

# Mechanisms of manual therapy in alleviating lower back pain: a comprehensive review.

Noriyo kanno\*

Department of Occupational Therapy, Eastern Kentucky University ,Richmond, , United States.

## Introduction

Lower back pain (LBP) is a prevalent condition affecting millions worldwide, significantly impacting quality of life and economic productivity. Manual therapy, a hands-on approach involving techniques such as spinal manipulation and mobilization, has gained prominence in the management of LBP. This article reviews the mechanisms through which manual therapy alleviates lower back pain, drawing on recent research and clinical findings [1].

Lower back pain can arise from various causes, including muscle strain, disc herniation, and degenerative conditions. The complexity of LBP is often attributed to its multifactorial nature, involving musculoskeletal, neurological, and psychosocial components. Manual therapy aims to address these components by improving musculoskeletal function and reducing pain [2].

Manual therapy affects the central nervous system's processing of pain through several mechanisms. One key mechanism is the gate control theory of pain, which posits that manual therapy can activate large-diameter afferent fibers, which inhibit the transmission of pain signals through small-diameter fibers. Studies have shown that spinal manipulation can alter pain perception and reduce the intensity of pain through central and peripheral mechanisms [3].

Restricted spinal mobility is a common feature of lower back pain. Manual therapy techniques, such as spinal manipulation and mobilization, aim to restore normal range of motion by increasing joint play and reducing stiffness. Improved spinal mobility can help alleviate pain and enhance functional outcomes. Research has demonstrated that spinal manipulation can improve lumbar spine range of motion and decrease pain-related disability [4].

Muscle spasm and increased muscle tone often accompany lower back pain. Manual therapy techniques, including soft tissue manipulation and myofascial release, help reduce muscle spasm and tension. By applying pressure to specific muscle groups and fascia, manual therapy can promote relaxation and reduce pain. Evidence suggests that manual therapy can effectively decrease muscle spasm and improve muscle function in patients with LBP [5].

Altered spinal biomechanics can contribute to lower back pain. Manual therapy aims to restore normal spinal

biomechanics by addressing misalignments and dysfunctional movement patterns. Techniques such as joint mobilization and manipulation can realign vertebrae and improve joint mechanics. Studies have shown that manual therapy can enhance spinal function and reduce pain by correcting biomechanical abnormalities [6].

Manual therapy can stimulate the release of endogenous pain-relieving substances, such as endorphins and enkephalins. These natural opioids act on the central nervous system to reduce pain perception. Research has indicated that spinal manipulation and mobilization can increase endorphin levels and promote analgesia, contributing to pain relief [7].

Improved blood flow and tissue healing are critical for managing lower back pain. Manual therapy techniques, such as massage and mobilization, enhance circulation to the affected tissues, facilitating nutrient delivery and waste removal. This increased blood flow can accelerate tissue repair and reduce inflammation. Evidence supports that manual therapy can improve circulation and support the healing process in patients with LBP [8].

Numerous studies and clinical guidelines support the efficacy of manual therapy in treating lower back pain. The American College of Physicians and the American Pain Society recommend spinal manipulation as a treatment option for acute and chronic LBP (13). Clinical trials have demonstrated that manual therapy, particularly spinal manipulation, can provide significant pain relief and functional improvement in patients with LBP [9].

Despite its benefits, manual therapy is not without challenges. Variability in technique application, patient response, and practitioner skill can affect outcomes. Additionally, manual therapy should be integrated with other treatment modalities, such as exercise therapy and patient education, for optimal results. Clinicians must carefully assess patient conditions and tailor manual therapy interventions accordingly [10].

## Conclusion

Manual therapy offers a multifaceted approach to alleviating lower back pain through mechanisms such as pain modulation, spinal mobility improvement, muscle spasm reduction, biomechanical restoration, and activation of endogenous pain relief systems. While evidence supports its efficacy, manual

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\*Correspondence to: Noriyo kanno, Department of Occupational Therapy, Eastern Kentucky University, Richmond, United States. E-mail: Kannoriyo@outlook.com

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therapy should be part of a comprehensive treatment plan that addresses individual patient needs. Ongoing research and clinical practice will continue to refine the application and understanding of manual therapy in managing lower back pain.

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