Scientia Review

Website: www.scientiafoundation.in

POPULAR SCIENCE ARTICLE

Healing Low Back Pain through Core-Focused Physiotherapy

Dr. Baisalee Saharia PT

Nemcare Super Speciality Hospital, Guwahati, Assam-781005

Email: baishalisaharia@gmail.com

Received: 20 June 2025
Revised: 30 June 2025
Accepted: 2 July 2025
Published online: 5 July 2025

Article ID: SR01002

Citation: Saharia, B. (2025) Healing Low Back Pain through Core-Focused Physiotherapy. *Scientia Review*, **1**(1), 13-16

Abstract

Low back pain (LBP) affects 60-80% of individuals globally, representing a leading cause of musculoskeletal disability and work absenteeism. Classified as acute, subacute, or chronic, LBP stems from mechanical, degenerative, postural, or psychosocial factors. While conventional treatments include medication and surgery, physiotherapy has emerged as a first-line conservative approach, offering non-pharmacological, evidence-based interventions tailored to individual needs. Mechanical causes of LBP include muscle strains, degenerative disc disease, herniated discs, spinal stenosis and spondylolisthesis, while non-mechanical causes involve inflammatory arthritis, infections, or malignancies. Risk factors such as age, sedentary lifestyle, obesity, occupational hazards, psychological stress and smoking further exacerbate susceptibility. Physiotherapy addresses these multifaceted issues through targeted goals: pain relief via manual therapy, electrotherapy and thermal modalities; mobility restoration through stretching and joint mobilization; core strengthening with motor control and stabilization exercises; functional improvement via task-specific training; and recurrence prevention through education and home exercise programs. Key interventions include structured exercise therapy (flexibility, core strengthening, aerobic conditioning), manual techniques (spinal mobilization, trigger point release) and adjunct therapies like TENS and ultrasound. Patient education on ergonomics, posture and behavioural strategies, including Cognitive Functional Therapy (CFT), plays a pivotal role in long-term management. Hydrotherapy and alternative therapies such as yoga and Pilates offer additional benefits, while a multidisciplinary approach integrates psychological and occupational support for complex cases. Physiotherapy's holistic focus on pain relief, functional restoration and prevention underscores its value in LBP management. Early intervention and expanded access to physiotherapy services can reduce reliance on invasive treatments, improve quality of life and mitigate the socioeconomic burden of LBP. By combining biomechanical and biopsychosocial strategies, physiotherapy empowers patients to achieve sustainable recovery and maintain spinal health.

Keywords: Physiotherapy, Electrotherapy, Ergonomics, Prevention and Exercise

Introduction

Low back pain (LBP) is a pervasive health issue that affects nearly 60–80% of individuals at some point in their lives (Andersson 1999). It is not only the most common cause of musculoskeletal disability worldwide but also a major reason for absenteeism from work and restricted activity. LBP can be classified as acute (<6 weeks), subacute (6-12 weeks), or chronic (>12 weeks) and may stem from mechanical, degenerative, postural, or psychosocial factors.

Conventional management of LBP includes pharmacological interventions, rest and in some cases, surgery. However, the non-pharmacological, conservative treatment offered by physiotherapy is increasingly being recognized as the most effective first-line approach, especially in cases without serious underlying pathology. Physiotherapists assess the biomechanical and functional status of the patient and develop individualized treatment

plans focusing on pain relief, mobility restoration and long-term prevention.

Causes and Risk Factors of Low Back Pain

Low back pain (LBP) is a prevalent musculoskeletal disorder affecting millions worldwide. It can arise from various anatomical structures, including muscles, ligaments, intervertebral discs, facet joints and nerves. Understanding its causes and risk factors is crucial for effective prevention and management.

Mechanical Causes

Mechanical LBP stems from structural or functional issues in the spine and surrounding tissues. Common causes include:

Muscle or ligament strain due to heavy lifting, sudden movements, or poor posture (Andersson 1999).

