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Original Research Article

REHABILITATION PROGRAM FOR LOW BACK PAIN PATIENT WITH COMPRESSION FRACTURE: A CASE REPORT

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ABSTRACT

Introduction. Vertebral compression fractures (VCFs) in older adults frequently cause low back pain and functional limitations. Conservative care is the first-line option for stable fractures without neurological deficit, focusing on pain control and medical rehabilitation. **Method.** The patient underwent medical rehabilitation twice a week for eight sessions over one month, followed by six months wearing of high LSO corset. Outcomes were assessed using pain scale and functional measures at weeks 8 and 16. **Case Report.** A 61-year-old woman sustained an L1 VCF after a low-energy fall onto her buttocks. She presented with chronic low back pain and activity limitation, without neurological deficit. Initial management consisted of analgesic optimization, education on safe activity, Infrared Ray (IRR) and conventional TENS, and a graded exercise program. After eight weeks, pain had improved but persisted during moderate activities; a high LSO lumbosacral corset was then prescribed to support posture. **Result.** After undergoing medical rehabilitation for 16 weeks, the patient showed significant recovery, pain was decreased from 7/10 to a manageable level with meaningful improvement even though radiology still showed persistent fracture deformity. **Discussion.** This case demonstrates that a conservative rehabilitation approach combining infrared therapy, TENS, structured exercises, and selective bracing can effectively reduce pain and improve function in an elderly patient with traumatic lumbar compression fracture. Current evidence supports multimodal conservative management for stable vertebral compression fractures, with emphasis on exercise programs and consideration of bone fragility treatment to prevent future fractures.

Keywords: Vertebral Compression Fracture, Low Back Pain, Rehabilitation program.

INTRODUCTION

Vertebral compression fractures (VCFs) represent one of the causes of low back pain (LBP) in the elderly population, frequently associated with reduced bone quality and low-energy trauma such as falls from standing or sitting positions (Jang et al., 2022; Nau et al., 2024; Soultanis et al., 2021). In clinical practice, not all patients have confirmed osteoporosis through bone densitometry; however, advanced age and

low-energy trauma remain important risk factors. Current guidelines recommend a conservative approach as the first-line management for stable VCFs without neurological deficits, with primary components including analgesia, education, and rehabilitation or physiotherapy (Alimy et al., 2024; Jang et al., 2022; Nau et al., 2024). Various conservative strategies, including analgesics, activity modification, braces or corsets, and exercise programs, have been evaluated. Bracing may reduce pain and improve function in selected patients, although the choice of brace type and adherence to its use are important considerations (Pieroh et al., 2023; Squires et al., 2023). Electrotherapy modalities such as transcutaneous electrical nerve stimulation (TENS) have demonstrated safety evidence and short-term pain reduction effects in LBP (Johnson et al., 2022; Verville et al., 2023), while infrared therapy and photobiomodulation show potential benefits for musculoskeletal pain (Tsagkaris et al., 2022). Structured exercise programs emphasizing motor control, lumbar stabilization, and back extensor strengthening consistently improve pain and function in chronic LBP (Hayden et al., 2021; Li et al., 2024; Mueller & Niederer, 2020) and are recommended after the acute pain phase has subsided (Jang et al., 2022; Nau et al., 2024). This case report describes the implementation of a conservative rehabilitation program incorporating infrared radiation (IRR), TENS, and physical exercise in an elderly patient with L1 VCF following a fall, accompanied by the use of a high LSO corset in the later phase, and compares this approach with current evidence from the literature.

METHOD

A 61- year-old woman named Mrs. Y diagnosed of L1 compression fracture. The patient underwent clinical assessment comprising history taking, physical examination, and thoracolumbar radiography. The intervention included infrared ray (IRR) and transcutaneous electrical nerve stimulation (TENS) administered twice a week for eight sessions. Combined with a structured exercise program consisting of muscle relaxation, motor control, core muscle strengthening, and functional training. At week eight, the patient was fitted with a high LSO corset. Pain was assessed using a numerical rating scale (0-10), and functional capacity evaluation was done at weeks 8 and 16.

CASE REPORT

Mrs. Y, a 61-year-old housewife, presented with complaints of low back pain for approximately one month, which had worsened over the past seven days. The complaint began approximately two weeks after the patient fell in a sitting position while dismounting from a motorcycle. Initially, the patient did not experience pain in the spine; however, three days after the fall, low back pain gradually developed and progressively worsened. The patient did not immediately seek care at a healthcare facility but instead consumed over-the-counter analgesics and underwent massage therapy in the painful area. The pain was described as sharp, burning, and stabbing, accompanied by aching sensations in both lumbar regions, with an intensity of 7 out of 10 (0: indicating no pain and 10: indicating the worst possible pain). The pain worsened with trunk and lower limb movements and when pressure was applied to the spine. There was no radiating pain to the lower extremities or complaints of urinary or bowel dysfunction. The patient's medical history included type 2 diabetes mellitus and osteoarthritis. There was no history of similar trauma or similar conditions in the family. The patient's daily activities consisted of household chores.

