

Multidomain Geriatric Rehabilitation Management for Sacroiliac Joint–Related Low Back Pain in an Older Adult With Mild Frailty: A Case Report

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Abstract

Low back pain (LBP) is highly prevalent in older adults and may arise from multiple degenerative and musculoskeletal problems. Sacroiliac joint (SIJ) pathology represents an important but potentially underrecognized contributor to pain in the lower back area, particularly when pain is localized around the posterior pelvic region and is reproduced by provocative maneuvers. In older adults, frailty, reduced physical capacity, and age-related comorbidities may further influence the clinical presentation. This case describes a multidisciplinary geriatric rehabilitation approach for an older woman with SIJ-related LBP, bilateral SIJ degenerative changes, and mild frailty.

Case Description: A 74-year-old retired nurse presented with a 6-month history of LBP localized predominantly to the lower lumbar and posterior pelvic dimple region, with intermittent radiation toward the right leg. Pain was initially rated 7–8 on the pain scale and was aggravated by bending and stair climbing. Neurological examination showed normal strength and sensation, without bowel or bladder dysfunction. Lumbar radiography demonstrated grade-I L4 spondylolisthesis, lumbar spondylosis, and bilateral SIJ degenerative changes. Clinically, pain localized to the SIJ and a positive bilateral Gaenslen test supported an SIJ-related component of her LBP. Comprehensive geriatric assessment identified mild frailty (Frailty Index 0.16), slight dependence in basic activities, reduced instrumental activity, and reduced functional endurance. The patient underwent a 12-week multidomain rehabilitation program including pain management, lumbopelvic stabilization, flexibility and posture training, strengthening, aerobic conditioning, breathing exercises, education on back and pelvic mechanics, home exercise, and environmental modification. Over the rehabilitation period, pain decreased from 7–8 to 2, the Oswestry Disability Index for LBP decreased from 14 to 4, and the 2-minute walk distance increased from 90 to 118 m. Timed Up and Go testing became feasible and was completed in 11.8 seconds. Patient remained independently ambulatory and was able to resume stair climbing and household activities without significant pain.

Conclusion: This case highlights the importance of considering SIJ-related pathology in older adults presenting with posterior pelvic LBP, particularly when pain is localized to the SIJ region and provocative testing is positive. A multidomain geriatric rehabilitation approach addressing pain, lumbopelvic stability, physical capacity, frailty, and environmental factors was associated with improvement in pain, disability, mobility, and participation. In older adults with multiple degenerative findings, clinical assessment of the SIJ may help identify a potentially relevant pain generator and guide individualized rehabilitation.

Keywords: sacroiliac joint; sacroiliac joint pain; low back pain; older adult; geriatric rehabilitation; frailty; lumbopelvic stabilization.

Introduction

Low back pain (LBP) is one of the most common musculoskeletal complaints in older adults and may substantially affect mobility, independence, and participation.^{1,2} In this population, LBP frequently occurs in the context of multiple age-related degenerative findings, including lumbar spondylosis, spondylolisthesis, and degenerative changes involving the sacroiliac joints.^{1,3} The sacroiliac joint is an important component of the lumbopelvic kinetic chain and may contribute to pain localized around the lower lumbar, buttock, or posterior pelvic region.^{4,5} SIJ-related pain may be particularly relevant when symptoms are centered near the posterior superior iliac spine or pelvic dimples and are reproduced by SIJ provocative maneuvers.⁶

In older adults, degenerative changes of the SIJ may coexist with lumbar degenerative abnormalities, making clinical

localization of the dominant pain generator challenging.^{3,7} Sacroiliac joint (SIJ) pathology represents an important but potentially underrecognized contributor to lumbopelvic pain and has been estimated in a number of series to contribute to pain in 10–38% of cases of LBP8-11. In older adults, the clinical presentation may be further influenced by frailty, reduced physical capacity, and age-related comorbidities.^{7,12} Consequently, radiographic abnormalities do not necessarily identify the structure responsible for an individual's pain.^{3,8}