Degenerative disc disease, where intervertebral discs lose hydration and elasticity with age (Battie *et al.* 2007).

Herniated or bulging discs, compressing spinal nerves (Deyo and Weinstein 2001).

Spinal stenosis, a narrowing of the spinal canal leading to nerve compression (Katz *et al.* 1995).

Spondylolisthesis, a slippage of one vertebra over another (Kalichman and Hunter 2008).

Non-Mechanical Causes

Some cases of LBP are linked to systemic conditions, such as:

Inflammatory arthritis (e.g., ankylosing spondylitis) causing chronic spinal stiffness (Braun and Sieper 2007).

Infections (e.g., osteomyelitis or discitis) leading to localized pain (Berbari*et al.* 2015).

Malignancies (e.g., spinal tumors or metastases) resulting in persistent, worsening pain (Cole and Patchell 2008).

Risk Factors

Several modifiable and non-modifiable factors increase LBP susceptibility:

Age: Degenerative changes become more common after 30–40 years (Hoy *et al.* 2012).

Sedentary lifestyle: Weak core muscles and poor flexibility contribute to spinal stress (Shiri *et al.* 2010).

Obesity: Excess weight increases mechanical load on the lumbar spine (Shiri *et al.* 2010).

Occupational hazards: Jobs involving heavy lifting, prolonged sitting, or vibration exposure elevate risk (Punnett *et al.* 2005).

Psychological factors: Stress, anxiety and depression can amplify pain perception (Pincus *et al.* 2002).

Smoking: Reduces blood flow to spinal tissues, impairing healing (Goldberg *et al.* 2000).

Chronic LBP may also be associated with conditions like spinal stenosis, spondylolisthesis, or fibromyalgia.

Goals of Physiotherapy in LBP Management

Physiotherapy plays a crucial role in managing low back pain by addressing pain, improving function and preventing recurrence. The treatment goals are tailored to the individual's condition, whether acute, subacute, or chronic. Below are the key objectives of physiotherapy in LBP management, supported by evidence-based research.

Pain Relief

The primary goal is to reduce pain intensity and improve comfort. Techniques include:

Manual therapy (spinal mobilization, soft tissue massage) to decrease muscle tension and joint stiffness (Bronfort*et al.* 2010).

Electrotherapy modalities (TENS, ultrasound) to modulate pain signals (Khademi-Kalantari *et al.* 2013).

Thermal therapies (heat/cold packs) to alleviate inflammation and muscle spasms (French *et al.* 2006).

Restoration of Mobility and Flexibility

Stiffness and restricted movement are common in LBP. Physiotherapy aims to:

Improve spinal range of motion (ROM) through stretching and joint mobilization (Childs *et al.* 2008).

Enhance muscle elasticity via dynamic and static stretching (May *et al.* 2016).

Correct postural imbalances contributing to pain (O'Sullivan *et al.* 2006).

Strengthening Core and Stabilizing Muscles

Weak core muscles (transversus abdominis, multifidus) contribute to LBP. Rehabilitation focuses on:

Motor control training to reactivate deep stabilizing muscles (Hodges and Richardson 1996).

Progressive resistance exercises to build endurance in the lumbar extensors and abdominal muscles (Kumar *et al.* 2015).

Functional stabilization exercises (e.g., planks, bridges) to enhance dynamic support (Searle *et al.* 2015).

Improving Functional Ability

Physiotherapy helps patients return to daily activities by:

Task-specific training (lifting techniques, ergonomic adjustments) (Dankaerts*et al.* 2006).

Gait and balance training to prevent falls in chronic LBP patients (Mientjes and Frank 1999).

Workplace modifications for occupational LBP (Waddell and Burton 2005).

Preventing Recurrence

Long-term management involves:

Patient education on posture, body mechanics and self-management (Engers *et al.* 2008).

Home exercise programs (HEP) to maintain gains (Hayden *et al.* 2005).

Behavioral strategies (cognitive-functional therapy) to reduce fear-avoidance beliefs (Vlaeyen and Linton 2000).