On examination, the patient walked slowly and cautiously with a stooped posture when standing. Lumbar spine movement in all planes was severely limited due to pain. Motor, reflex, and sensory examinations of the lower extremities were within normal limits. Palpation of the spinous processes elicited local tenderness, with bilateral thoracolumbar paraspinal muscle stiffness. Percussion using a reflex hammer provoked pain, particularly in the T12 to L1 and L2 regions. Vital signs were within normal limits. Thoracolumbar radiographs revealed a compression fracture of the L1 vertebra without signs of severe instability. (Figure 1)

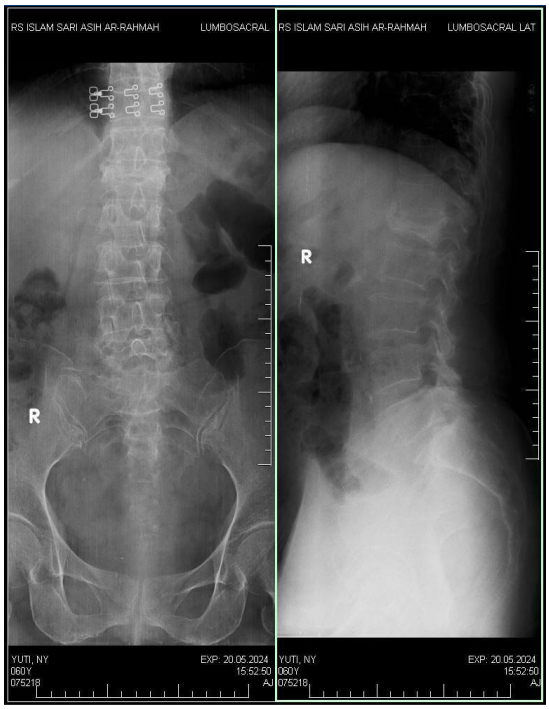

Figure 1 Early lumbosacral X-ray (before receiving medical rehabilitation program)
Source: Author Database (2025)

The working diagnosis was established as low back pain secondary to L1 compression fracture in an elderly patient with suspected age-related bone fragility. Initial management included education on maintaining an upright spinal position, avoiding excessive flexion movements, maintaining light-intensity activities, and avoiding prolonged static positions. The patient was prescribed non-steroidal analgesics according to indication and comorbidities.

As part of the medical rehabilitation program, the patient received infrared ray (IRR) and conventional TENS modalities to the lower paralumbar region twice weekly for eight sessions over one month, accompanied by structured physical exercises tailored to pain tolerance. The physical exercise program included muscle relaxation exercises, motor control and stabilization exercises, strengthening of back extensor and core muscles, and functional training such as sit-to-stand transitions and home ambulation, as detailed in Table 1 and Figures 2 to 5.

Table 1. Initial Pre-operative Laboratory Result

Physical Exercise Therapy	Dose	Frequency
Standing wall push up	8-10 repetitions x 2	3 times/week
Shoulder Flexion in supine	Hold for 10 seconds x 5 times	Everyday
Step ups	8-10 repetitions x 2	3 times/week
Seated row with dumbles	8-10 repetitions x 2	3 times/week

Figure 2 Standing wall Push up
Source: Author Database (2025)

Figure 3 Shoulder Flexion in Supine
Source: Author Database (2025)

Figure 4 Step ups - Progress to holding
Source: Author Database (2025)

Figure 5 Sited Raw with
Source: Author Database (2025)

At the week 8 evaluation, pain had decreased but still occurred during moderate to heavy activities such as repetitive sweeping and mopping. The patient was therefore advised to consult with orthopedics. The patient declined surgical intervention and was subsequently advised to use a high LSO corset as postural support for the following six months.

At the week eight, evaluation after initiating the medical rehabilitation program, the patient reported a reduction in pain intensity from seven out of ten to approximately four out of ten, with improved ability to perform light household activities, although pain persisted during moderate to heavy activities. Following the addition of the high LSO corset and continuation of exercises, at week 16 the patient reported lighter and more controlled pain, with better ability to walk, rise from a chair, and perform daily household tasks. Follow-up radiographs still demonstrated the L1 compression fracture deformity

however, clinically significant improvement in symptoms and function was observed. (Figure 6)

