

The Positive Impact of Adjusting Medical Pain Therapy on Radiological Sagittal Balance in a Patient with OF2 Osteoporotic Compression Fracture of T12: A Case Report

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Abstract

Protective postures caused by pain in patients with vertebral fractures, combined with associated muscular discomfort, frequently exacerbate sagittal imbalance. This misalignment adversely affects spino-pelvic biomechanics and compromises functional mobility. Timely and effective pain management plays a crucial role in mitigating these issues, restoring sagittal and spino-pelvic balance, and ultimately improving patients' quality of life. This case report highlights the significant impact of optimizing medical pain therapy in achieving these outcomes.

Keywords

Visual analogue scale (VAS); Sacral slope (SS); Pelvic incidence (PI); Pelvic tilt (PT); Lumbar lordosis (LL); Sagittal balance; Osteoporotic fracture; Pain Management.

Introduction

Protective postures caused by pain in patients with vertebral fractures, combined with associated muscular discomfort, frequently exacerbate sagittal imbalance. This misalignment adversely affects spino-pelvic biomechanics and compromises functional mobility. Timely and effective pain management plays a crucial role in mitigating these issues, restoring sagittal and spino-pelvic balance, and ultimately improving patients' quality of life. This case report highlights the significant impact of optimizing medical pain therapy in achieving these outcomes.

Case Presentation

A 77-year-old female presented with a one-week history of worsening back pain. Radiological findings revealed a spontaneous osteoporotic compression fracture at the T12 vertebra (OF2). The patient exhibited profound functional impairment characterized by severe load-dependent and movement-induced pain at the thoraco-lumbar junction, scoring 9/10 on the Visual Analogue Scale (VAS) in both lying and standing positions.

On clinical examination, the patient demonstrated considerable discomfort and postural adaptations indicative of a significant sagittal imbalance. Given her complex medical background, a conservative treatment plan focused on optimizing pain management was initiated. Intravenous (IV) analgesics were administered initially, followed by oral pain medications. Serial standing X-rays were obtained to monitor changes in sagittal balance during treatment.

Results

Following the adjustment of medical pain therapy, the patient reported a marked reduction in pain levels. The VAS score improved from 9/10 to 1/10 in the lying position (without load) and from 9/10 to 5/10 in standing and walking positions. Radiological assessments demonstrated significant improvements in sagittal balance parameters:

- **Sacral Slope (SS):** Improved from 13° at admission to 26° after two days of treatment.
- **Pelvic Incidence (PI):** Reduced slightly from 54.5° to 50°.
- **Pelvic Tilt (PT):** Decreased from 39° to 33°.
- **Lumbar Lordosis (LL, T12 to S1):** Increased from 16.5° to 33°.

A detailed summary of the sagittal balance parameters is presented in (Table 1).

Parameter	At Admission (Day 0)	After Treatment (Day 2)
Sacral Slope (SS)	13°	26°
Pelvic Incidence (PI)	54.5°	50°
Pelvic Tilt (PT)	39°	33°
Lumbar Lordosis (LL)	16.5°	33°

Table 1: Changes in Sagittal Balance Parameters Before and After Medical Pain Therapy.

These findings suggest that the pain-induced sagittal imbalance was substantially corrected with effective pain therapy, resulting in improved functional posture and spino-pelvic alignment.

Discussion

This case highlights the pivotal role of pain management in addressing sagittal imbalance caused by protective pain-induced postures in osteoporotic vertebral fractures. Pain-driven compensatory postural changes exacerbate functional impairments and lead to biomechanical misalignment. Effective pain therapy alleviates these compensatory mechanisms, facilitating the restoration of sagittal and spino-pelvic alignment.

These findings are particularly relevant in elderly patients with complex medical conditions, for whom surgical interventions may not be feasible. Conservative pain management, as demonstrated in this case, remains a vital therapeutic option in such scenarios.

Conclusion

Tailored medical pain therapy is a cornerstone of the management of osteoporotic vertebral fractures, especially in elderly patients with comorbidities. This case demonstrates that effective pain control prevents the progression of pain-induced postural adaptations, restores sagittal balance, and enhances functional outcomes. Conservative pain management should be prioritized as both a therapeutic and preventive strategy in such cases (Figure 1).

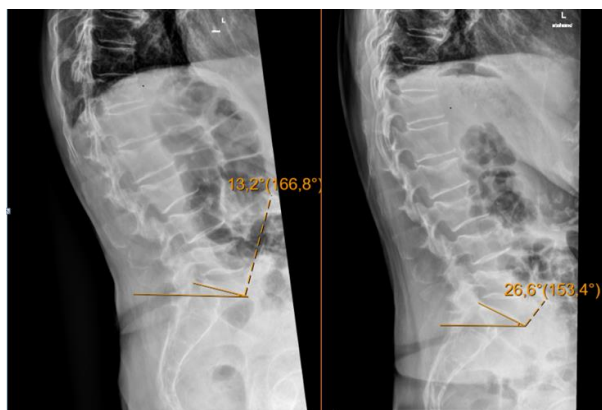


Figure 1: Standing lumbar X-Ray demonstrates the marked improvement of Sacral Slope and other pelvic Parameters , Left: prior therapy, right: after Pain therapy.

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