Physiotherapeutic Interventions

Exercise Therapy Exercise is the cornerstone of physiotherapy for LBP.Consider offering a structured exercise programme tailored to the person.

- **Flexibility exercises** (e.g., hamstring stretches, spinal mobility routines) reduce stiffness.
- **Core strengthening** targets the transversus abdominis and multifidus muscles for spinal stability.
- **Aerobic conditioning** (e.g., walking, swimming) improves overall fitness and reduces pain sensitivity.
- **McKenzie therapy** involves extension-based exercises to centralize discogenic pain.

Manual Therapy

Hands-on techniques help to:

- Mobilize stiff spinal segments
- Reduce muscle tightness and spasms
- Improve joint range of motion

These may include spinal mobilization, manipulation, trigger point release and myofascial release.

Manipulation and mobilisation decrease pain and increase function. Manipulation however seemed to be more effective than mobilisation.

Trigger point Release - Trigger points are one contributing factor to the mysterious, painful phenomena of muscle pain. When trigger points are present, your muscles constantly pull on your joints, producing a lot of pain in the body - especially in the lower back. There are 5 main muscles that can cause lower back pain when ridden with trigger points - Quadratus Lumborum (QL), Psoas, Iliacus, Gluteus Medius and Piriformis (Shipton 2018).

Electrotherapy

Used as adjuncts to reduce pain and inflammation:

- Transcutaneous Electrical Nerve Stimulation (TENS) for pain gating
- Ultrasound therapy for deep tissue healing
- Interferential therapy (IFT) for muscle relaxation and edema control

Education and Behavioral Therapy

Patient education is crucial to demystify pain and promote movement.

- Encouraging activity continuation rather than bed rest
- Ergonomic advice for work and daily living
- Cognitive Functional Therapy (CFT) combines biomechanics and psychology to address maladaptive behaviors and beliefs about pain

Postural Training and Ergonomics

Poor posture contributes significantly to chronic LBP. Physiotherapists assess sitting, standing, lifting and sleeping postures and provide tailored corrections.

- Lumbar supports and proper workstation design
- Education on spine-neutral techniques during daily tasks
- Ergonomics:[56]
- Work environment adjustments (ergonomics) are useful in supporting an earlier return to work after LBP episodes.
- Modifications should be tailored to individual needs for effectiveness.

Hydrotherapy and Alternative Therapies

Hydrotherapy enables low-impact movement for patients with severe pain or deconditioning. Emerging evidence also supports yoga, Pilates and mindfulness-based movement therapies under physiotherapist supervision.

Multidisciplinary Approach

In complex cases, a combination of physiotherapy, psychological counselling, occupational therapy and pharmacological care may be necessary. Multidisciplinary pain clinics have shown greater efficacy in chronic LBP management.

Conclusion

Physiotherapy plays a central role in the conservative management of low back pain by addressing both the symptoms and root causes

of the condition. Through a combination of manual therapy, structured exercise, education and ergonomic guidance, physiotherapists not only relieve pain but also empower patients to regain function and prevent recurrence. Given the high global burden of LBP and its impact on individuals' quality of life and productivity, early physiotherapeutic intervention, supported by evidence-based guidelines and a biopsychosocial approach, is essential for sustainable recovery. Expanding access to physiotherapy, especially in primary healthcare settings, can significantly reduce the reliance on medications and surgical interventions.

Conflict of Interest

The author has no conflict of interest.

References

Andersson, G. B. J. (1999). "Epidemiological features of chronic low-back pain." *The Lancet*, 354(9178), 581–585.

Battie, M. C., *et al.* (2007). Lumbar disc degeneration: Epidemiology and genetic influences. Spine, 32(19), 2159-2165.

Deyo, R. A., & Weinstein, J. N. (2001). Low back pain. New England Journal of Medicine, 344(5), 363-370.

