

Effect of Muscle Energy Technique (MET) and Joint Mobilization on Pain and Mobility in a Patient with L4-L5 and S1 Disc Bulge with Sacroiliac Joint Pain on Abduction: A Case Report

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Abstract: Background: Low back pain associated with lumbar intervertebral disc bulge and concomitant sacroiliac SI joint dysfunction is a common musculoskeletal presentation in middle-aged and elderly adults, often producing pain, restricted lumbar mobility, and pain on hip abduction due to SI joint irritation. Case Presentation: A 62-year-old male presented with chronic low back pain radiating intermittently to the left lower limb, associated with stiffness and pain on abduction of the hip suggestive of sacroiliac joint involvement. MRI of the lumbosacral spine revealed disc desiccation with concentric disc bulge and posterocentral protrusion at the L4-5 and L5-S1 levels, along with straightening of the lumbar curvature. Intervention: The patient was managed with a structured physiotherapy protocol combining Muscle Energy Technique (MET) directed at the SI joint and associated hip musculature, along with lumbar and SI joint mobilization, core stabilization exercises, and postural correction, delivered over a defined treatment period. Results: Following the intervention, the patient demonstrated a marked reduction in pain intensity, improved lumbar range of motion, reduced pain on hip abduction, and improved functional performance in activities of daily living. Conclusion: A combined approach of MET and joint mobilization appears effective in reducing pain and improving mobility in patients with lumbar disc bulge accompanied by SI joint dysfunction, supporting its inclusion as a conservative management option before considering more invasive interventions.

Keywords: Muscle Energy Technique, Joint Mobilization, Lumbar Disc Bulge, Sacroiliac Joint Dysfunction, Low Back Pain, Case Report

1. Background

Low back pain is one of the leading causes of disability worldwide, affecting up to 60-80% of adults at some point in their lives. Lumbar disc bulge with associated sacroiliac joint dysfunction is commonly seen in the fifth to seventh decades of life, with degenerative disc changes becoming increasingly prevalent with advancing age. SI joint dysfunction is estimated to contribute to 1530% of chronic low back pain cases, frequently coexisting with lumbar spine pathology.

The lumbar intervertebral discs consist of a central nucleus pulposus surrounded by the annulus fibrosus, functioning to absorb axial load and permit spinal mobility. The sacroiliac joint is a synovial joint formed between the sacrum and the ilium, stabilized by strong anterior and posterior sacroiliac ligaments, the sacrotuberous and sacrospinous ligaments, and surrounding musculature including gluteus maximus, piriformis, and the thoracolumbar fascia. Together, the lumbar spine and SI joint form a kinetic chain that transmits load between the trunk and lower limbs.

Age-related desiccation and loss of proteoglycan content in the nucleus pulposus reduce disc height and hydration, predisposing the annulus fibrosus to bulging or protrusion. This can indent the ventral thecal sac and narrow the neural foramina, potentially irritating exiting nerve roots. Altered lumbar biomechanics and compensatory postural changes secondary to disc pathology can place abnormal shear stress across the SI joint, leading to secondary SI joint dysfunction, characterized by pain on provocative movements such as hip abduction, and by muscular guarding of the surrounding hip and pelvic musculature.

Common contributing factors include age-related degenerative disc disease, repetitive mechanical loading, poor

posture, sedentary lifestyle, occupational strain, obesity, and previous episodes of low back injury. Asymmetrical loading patterns and gait abnormalities may further predispose to concurrent SI joint dysfunction.

Chronic or intermittent low back pain is commonly reported and may be aggravated by prolonged sitting, standing, or bending. Pain may be localized over the sacroiliac (SI) joint region and can be reproduced or aggravated during hip abduction. Patients may also present with reduced lumbar range of motion, particularly during flexion and extension, along with possible referred pain into the buttock or posterior thigh. Paraspinal and gluteal muscle tightness or spasm may be present. Clinical examination may reveal positive SI joint provocation tests, such as FABER (Patrick's) test and resisted hip abduction.

Magnetic Resonance Imaging (MRI) of the lumbosacral spine is the investigation of choice to assess disc morphology, degree of bulge or herniation, thecal sac indentation, and neural foraminal narrowing. Clinical examination including SI joint provocation tests, range of motion assessment, neurological screening, and functional outcome measures (e.g., Oswestry Disability Index, Numeric Pain Rating Scale) complements imaging findings for a comprehensive diagnosis.

Management is generally conservative in the absence of red flag signs or significant neurological deficit, and includes patient education, activity modification, pharmacological pain relief, and physiotherapy interventions such as Muscle Energy Technique, joint mobilization, therapeutic exercise, core stabilization, and postural correction. Surgical intervention is reserved for cases with progressive neurological deficit or failure of conservative management.

Aim of study

To evaluate the effect of Muscle Energy Technique and joint mobilization on pain and functional mobility in a patient presenting with lumbar disc bulge and sacroiliac joint dysfunction with pain on hip abduction.

Objective of study

- To assess the pre- and post-intervention pain intensity using a standardized outcome measure.
- To assess the pre- and post-intervention lumbar range of motion and SI joint mobility.
- To evaluate the effect of MET and joint mobilization on pain reproduced during hip abduction.
- To document functional improvement in activities of daily living following the intervention.