Rehabilitation management of older adults with LBP should extend beyond pain reduction.¹² Age-related reductions in physical activity, endurance, muscle performance, and physiological reserve may contribute to functional decline and frailty. A comprehensive geriatric assessment (CGA) is conducted to identify older people's problems and care needs. Comprehensive geriatric assessment (CGA) is a core and an essential part of the comprehensive care of the aging population. CGA uses specific tools to summarize elderly status in several domains that may influence the general health and outcomes of diseases of elderly patients, including assessment of medical, physical, psychological, mental, nutritional, cognitive, social, economic, and environmental status.¹² Therefore, an individualized rehabilitation program addressing pain, lumbopelvic mechanics, strength, flexibility, endurance, balance, and participation may be particularly relevant in this population.⁷

CASE PRESENTATION

Patient Information

A 74-year-old woman, a retired nurse, presented to a rehabilitation clinic with a 6-month history of LBP. She lived with her 65-year-old female cousin in a two-story house in Surabaya, Indonesia. Before the onset of her symptoms, she was socially active and independently performed household activities, gardening, walking, and outdoor cycling. Her estimated usual activity level was approximately 4–5 metabolic equivalents (METs). Her medical history included long-standing hypertension, previous cataract surgery, and previous trigger-finger surgery. She had worked as an operating theatre nurse for approximately 36 years, during which she frequently performed activities involving lifting instruments and prolonged standing in poor postures.

Presenting Complaint and History

The primary complaint was pain in the lower lumbar region predominantly around the posterior pelvic dimple. At presentation, the pain intensity was approximately 7–8 on the Visual Analog Scale. The pain was described as sharp and occasionally radiated toward the right lower extremity. Symptoms were aggravated by bending and climbing stairs, whereas walking on a flat surface was better tolerated. The patient denied lower-extremity weakness, paresthesia, bowel or bladder dysfunction, nocturnal pain, or worsening of symptoms with coughing or straining. She had been using NSAID as needed, which reduced the pain to approximately VAS 5-6. Despite maintaining independence in most basic activities, pain during stair climbing and other physically demanding activities reduced her participation in household and community activities. The localization of symptoms to the posterior pelvic or the SIJ region, together with the absence of objective neurological deficits, raised the possibility of an SIJ-related component of her LBP.

Comprehensive Geriatric Assessment

The Comprehensive Geriatric Assessment demonstrated mild functional vulnerability. Her Barthel Index was 95, indicating slight dependence, while her Instrumental Activities of Daily Living score was 7/8. The 40-item Frailty Index was 0.16, consistent with mild frailty. Nutritional status was preserved, with a Mini Nutritional Assessment score of 25.5. Cognitive screening showed an MMSE score of 26, with no evidence of delirium on the Confusion Assessment Method. She had no urinary or fecal incontinence. Visual impairment related to hypermetropia was corrected with glasses. Her initial fall-risk score was 6. The initial Timed Up and Go (TUG) test initially could not be completed because changing position provoked back pain. Her initial 2-minute walk test (2MWT) distance was 90 m. The EQ-5D profile was 2-1-1-3-1 with a visual analogue scale of 75%. Her initial Oswestry Disability Index (ODI) was 14, corresponding to mild disability.

Physical Examination

The patient was cooperative and independently ambulatory without assistive device. Forward-head posture was observed. Range of motion of the upper and lower extremities was preserved, and manual muscle testing demonstrated 5/5 strength throughout. Sensory examination from L2 to S1 was intact but paralumbar muscle spasm was present. Importantly, pain was primarily localized to the lower lumbar/posterior pelvic region. Neurological tension signs, including straight-leg raising and Bragard testing, were negative. Provocative test like Thomas, Patrick, pelvic compression, Ober, piriformis, Ely, and hamstring tightness were also negative. Gaenslen testing was positive bilaterally, providing clinical evidence supporting SIJ involvement. There was no clinical evidence of significant neurological compromise. Sitting balance was good in both static and dynamic conditions. The initial count test was 15, with estimated functional capacity was approximately 3.5 METs.

Diagnostic Evaluation

Lumbosacral radiography demonstrated Grade-I L4 spondylolisthesis, lumbar spondylosis and bilateral degenerative changes of the sacroiliac joints. Although the radiograph demonstrated several degenerative abnormalities, the clinical presentation was predominantly characterized by posterior pelvic or SIJ-region pain and a positive bilateral Gaenslen test. Therefore, the SIJ was considered a clinically relevant contributor to the patient's LBP, while lumbar spondylosis and grade-I L4 spondylolisthesis were considered coexisting structural abnormalities.



