

# Hospital and Clinical Management

## Research Article

# The Impact of Low Back Pain Rehabilitation on Mental Health Improvement

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**Received Date:** 25 March 2026; **Accepted Date:** 13 April 2026; **Published Date:** 20 April 2026

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## Abstract

**Introduction:** Low Back Pain (LBP) is a prevalent musculoskeletal disorder that affects physical functioning and quality of life, often leading to anxiety, stress, and depression. Physiotherapeutic rehabilitation can reduce pain and enhance psychological well-being. **Objective:** To evaluate the impact of physiotherapeutic rehabilitation on the improvement of mental health and physical function in patients with lumbar pain.

**Materials and Methods:** The experimental study involved 30 participants divided into two groups. All subjects underwent 20 treatment sessions over 8 weeks. Assessments included pain levels, physical function, balance, neuromuscular coordination, and psychological well-being. Statistical analysis compared results before and after the intervention.

**Results:** Participants in the experimental group exhibited a reduction in pain, improvement in physical function, balance, neuromuscular coordination, and performance in daily activities, along with an increase in psychological well-being ( $p < 0.05$ ).

**Conclusions:** Physiotherapeutic rehabilitation is effective in enhancing musculoskeletal function and mental health among patients with lumbar pain, contributing to the restoration of independence and psychological well-being.

**Keywords:** Low Back Pain, physiotherapeutic rehabilitation, physical function, mental health, quality of life.

## Introduction

Low Back Pain (LBP) is one of the most common musculoskeletal problems and often negatively affects patients' ability to perform daily activities (Activities of Daily Living - ADL). The presence of pain, reduced postural control, and decreased lumbopelvic stability can impair physical function and influence individuals' quality of life.

Beyond the physical impact, chronic lumbar pain is frequently associated with psychological consequences, affecting patients' well-being and mental health. Various studies have shown that trunk stability loss is closely linked to the presence of chronic pain and limited functional movements [1,2].

Among the techniques used in rehabilitation, Proprioceptive Neuromuscular Facilitation (PNF) techniques involve proprioceptive stimulation of muscles to improve coordination and neuromuscular control. These techniques aim to enhance trunk stability, increase postural control, and help patients return to their daily activities without functional limitations [3, 4].

### Objective of the Study

The aim of this study is to evaluate the effectiveness of Proprioceptive Neuromuscular Facilitation techniques in reduc-

ing pain and improving postural control and lumbar-pelvic stability in patients with lumbar pain. Restoring normal spinal function and the ability to perform daily activities without limitations are essential factors that positively influence individuals' well-being and mental health.

## **Materials and Methods**

### **Study Type**

This experimental study was conducted over a four-month period (February 2025 – May 2025). A total of 30 individuals with Low Back Pain, accompanied by postural control and lumbar-pelvic stability disorders, who met the inclusion criteria, participated in the study. The research was carried out at a specialized physiotherapy and functional rehabilitation center in Tirana, equipped with spaces for exercise therapy and manual treatments.

Participants were randomly divided into two groups, each comprising 15 individuals: an experimental group and a control group. Their rehabilitation was conducted under standardized clinical conditions, supervised by licensed physiotherapists. Sessions were performed individually in a controlled environment to ensure patient privacy.

The experimental group underwent a structured rehabilitation program that included Proprioceptive Neuromuscular Facilitation (PNF) techniques, while the control group received standard physiotherapeutic treatment according to protocols widely used in clinical practice in Albania, without the inclusion of PNF techniques.

### **Inclusion Criteria**

The study included individuals who met the following criteria:

Presence of lumbar pain and lumbar-pelvic instability

Trunk control deficits

Adults aged 18 years and above

Willingness to participate in the rehabilitation program

All participants signed an informed consent form for the use of their medical data for research purposes, ensuring anonymity and confidentiality.