2. Case Description

A 62-year-old male presented with a history of chronic low back pain of insidious onset, associated with intermittent stiffness and discomfort over the sacroiliac region, aggravated on abduction of the hip and on prolonged sitting or standing. The patient reported no history of trauma, fever, bowel or bladder disturbance, or significant weight loss. On examination, tenderness was noted over the paraspinal muscles and the SI joint region, with restricted lumbar range of motion in flexion and extension. Pain was reproduced on resisted hip abduction and on SI joint provocation testing. Neurological examination of the lower limbs was unremarkable, with no significant motor or sensory deficit.

MRI of the lumbosacral spine with screening of the whole spine revealed straightening of the lumbar curvature, loss of normal disc signal intensity on T2-weighted images suggestive of desiccation, and concentric disc bulge with posterocentral protrusion at the L4-5 and L5-S1 levels, indenting the ventral thecal sac and causing mild bilateral neural foraminal narrowing, with impingement over the left exiting nerve root at L5-S1. No evidence of spinal canal stenosis was noted. Screening of the cervical and dorsal spine additionally showed degenerative changes, including disc bulge at C3-4 and C5-6, mild ligamentum flavum hypertrophy in the lower dorsal spine, and endplate fatty degenerative changes at D12-L1.

Based on clinical findings and imaging correlation, the patient was diagnosed with lumbar disc bulge at L4-5 and L5-S1 with associated secondary sacroiliac joint dysfunction, and was referred for physiotherapy management.

Uniqueness of the Study

This case highlights the coexistence of multilevel lumbar disc pathology with secondary sacroiliac joint dysfunction presenting specifically as pain on hip abduction, a presentation that can be under-recognized when clinical focus is directed solely toward the lumbar disc findings on imaging. The case demonstrates that a combined, targeted conservative approach using Muscle Energy Technique alongside joint mobilization can address both the discogenic and SI joint components of the presentation simultaneously, offering a practical treatment model for similar mixed presentations in an elderly population.

Physiotherapy Management

A structured physiotherapy program was designed and delivered, incorporating the following components:

- Muscle Energy Technique (MET): Applied to the sacroiliac joint (e.g., for innominate rotation correction)



and to tight surrounding musculature including the hip flexors, piriformis, and hamstrings, using gentle isometric contraction-relaxation principles to restore joint alignment and muscle length.

- Joint Mobilization: Grade I-IV mobilization techniques applied to the lumbar spine and SI joint according to patient tolerance and irritability, aimed at reducing pain and restoring accessory joint movement.
- Core Stabilization Exercises: Progressive activation of the transversus abdominis, multifidus, and pelvic floor musculature to enhance lumbopelvic stability.
- Stretching Exercises: For tight paraspinal, gluteal, and hip musculature contributing to altered biomechanics
- Postural Correction and Ergonomic Advice: Education regarding sitting posture, lifting mechanics, and activity modification to minimize aggravating factors.
- Home Exercise Program: Prescribed to reinforce gains between sessions and promote longterm self-management.

The intervention was delivered over a structured course of physiotherapy sessions, with progression of technique intensity and exercise difficulty based on the patient's response and tolerance.

3. Result

Following completion of the intervention program, the patient reported a significant reduction in pain intensity on the Numeric Pain Rating Scale, along with subjective improvement in ease of movement. Lumbar range of motion improved across flexion, extension, and lateral flexion. Pain previously reproduced on resisted hip abduction and SI joint provocation testing was substantially reduced. The patient also reported improved tolerance for prolonged sitting and standing, along with overall improvement in performance of activities of daily living.

Parameter	Pre-Intervention	Post-Intervention
Pain (NPRS, 0-10)	7-10	2-10
Lumbar Flexion	Restricted	Improved
Pain on Hip Abduction	Present, marked	Minimal / absent
SI Joint Provocation Tests	Positive	Negative / reduced
Functional Activities (ADL)	Limited	Improved

4. Discussion

This case demonstrates the clinical benefit of combining Muscle Energy Technique with joint mobilization in a patient with concurrent lumbar disc bulge and sacroiliac joint dysfunction. MET is proposed to work through mechanisms including post-isometric relaxation, reciprocal inhibition, and correction of positional faults at the SI joint, thereby reducing muscular guarding and restoring more optimal joint mechanics. Joint mobilization is thought to modulate pain through mechanoreceptor stimulation and gate-control mechanisms, while also restoring accessory joint motion lost due to pain-related guarding and degenerative change.

The improvement in pain on hip abduction alongside improved lumbar mobility in this case supports the concept that SI joint dysfunction frequently develops secondary to altered lumbar biomechanics, and that addressing both regions together, rather than the lumbar spine in isolation, may yield more comprehensive functional outcomes. These findings are broadly consistent with existing literature

describing the benefit of manual therapy approaches, including MET and joint mobilization, in the conservative management of lumbopelvic pain of combined discogenic and SI joint origin.

5. Limitations of this Study

It include its single-subject design, which limits generalizability, and the absence of long-term follow-up to assess the durability of the reported improvements. Further controlled studies with larger sample sizes and longer follow-up periods are warranted to substantiate these findings.

6. Conclusion

In this case, a physiotherapy program combining Muscle Energy Technique and joint mobilization resulted in meaningful reduction in pain and improvement in functional mobility in a patient with lumbar disc bulge and associated sacroiliac joint dysfunction. This supports the use of a combined manual therapy approach as an effective, non-invasive treatment option in patients presenting with this mixed clinical picture, prior to consideration of more invasive management.

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