Picture 1. Lumbopelvic Xray Showed SIJ degenerative abnormalities

REHABILITATION ASSESSMENT

The principal rehabilitation problems founded in this patient were:

1. SIJ-related posterior pelvic and low back pain.
2. Bilateral degenerative SIJ changes.
3. Grade-I L4 spondylolisthesis and lumbar spondylosis as coexisting degenerative findings.
4. Paralumbar muscle spasm.
5. Mild frailty
6. Reduced cardiopulmonary endurance.
7. Reduced walking tolerance.
8. Reduced ability to climb stairs and perform selected household activities.
9. Risk of further deconditioning associated with pain-related activity restriction.

10. Need for education regarding lumbopelvic mechanics and safe activity.

From rehabilitation perspective, the principal impairments involved pain, reduced endurance, impaired lumbopelvic function, and reduced activity tolerance. These impairments affected activities such as stair climbing, prolonged walking, and household activities and resulted in reduced participation in previously enjoyed physical and community activities.

REHABILITATION INTERVENTION

Pain Management

Pain-modulating physical modalities were initially used to facilitate participation in therapeutic exercise. HI-TENS at 100 Hz was initially applied over the painful lower back region. After 2 session of treatment evaluation, HI-TENS was switch to interferential current therapy at 4000–4100 Hz over the paralumbar-to-gluteal region for wider area approach. Cold pack as was also applied for when localized pain was present after doing activities at home. The primary purpose of these modalities was to reduce pain sufficiently to allow active participation in the rehabilitation program.

Lumbopelvic Stabilization and Strengthening

Patient's symptoms were considered to have a significant SIJ or lumbopelvic component, therefore the exercise program emphasized maintenance of trunk and pelvic stability. The strengthening program included abdominal drawing-in exercises, partial sit-ups, straight-leg raises, isometric upper- and lower-extremity exercises, resistance exercises using therabands and water bottle lifting. The exercises were progressively incorporated into daily activities and home program setting while avoiding excessive loading and Valsalva maneuvers.

Flexibility and Postural Training

Postural correction and kinesthetic awareness were emphasized because of the patient's history of prolonged kyphotic occupational postures. The patient performed active range-of-motion exercises for the upper and lower extremities and William flexion exercises, including pelvic tilting, single-knee-to-chest exercises, and double-knee-to-chest exercises. The exercises were also performed as home program with precaution to controlled lumbopelvic movement and avoidance of excessive strain.





Picture 2. Patient was doing routine home exercise program

Aerobic Conditioning

Aerobic conditioning was introduced to address reduced cardiopulmonary endurance and the risk of deconditioning associated with pain-related activity restriction. Patient initially performed static cycling and later progressed to walking. The prescribed frequency was approximately 3–5 sessions per week. Exercise intensity was prescribed according to the patient's clinical tolerance, with an initial target corresponding to approximately 40–60% heart-rate reserve.



Picture 3. Posture correction and exercise using static cycle exercise

Additionally patient was also given education regarding to her condition included:

- appropriate posture during daily activities;
- safe bending and lifting techniques;

- Lumbo pelvic and SIJ mechanical awareness;
- Avoidance of prolonged aggravating positions;
- Home exercise adherence;
- Gradual progression of physical activity;
- Fall-prevention strategies;
- Home environmental modification;
- Continued medical follow-up for hypertension and other comorbidities; and
- Nutritional strategies for supporting healthy aging.