Kalichman, L., & Hunter, D. J. (2008). Diagnosis and conservative management of degenerative lumbar spondylolisthesis. European Spine Journal, 17(3), 327-335.

Katz, J. N., *et al.* (1995). Lumbar spinal stenosis. New England Journal of Medicine, 332(6), 351-357.

Berbari, E. F., *et al.* (2015). Infections of the spine. Infectious Disease Clinics, 29(4), 783-799.

Braun, J., &Sieper, J. (2007). Ankylosing spondylitis. The Lancet, 369(9570), 1379-1390.

Cole, J. S., & Patchell, R. A. (2008). Metastatic epidural spinal cord compression. The Lancet Neurology, 7(5), 459-466.

Goldberg, M. S., *et al.* (2000). The association between smoking and low back pain: A meta-analysis. American Journal of Medicine, 109(7), 536-542.

Hoy, D., *et al.* (2012). The global burden of low back pain. Best Practice & Research Clinical Rheumatology, 27(6), 769-781.

Pincus, T., *et al.* (2002). Depression and pain comorbidity. Archives of Internal Medicine, 162(20), 2433-2445.

Punnett, L., *et al.* (2005). Work-related musculoskeletal disorders: The epidemiologic evidence. American Journal of Industrial Medicine, 47(6), 495-505.

Shiri, R., *et al.* (2010). The association between obesity and low back pain: A meta-analysis. American Journal of Epidemiology, 171(2), 135-154.

Shipton, E. A. (2018). Physical therapy approaches in the treatment of low back pain. *Pain and therapy*, *7*(2), 127-137.

Bronfort, G., *et al.* (2010). Effectiveness of manual therapies: The UK evidence report. Chiropractic & Osteopathy, 18(1), 3.

Childs, J. D., *et al.* (2008). A clinical prediction rule to identify patients with low back pain most likely to benefit from spinal manipulation. Annals of Internal Medicine, 147(7), 478-491.

Dankaerts, W., *et al.* (2006). Altered patterns of superficial trunk muscle activation during sitting in nonspecific chronic low back pain patients. Spine, 31(17), 2017-2023.

Engers, A., *et al.* (2008). Individual patient education for low back pain. Cochrane Database of Systematic Reviews, 1, CD004057.

French, S. D., *et al.* (2006). Superficial heat or cold for low back pain. Cochrane Database of Systematic Reviews, 1, CD004750.

Hayden, J. A., *et al.* (2005). Exercise therapy for chronic low back pain. Cochrane Database of Systematic Reviews, 3, CD000335.

Hodges, P. W., & Richardson, C. A. (1996). Inefficient muscular stabilization of the lumbar spine associated with low back pain. Spine, 21(22), 2640-2650.

Khademi-Kalantari, K., *et al.* (2013). Effects of non-invasive electrotherapies on pain and disability in chronic LBP. Journal of Back and Musculoskeletal Rehabilitation, 26(2), 109-117.

Kumar, S., *et al.* (2015). Effectiveness of core strengthening exercises in chronic LBP. Journal of Physical Therapy Science, 27(3), 619-622.

May, S., *et al.* (2016). Stretching for low back pain. Physical Therapy Reviews, 21(3-4), 169-175.

Mientjes, M. I., & Frank, J. S. (1999). Balance in chronic low back pain patients compared to healthy people. Clinical Biomechanics, 14(1), 14-23.

O'Sullivan, P. B., *et al.* (2006). Lumbar segmental instability: Clinical presentation and specific stabilizing exercise management. Manual Therapy, 11(1), 2-12.

Searle, A., *et al.* (2015). Exercise interventions for chronic low back pain. British Journal of Sports Medicine, 49(24), 1545-1546.

Vlaeyen, J. W., & Linton, S. J. (2000). Fear-avoidance and its consequences in chronic musculoskeletal pain. Pain, 85(3), 317-332.

Waddell, G., & Burton, A. K. (2005). Concepts of rehabilitation for the management of low back pain. Best Practice & Research Clinical Rheumatology, 19(4), 655-670.