### **Exclusion Criteria**

Individuals with the following conditions were excluded from the study:

Severe neurological or orthopedic pathologies limiting active participation in treatment

Acute spinal trauma

Recent surgical interventions in the lumbar-pelvic region

Medical conditions restricting physical exercise performance

### **Physiotherapeutic Assessment**

All participants underwent a comprehensive physiotherapeutic assessment, including measurement of pain intensity, static and dynamic balance tests, neuromuscular coordination evaluation, lumbar-pelvic stability measurement, and functional performance during daily activities. Assessments

were performed at two time points: before the start of the rehabilitation program and after its completion, which consisted of 20 sessions.

### **Statistical Analysis**

Data from this study were analyzed using statistical software such as SPSS to evaluate the effectiveness of physiotherapeutic intervention in reducing pain and improving function in patients with low back pain. Paired sample t-tests were used to compare pre- and post-intervention results, while ANOVA was applied for between-group analysis.

Results are reported with statistical significance values (p), 95% confidence intervals (95% CI), and effect sizes (Cohen's d) to assess not only statistical significance but also clinical relevance of the intervention.

Confidence intervals for key parameters, such as pain intensity and physical function, did not include zero, indicating a clear and sustained effect of physiotherapeutic intervention. The effect size indicates the practical importance of the intervention:

Pain (VAS):  $d \approx 0.9$  → large effect

Physical function (ODI):  $d \approx 0.8$  → large effect

These results demonstrate that physiotherapy has not only statistical significance but also a considerable clinical impact on improving the condition of patients with low back pain. The large effects suggest that interventions such as therapeutic exercises, lumbar-pelvic stabilization, and manual techniques are highly effective.

The study has some limitations that should be considered:

Participant randomization was not fully controlled, increasing the risk of selection bias

Blinding was not used, which could influence outcome perception

External factors, such as physical activity outside the program, medication use, and social support, were not fully controlled

The sample size was relatively small, limiting the generalizability of the results

### **Intervention Protocol**

Both groups participated in approximately 20 individual treatment sessions over an 8-week period. The rehabilitation program for the experimental group included PNF techniques focused on pain reduction, trunk stabilization, and improving lumbar-pelvic control. The intervention involved functional diagonal and spiral movement patterns, manual resistance, sensory facilitation, and synchronized activation of deep and superficial stabilizer muscles of the trunk.

The control group received standard physiotherapy for core stability, including muscle strengthening exercises, gentle mobilizations, and general stabilization exercises, without the use of PNF techniques.

To evaluate the durability of the results, participants were followed up at 3 and 6 months post-intervention. Follow-up

data showed that improvements in pain, physical function, and psychological well-being were largely maintained, although a slight tendency of relapse was observed in some patients who did not continue physical activity.

**Outcome Evaluation**

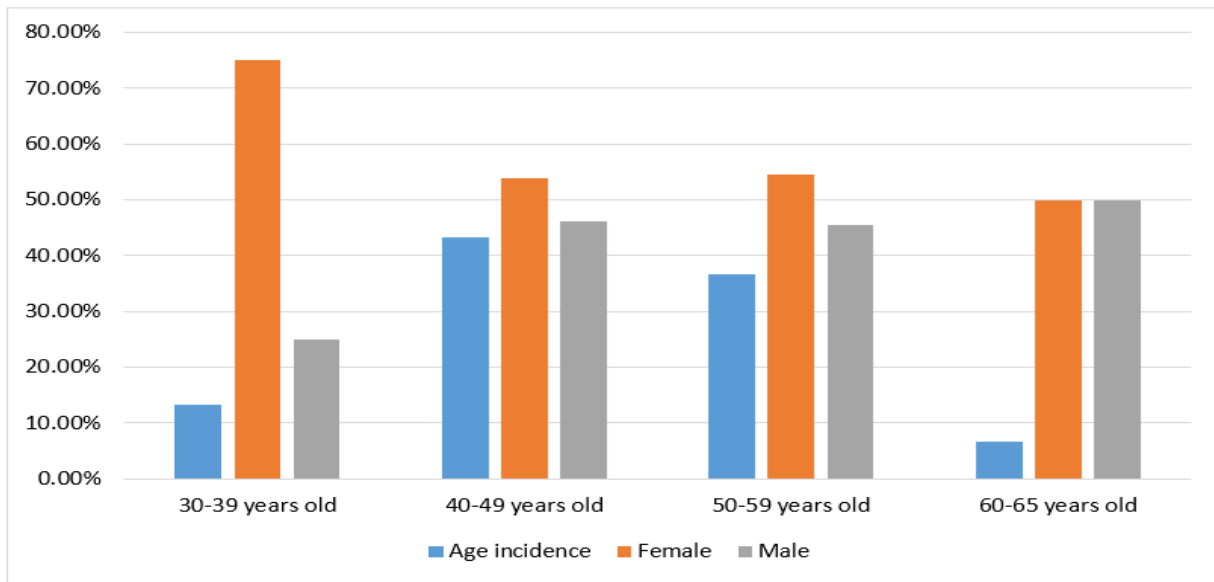
The effectiveness of the rehabilitative intervention was assessed through functional and clinical measurements at two time points: before treatment initiation (baseline) and after completing the rehabilitation cycle. The parameters evaluated included:

- Pain intensity
- Trunk stability and postural control
- Static and dynamic balance

Neuromuscular coordination  
 Functional performance during daily activities (ADL)  
 These indicators were used to analyze the impact of the rehabilitation program on improving physical function and restoring the ability to perform daily activities.

**Ethical Aspects**

All participants were informed about the study’s purpose and treatment procedures beforehand. Informed consent was obtained prior to participation. Personal and clinical data were treated confidentially and anonymously, in accordance with ethical principles of scientific research and international standards of medical research ethics.



**Graphic 1:** Incidence of Age and Gender Among Individuals Included in the Study

Analysis of pain parameters showed improvement in both groups after the rehabilitative intervention. However, the reduction in pain was achieved in a shorter period in the group subjected to PNF techniques compared to the control group. Regarding trunk stability, improvements were observed in both groups after treatment, but the results were notably better in the experimental group. In this group, a significant enhancement of lumbopelvic stability was noted, reflected in increased duration of maintaining stabilizing positions and improved postural control during functional tests.

The mean values indicated an improvement of approximately 60% compared to the baseline ( $p < 0.01$ ,  $r = 0.47$ ). In the control group, the improvement was more modest, with an average increase of about 30% ( $p < 0.05$ ,  $r = 0.29$ ).

Balance test results showed increased postural stability after treatment in both groups. However, the group applying PNF techniques demonstrated a greater reduction in postural sway and better control during functional movements. The experimental group reported a significant improvement

in both static and dynamic balance ( $p < 0.01$ ,  $r = 0.44$ ). The control group showed a moderate improvement ( $p < 0.05$ ,  $r = 0.31$ ).

Functional tests assessing coordination and activation of stabilizer muscles demonstrated improvements in motor control post-rehabilitation program. In the experimental group, better activation of deep stabilizer muscles and improved synchronization of lumbopelvic movements were observed, reflecting a significant enhancement in neuromuscular control ( $p < 0.01$ ,  $r = 0.42$ ). The control group showed more limited improvements, primarily in muscle strength, but not to the same extent in functional coordination ( $p < 0.05$ ,  $r = 0.27$ ). Assessment of function during daily activities indicated that participants in the experimental group reported a significant reduction in difficulties when performing:

- Standing for extended periods
- Bending and lifting objects
- Rotational movements of the trunk
- Walking and changing positions

Functional improvement in the experimental group was statistically significant ( $p < 0.05$ ,  $r = 0.39$ ), while in the control group, a more limited improvement was observed ( $p < 0.05$ ,  $r = 0.26$ ).