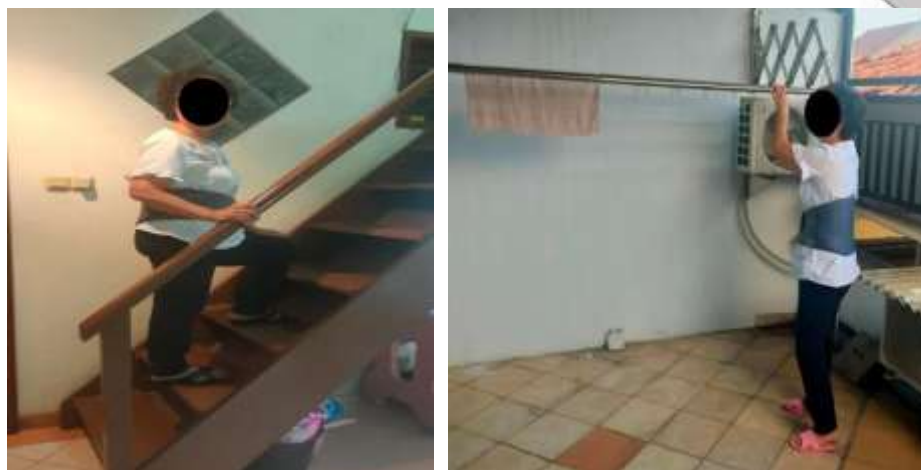
Clinical course and outcome

At the first follow-up, pain had decreased to 5 and occurred approximately twice weekly. Walking tolerance had improved, and analgesic medication was required only once when pain interfered with activity. She had begun performing the prescribed home exercises regularly. 4 weeks later, pain had decreased further to 4, with approximately two episodes per week, and she no longer required analgesic medication. By 2nd month of rehabilitation management, pain was rated 3 and no analgesic medication was required. She had begun gradually climbing stairs while wearing corset and was able to perform limited laundry-related activities upstairs.

After 12 weeks of rehabilitation program, pain had decreased to VAS 2 (tolerable pain). She was remained independently ambulatory without an assistive device and routinely performed her exercises twice daily. She used a static bicycle and was able to walk around her neighborhood without pain. Her functional capacity improved to approximately 4–4.5 METs. The TUG could be completed in 11.8 seconds, and the 2MWT increased from 90 m to 102.5 m. The Oswestry Disability Index decreased from 14 to 4. The EQ-5D visual analogue scale increased from 75% to 80%. She could climb stairs to hang laundry without experiencing pain and was able to perform one-leg standing and tandem walking. Examination demonstrated preserved ROM, 5/5 strength, intact sensation and proprioception, independent sit-to-stand transfer, and good static and dynamic standing balance. The 2MWT increased further to 118 m. The patient's frailty index remained 0.16, indicating persistent mild frailty despite functional improvement.

Table 1. Clinical and Functional Outcomes after 12 Weeks Rehabilitation Management

Outcome	Initial	Follow-up
Pain (WBS)	7–8	2
Barthel Index	95	95
IADL	7/8	7/8
Fall-risk score	6	4
TUG	Not evaluable due to pain	11.8 s
2MWT	90 m	118 m
EQ-5D VAS	75%	80%
Oswestry Disability Index	14	4
Estimated METs	~3.5	~4–4.5



Picture 4. Return to household activities painfree

DISCUSSION

This case illustrates the clinical importance of considering the SIJ as a potential contributor to LBP in older adults with multiple degenerative findings. The patient had radiographic evidence of both lumbar degenerative pathology and bilateral SIJ degeneration. However, her symptom pattern was particularly notable for pain localized to the lower lumbar/posterior pelvic dimple region, absence of objective neurological deficits, negative neural tension tests, and bilateral positivity on Gaenslen testing. These findings supported the interpretation that the SIJ represented a clinically relevant component of her pain presentation. Importantly, the presence of grade-I L4 spondylolisthesis and lumbar spondylosis on radiography did not necessarily establish these findings as the dominant pain generators.³ In older adults, structural abnormalities may be present without corresponding symptoms, and therefore clinical correlation remains essential.^{9,15}

The patient's presentation may be described as SIJ-related LBP in the setting of bilateral degenerative SIJ changes, rather than isolated lumbar spine disease.³ This distinction is clinically relevant because rehabilitation strategies can be directed toward restoring lumbopelvic control, maintaining mobility, improving trunk and lower-extremity strength, and progressively restoring functional loading.⁷ The diagnosis of SIJ-related pain in this case should nevertheless be interpreted cautiously. The positive Gaenslen test and specified pain localization provide supportive clinical evidence but do not establish a definitive etiologic diagnosis. The coexistence of lumbar spondylosis and L4 spondylolisthesis also suggests the patient's symptoms may be multifactorial.³

