat hours that safely prevents a leak.

Mobilization and drain decisions are linked in practice but should not be conflated. Drain location and suction may affect the appearance and timing of fluid output; output alone may not identify its source. A planned drain strategy and the response to a new concerning pattern should be documented. Bed rest cannot correct a mechanically inadequate dural closure. Prolonged restriction for a persistent leak may be part of a selected management plan, but those patients are outside the clean comparison of routine positioning after a repaired tear.

How a fusion-specific study should be designed

A multicenter study should enroll patients at the time of a recognized durotomy during instrumented lumbar fusion, before postoperative positioning decisions are known. It should distinguish watertight primary repair, augmented repair, and unresolved or untestable closure. Capture approach, number of levels, revision status, interbody technique, drain position and suction, and exact elapsed

hours to sitting, standing, and walking. Analyze planned restriction and actual mobility separately; a postoperative leak that causes bed rest must not be misclassified as a leak caused by bed rest.

A randomized trial could compare a prespecified supervised mobilization pathway with 24–48 hours of flat rest among patients with a secure closure and genuine equipoise, stratifying by revision and fusion extent. Patient-centered endpoints should include persistent symptomatic CSF leak, cutaneous fistula, pseudomeningocele requiring intervention, revision for dural failure, pulmonary and urinary complications, length of stay, readmission, and 30- or 90-day outcomes. Blind outcome adjudication where possible, count events arising before first mobilization, and report absolute differences with confidence intervals. Patients with an uncontrolled leak should be described in a parallel registry rather than folded into a randomized secure-repair comparison.

2. Limitations and Conclusion

The included randomized trial is small and focused on decompression, while larger studies are prone to confounding by repair difficulty and by complications that determine time in bed. Meta-analyses of overlapping mixed-procedure studies cannot resolve a fusion-only subgroup. Under these constraints, prolonged flat bed rest after a secure repaired durotomy has no demonstrated reduction in revision or CSF leak and is associated with longer stay and medical harms. Early supervised mobilization is a reasonable conditional pathway, with the integrity of repair and emerging symptoms guiding deviations. Direct instrumented-fusion evidence is needed to determine which repairs and patients benefit from a different course.

Declarations for Author Completion

Add author names, affiliations, contributions, funding, conflicts of interest, and journal-specific disclosures after clinical author review. No patient-level data were collected for this narrative review.

References

- [1] Farshad M, Aichmair A, Wanivenhaus F, et al. No benefit of early versus late ambulation after incidental durotomy in lumbar spine surgery: a randomized controlled trial. *Eur Spine J.* 2020; 29: 141–146. doi:10.1007/s00586-019-06144-5.
- [2] Verma K, Freelin AH, Atkinson KA, Graham RS, Broaddus WC. Early mobilization versus bed rest for incidental durotomy: an institutional cohort study. *J Neurosurg Spine.* 2022; 37: 460–465. doi:10.3171/2022.1.SPINE211208.
- [3] Gomes FC, et al. Early ambulation versus prolonged bed rest for incidental durotomies in spine procedures: a systematic review and meta-analysis. *Neurosurg Rev.* 2023; 46: 310. doi:10.1007/s10143-023-02201-2.
- [4] Najjar E, Hassanin MA, Komaitis S, Karouni F, Quraishi N. Complications after early versus late mobilization after an incidental durotomy: a systematic review and meta-analysis. *Eur Spine J.* 2023. doi:10.1007/s00586-023-07526-6. Correction: *Eur*

Spine J. 2023; 32: 1094. doi:10.1007/s00586-023-07538-2.

- [5] Huan Z, Lei L. Does incidental durotomy affect clinical outcome in patients with lumbar degenerative diseases after posterior open lumbar interbody fusion? A multicenter observational study. *J Orthop Surg Res.* 2025; 20: 378. doi:10.1186/s13018-025-05792-2.
- [6] Toci G, Lambrechts MJ, Issa T, et al. Incidence, risk factors, and outcomes of incidental durotomy during lumbar spine decompression with or without fusion. *Asian Spine J.* 2023; 17: 647–655. doi:10.31616/asj.2022.0297.
- [7] Abboud T, Asendorf T, Evangelou P, et al. Results of a German national survey to assess early mobilization versus bed rest in the postoperative management of incidental durotomy during lumbar surgery and the need for a randomized clinical trial. *Neurosurg Focus.* 2025; 58: E14. doi:10.3171/2024.11.FOCUS24586.
- [8] Kögl N, Schenk L, Preuss-Hernandez C, Thomé C, Petr O. Bed rest after incidental durotomy in lumbar surgery: a redundant measure in case of watertight dural repair. *J Neurosurg Sci.* 2023; 67: 206–212. doi:10.23736/S0390-5616.20.05143-7.