Assessed Parameter	Experimental Group (PNF)	Control Group	Comparison Between Groups
Pain	Faster reduction of pain after rehabilitative intervention	Pain reduction, but over a longer period	PNF showed a faster effect in pain management
Lumbo-pelvic trunk stability	Significant improvement in stability and postural control; ~60% improvement ( $p < 0.01$ , $r = 0.47$ )	Modest improvement in trunk stability; ~30% improvement ( $p < 0.05$ , $r = 0.29$ )	Significantly better results in the PNF group
Static and dynamic balance	Significant improvement in postural stability and reduction of sway ( $p < 0.01$ , $r = 0.44$ )	Moderate improvement in balance ( $p < 0.05$ , $r = 0.31$ )	PNF improved postural control more
Neuromuscular control & coordination	Better activation of deep stabilizer muscles; improved lumbopelvic synchronization ( $p < 0.01$ , $r = 0.42$ )	Mainly muscle strength improvement; limited functional coordination ( $p < 0.05$ , $r = 0.27$ )	Greater effect on neuromuscular control with PNF
Function during daily activities (ADL)	Noticeable improvement in standing, lifting, rotation, walking ( $p < 0.05$ , $r = 0.39$ )	More limited functional improvement ( $p < 0.05$ , $r = 0.26$ )	PNF contributed to greater functional recovery

**Table 1:** Comparison of Physiotherapeutic Assessment Parameters Between the Experimental Group and the Control Group.

The results of the study suggest that rehabilitation programs for low back pain should be based on an integrated biopsychosocial approach. In addition to traditional physiotherapeutic interventions such as therapeutic exercises and manual treatments, it is essential to include other components that address the psychological and social dimensions of the patient. Within this framework, patient education about the nature of pain and ways to manage it, the application of stress reduction techniques, and the provision of psychological support constitute fundamental elements of treatment. Such a comprehensive approach contributes to improvements in physical function while simultaneously reducing pain perception and increasing mental well-being. As a result, patients experience an overall enhancement in quality of life, highlighting the importance of integrating physical and psychological components in managing low back pain.

**The Impact of Mental Health on Low Back Pain Rehabilitation**

In this study, emphasis was placed not only on the physical effects of rehabilitation in reducing pain and improving function, but also on the crucial role of mental health. Chronic low back pain is often accompanied by psychological challenges such as anxiety, depression, and reduced self-confidence, which can worsen physical symptoms and hinder recovery.

**The Link Between Mental Health and Rehabilitation**

International research has shown that improvements in physical function and pain reduction have a positive influence on patients' psychological well-being. Through therapeutic ex-

ercises and stress management techniques, patients report decreased levels of anxiety and stress, along with increased self-confidence and motivation to continue physical activity.

**The Impact of Integrated Interventions**

A multidisciplinary approach that combines physiotherapy, psychological education, and stress management strategies has been highlighted as more effective in treating chronic pain. This approach helps reduce fear of movement, enhances patients' perception of their ability to perform daily activities, and lessens the emotional and social burden of pain.

**Study Findings**

Our findings indicate that rehabilitation programs incorporating PNF techniques provide benefits not only in physical outcomes but also in mental well-being. Improvements in psychological parameters such as reduced stress and anxiety, together with enhanced physical function, contribute to a higher quality of life and a stronger sense of control over one's health condition.

**Conclusion**

Integrating psychological components into rehabilitation programs is essential for achieving sustainable and comprehensive results in the management of low back pain. This is particularly important for patients with chronic pain, who face emotional challenges that can exacerbate their health condition.

## **Discussion**

The results of this study demonstrated that the rehabilitation program applied to patients with low back pain produced statistically significant improvements not only in pain reduction and physical function, but also in mental health outcomes, including decreased anxiety, reduced stress, and enhanced psychological well-being. These findings are consistent with international literature, which highlights the strong association between chronic low back pain and psychological status. Several studies have shown that chronic low back pain is frequently accompanied by psychological disorders such as depression, anxiety, and reduced quality of life. According to Gordon Waddell [5], low back pain should be understood within the biopsychosocial model, where biological, psychological, and social factors interact in the development and perception of pain. In this context, rehabilitation interventions that include therapeutic exercise and patient education can positively influence not only the physical component of pain but also emotional and psychological aspects.