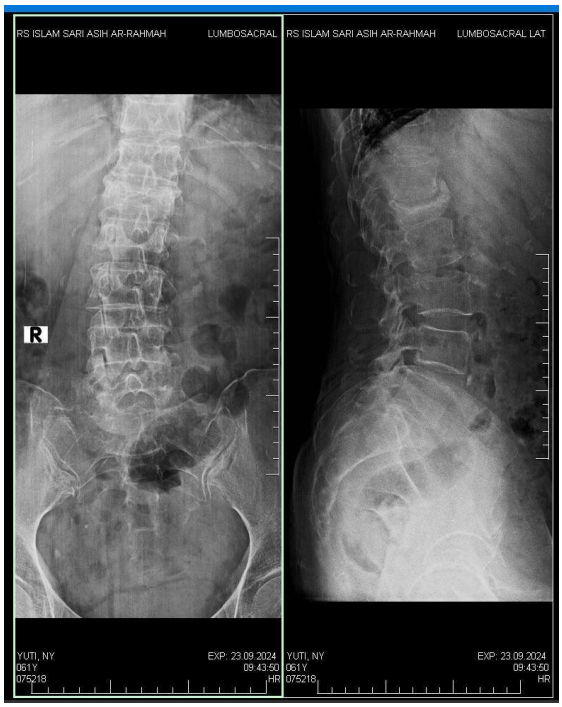

Figure 6 Lumbosacral evaluation X-ray (after receiving medical rehabilitation program) *Source: Author Database (2025)*

RESULT

The patient presented with low back pain rated 7 out of 10 on the numerical pain scal, walked cautiously with a stooped posture while standing, and spinal movement was limited. Thoracolumbar radiographs showed a compression fracture of the L1 vertebra.

At the eight-week evaluation following medical rehabilitation including infrared ray (IRR) modalities, conventional TENS, and structured physical exercises, significant clinical improvement was observed. Pain intensity decreased from 7 out of 10 to 4 out of 10. The patient reported reduced pain and improved ability to perform light household activities, although pain recurred during moderate to heavy activities. The patient declined surgical intervention and was subsequently prescribed a high LSO corset.

At the 16-week evaluation after continued medical rehabilitation and use of the high LSO corset, marked an improvement. The patient had a better walking ability, easier to get up from chair, more controlled pain, and improved performance of daily household tasks. Radiological image still showed L1 compression fracture deformity, but clinically significant improvement in symptoms and function was documented.

DISCUSSION

This case illustrates a traumatic VCF in an elderly patient managed with a conservative approach based on medical rehabilitation. In the elderly population, low-energy trauma such as falls frequently causes VCFs, with or without confirmed osteoporosis through diagnostic investigations (Jang et al., 2022; Nau et al., 2024; Soultanis et al., 2021). Current literature affirms that most stable VCFs without neurological deficits can be managed conservatively with a combination of analgesia, activity modification, braces or corsets, and rehabilitation (Alimy et al., 2024; Jang et al., 2022; Nau et al., 2024). Systematic reviews indicate that thoracolumbar bracing can reduce pain and improve function, although there is no consistent evidence distinguishing rigid from soft braces, and adherence to brace use remains an important factor (Pieroh et al., 2023; Squires et al., 2023). In this case, the initial management phase focused on education, IRR, TENS, and exercises without a corset. The high LSO corset was subsequently added when pain continued to interfere with activities, reflecting the selective use of

bracing according to patient tolerance and needs. TENS has been reported as safe and beneficial as an adjuvant modality for reducing short-term LBP (Johnson et al., 2022; Verville et al., 2023), thereby potentially assisting patients in tolerating exercise. Infrared therapy and photobiomodulation demonstrate potential for reducing musculoskeletal pain and muscle spasm (Tsagkaris et al., 2022). Cochrane reviews and meta-analyses show that exercise, particularly stabilization and core muscle strengthening exercises, effectively reduces pain and improves function in chronic LBP (Hayden et al., 2021; Li et al., 2024; Mueller & Niederer, 2020). In the context of stable VCFs, these exercises are recommended after the acute pain phase is better controlled (Jang et al., 2022; Nau et al., 2024). Although not quantitatively evaluated in this case, back extensor strengthening and education on brace or corset use are expected to help prevent further postural impairment. Furthermore, current guidelines encourage the evaluation and management of bone fragility, including anti-osteoporosis therapy and fracture liaison services, to reduce the risk of subsequent fractures (Abdildin et al., 2023; Imamudeen et al., 2022; Nau et al., 2024), which represents an important consideration for follow-up in similar patients.

CONCLUSION

This case demonstrates favorable outcomes from the administration of physical exercise therapy, TENS, and IRR in a patient with lumbar compression fracture. The effects experienced by the patient included pain reduction, improvement in joint range of motion, and decreased back spasm. Nevertheless, the administration of these modalities may have variable effects in other individuals. This case also illustrates that in compression fracture cases where structural bone healing has not yet occurred, the provision of specific modalities can reduce patient suffering, which has the effect of improving patient quality of life.

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