Conventional non-surgical therapies such as medications, physical therapy, radiofrequency denervation, and direct SI joint injections may offer limited durability of benefit.^{9,11} Surgical fixation can be done via a lateral or posterior/posterior oblique approach, with the literature supporting minimally invasive options that improve pain and function while maintaining a low adverse event profile. SIJ pain is felt to be an underdiagnosed and undertreated element of LBP.¹¹ The rehabilitation program therefore extended beyond local pain treatment with comprehensive geriatric assessment. Comprehensive Geriatric Assessment (CGA) can be carried out throughout the care of elderly patients with chronic diseases, which helps identify potential comorbidities that may affect clinical decision-making, treatment outcomes, and Quality of Life in elderly patients.¹⁰

A second important feature of this case was mild frailty, with a frailty Index of 0.¹⁶ that remained unchanged despite substantial improvement in pain and physical function. This finding illustrates that improvement in a specific musculoskeletal condition does not necessarily eliminate the broader multidimensional vulnerability associated with

frailty.¹⁵ Lumbopelvic stabilization and flexibility exercises were combined with progressive strengthening, aerobic conditioning, breathing exercises, postural education, and home-based activity. This approach allowed the patient to progress from pain-limited mobility to walking, stair climbing, household activities, and community ambulation. The improvement in 2MWT distance from 90 to 118 m, reduction in Oswestry Disability Index from 14 to 4, and reduction in pain from 7–8 to 2 suggest clinically meaningful functional improvement over the rehabilitation period.¹⁶ The ability to complete the TUG, which was initially prevented by pain, further demonstrated improved functional mobility.¹⁷ The patient's preserved independence throughout the rehabilitation course is also clinically relevant. Her Barthel Index remained 95, and her IADL remained 7/8, suggesting that rehabilitation helped prevent further functional decline while allowing recovery of selected activities that had been limited by pain.^{12,15}

From a geriatric rehabilitation perspective, this case emphasizes that the treatment target should not be the radiographic abnormality alone. Instead, rehabilitation should address the interaction among SIJ-related pain, lumbopelvic mechanics, physical capacity, frailty, activity limitation, and participation.

CLINICAL IMPLICATIONS

This case suggests several practical considerations for rehabilitation clinicians managing older adults with LBP including

1. Localize the pain clinically. Posterior pelvic or SIJ-region pain should prompt consideration of SIJ involvement, particularly when neurological findings are absent.
2. Do not equate radiographic abnormalities with the primary pain generator. Lumbar spondylosis and spondylolisthesis may coexist with SIJ pathology.
3. Use provocative testing as part of a broader clinical assessment. The positive bilateral Gaenslen test in this patient supported, but did not definitively establish, SIJ involvement.
4. Consider lumbopelvic stabilization as part of rehabilitation. Strengthening the trunk and lower extremities and improving movement control may facilitate functional recovery.
5. Screen for geriatric syndromes. Mild frailty, reduced endurance, fall risk, nutritional status, cognition, and environmental factors may influence rehabilitation outcomes.
6. Prioritize participation and independence. In this case, meaningful outcomes included the ability to climb stairs, perform laundry, walk in the neighborhood, and remain independently ambulatory.

LIMITATIONS

The major limitation of this case is the inability to definitively establish the SIJ as the sole source of pain. Furthermore, the patient had concomitant grade-I L4 spondylolisthesis and lumbar spondylosis, which may also have contributed to her symptoms. The improvement observed during rehabilitation cannot therefore be attributed to treatment of SIJ pathology alone. Finally, as a single case report, the observed improvement cannot establish treatment efficacy or generalizability to other older adults.

CONCLUSION

This case demonstrates the importance of considering sacroiliac joint–related low back pain in older adults presenting with posterior pelvic pain, particularly when symptoms are localized to the SIJ region, neurological findings are absent, and SIJ provocative testing is positive. In this patient, bilateral SIJ degenerative changes coexisted with lumbar spondylosis and grade-I L4 spondylolisthesis, highlighting the difficulty of identifying the dominant pain generator based on imaging alone.

A multidomain geriatric rehabilitation program incorporating pain management, lumbopelvic stabilization, strengthening, flexibility, aerobic conditioning, postural education, home exercise, and environmental modification was associated with improvement in pain, disability, mobility, endurance, and participation. The case supports a

person-centered and taylor made rather than purely radiographic approach to older adults with multifactorial LBP. Further studies using standardized SIJ diagnostic criteria and confirmatory diagnostic blocks are needed to better characterize SIJ-related LBP in older adults and to determine the effectiveness of targeted rehabilitation strategies.

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