The findings of this study are also aligned with those reported by Christopher Maher [6] and colleagues, who observed that structured therapeutic exercise programs for patients with chronic low back pain contribute to pain reduction, improved physical function, and enhanced quality of life. Similarly, a meta-analysis published by Manuela Ferreira [7] showed that rehabilitation interventions based on physical activity and patient education significantly reduce symptoms of anxiety and depression in patients with chronic spinal pain.

Improvement in physical condition is often accompanied by increased self-confidence and reduced fear of movement, a phenomenon known as kinesiophobia. Research by Steven J. Linton [8] has demonstrated that fear of movement and avoidance of physical activity are key factors contributing to the chronicity of low back pain. Rehabilitation programs that encourage gradual movement and activation of stabilizing muscles can reduce this fear and improve patients' perception of their functional abilities.

This study also observed improvements in physical function and the ability to perform daily activities. These results are consistent with findings reported by Paul Hodges [9], who demonstrated that activation and training of trunk stabilizing muscles play a crucial role in lumbopelvic stability and in reducing low back pain symptoms. Enhanced trunk stability and neuromuscular control contribute to restoring functionality and reducing limitations in daily activities.

From a biopsychosocial perspective, improvements in physical function and pain reduction can directly influence patients' psychological well-being. According to recommendations published by the World Health Organization [10], physical activity and functional rehabilitation play an important role in improving mental health and reducing symptoms of stress and anxiety in individuals with chronic pain.

Other studies have also shown that rehabilitation programs

combined with pain management education and self-management strategies may have an even greater impact on mental health. Research by Peter O'Sullivan [11] has demonstrated that therapeutic approaches combining physical rehabilitation with educational and psychological interventions can significantly reduce symptoms of anxiety and depression in patients with chronic low back pain.

Nevertheless, existing literature indicates that the effects of rehabilitation on mental health may be influenced by various factors, including pain duration, level of physical activity, psychosocial factors, and individual patient characteristics. Some studies suggest that multidisciplinary interventions involving physiotherapy, psychological education, and stress management strategies may be more effective in treating patients with chronic low back pain.

Despite the positive results reported in this study and in international literature, certain limitations must be considered. Many studies in this field are characterized by relatively small sample sizes and limited follow-up periods, which may restrict the generalizability of findings. Therefore, further research with stronger methodological designs and longer follow-up periods is needed to more comprehensively evaluate the impact of rehabilitation programs on mental health and quality of life in patients with chronic low back pain.

## **Conclusions and Recommendations**

This study shows that rehabilitation programs for patients with low back pain have a positive effect not only on pain reduction and physical function but also on mental health. Participants in the rehabilitation program demonstrated significant improvements in psychological well-being, including reduced levels of stress and anxiety, and decreased negative impact of chronic pain on daily life. These results support international findings emphasizing the close link between physical improvement and mental health enhancement in patients with chronic low back pain.

Physical rehabilitation, through therapeutic exercises and structured physical activity programs, contributes to functional recovery, increased independence in daily activities, and improved patient perception of their health status. These improvements are directly associated with greater self-confidence and psychological well-being, reducing the negative impact of chronic pain on mental health.

Based on these results, it is recommended that rehabilitation programs for patients with low back pain adopt a comprehensive approach that integrates not only physical treatment of pain but also its psychological aspects. Combining therapeutic exercise with patient education, stress management, and promotion of physical activity can contribute to overall improvements in quality of life.

It is further recommended that rehabilitation professionals,

particularly physiotherapists, take psychological factors into account when treating patients with chronic low back pain, using multidisciplinary approaches to achieve more effective outcomes. Continuous monitoring of patient progress through functional and psychological assessments can help tailor rehabilitation programs to individual needs.

To better evaluate the long-term effects of rehabilitation on mental health in patients with low back pain, future studies with larger samples and longer follow-up periods are necessary. Such studies may contribute to the development of more effective rehabilitation protocols that address both the physical and psychological dimensions of this condition.

To maximize the effectiveness of rehabilitation treatments for patients with low back pain, it is important that healthcare institutions implement integrated protocols addressing both physical and psychological aspects of the condition. Moreover, it is essential that professionals, including physiotherapists and nurses, participate in ongoing training to improve their skills in applying new multidisciplinary approaches. Patient education on the importance of active participation and stress management can further enhance the benefits of rehabilitation efforts and help prevent recurrence of pain.

## References

1. Hodges, Paul W., and C. A. Richardson. "Feedforward contraction of transversus abdominis is not influenced by the direction of arm movement." *Experimental brain research* 114, no. 2 (1997): 362-370.
2. Akuthota, Venu, Andrea Ferreiro, Tamara Moore, and Michael Fredericson. "Core stability exercise principles." *Current sports medicine reports* 7, no. 1 (2008): 39-44.
3. Sharman, Melanie J., Andrew G. Cresswell, and Stephan Riek. "Proprioceptive neuromuscular facilitation stretching: mechanisms and clinical implications." *Sports medicine* 36, no. 11 (2006): 929-939.
4. Yoo, Y. D., & Lee, Y. S. (2012). Comparison of sling exercise and floor exercise on pain and muscle strengthening in patients with non-specific chronic low back pain. Proceedings of the RSU International Research Conference
5. Waddell, Gordon. *The back pain revolution*. Elsevier Health Sciences, 2004.
6. Maher, Chris, Martin Underwood, and Rachelle Buchbinder. "Non-specific low back pain." *The Lancet* 389, no. 10070 (2017): 736-747.
7. Wicksell, R. K., M. Kemani, K. Jensen, E. Kosek, D. Kadetoff, K. Sorjonen, M. Ingvar, and G. L. Olsson. "Acceptance and commitment therapy for fibromyalgia: a randomized controlled trial." *European journal of pain* 17, no. 4 (2013): 599-611.
8. Linton, Steven J. "A review of psychological risk factors in back and neck pain." *Spine* 25, no. 9 (2000): 1148-1156.
9. Hodges, Paul W., and Carolyn A. Richardson. "Inefficient muscular stabilization of the lumbar spine associated with low back pain: a motor control evaluation of transversus abdominis." *Spine* 21, no. 22 (1996): 2640-2650.
10. World Health Organization. (2019). Guidelines on physical activity, sedentary behaviour and health. Geneva, Switzerland: *World Health Organization*. <https://www.who.int/publications/item/9789240015128>
11. O'sullivan, Peter. "It's time for change with the management of non-specific chronic low back pain." *British journal of sports medicine* 46, no. 4 (2012): 224-227.
12. Boob, Manali A., Rakesh K. Kovala, and Rakesh K. Kovala Sr. "Effectiveness of pelvic proprioceptive neuromuscular facilitation techniques on balance and gait parameters in chronic stroke patients: a randomized clinical trial." *Cureus* 14, no. 10 (2022).
13. Nguyen, Phan The, Li-Wei Chou, and Yueh-Ling Hsieh. "Proprioceptive neuromuscular facilitation-based physical therapy on the improvement of balance and gait in patients with chronic stroke: A systematic review and meta-analysis." *Life* 12, no. 6 (2022): 882.
14. Sharma, Vishal, and Jaskirat Kaur. "Effect of core strengthening with pelvic proprioceptive neuromuscular facilitation on trunk, balance, gait, and function in chronic stroke." *Journal of exercise rehabilitation* 13, no. 2 (2017): 200.
15. Gao, Pincao, Fang Tang, Weiguo Liu, and Yu Mo. "The effects of proprioceptive neuromuscular facilitation in treating chronic low back pain: A systematic review and meta-analysis." *Journal of back and musculoskeletal rehabilitation* 35, no. 1 (2022): 21-33.