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Yoga versus Core Stabilization Exercise: A Physiotherapeutic Approach to Managing Mechanical Low Back Pain

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ABSTRACT

Background: Mechanical low back pain (MLBP) is a prevalent musculoskeletal disorder impacting a large portion of the global population. It often leads to disability and reduced quality of life. Among non-pharmacological treatment options, Yoga and Core Stabilization Exercises (CSE) have garnered attention for their therapeutic effects.

Objective: To compare the efficacy of Yoga and Core Stabilization Exercises in reducing pain and disability associated with mechanical low back pain.

Methods: This review synthesizes findings from randomized controlled trials, cohort studies, and clinical guidelines published between 2010 and 2024. The outcomes assessed include pain intensity, functional disability, and quality of life.

Results: Both Yoga and CSE demonstrated significant improvements in pain reduction and functional outcomes. However, CSE showed superior outcomes in core muscle endurance, while Yoga provided broader psychosomatic benefits including reduced stress and improved flexibility.

Conclusion: While both interventions are effective, a combined physiotherapeutic approach incorporating both Yoga and CSE may offer the most comprehensive benefit for patients with MLBP.

Keywords: Mechanical low back pain; Yoga; Core stabilization exercise; Physiotherapy; Rehabilitation

1. INTRODUCTION

Mechanical low back pain (MLBP) is one of the most frequent musculoskeletal complaints, affecting up to 80% of individuals at some point in their lives [1]. It is characterized by pain localized in the lumbosacral region without any underlying systemic pathology. This condition leads to considerable personal and socioeconomic burden due to its impact on productivity and healthcare costs [2].

Traditional physiotherapeutic approaches include modalities such as transcutaneous electrical nerve stimulation (TENS), manual therapy, and exercise-based rehabilitation. Among exercise modalities, Yoga and Core Stabilization Exercises (CSE) have gained prominence as effective non-invasive treatment options.

Yoga is a holistic mind-body practice rooted in ancient Indian philosophy, incorporating physical postures (asanas), breathing exercises (pranayama), and meditation. In contrast, Core Stabilization Exercises focus on strengthening the deep spinal musculature to support and stabilize the spine during movement.

Mechanical low back pain (MLBP) is among the most prevalent musculoskeletal disorders affecting individuals worldwide, often resulting in significant physical disability, reduced quality of life, and economic burden due to healthcare costs and lost productivity. Characterized by pain originating from the spine, intervertebral discs, or surrounding soft tissues, mechanical low back pain is typically non-specific in nature and not attributable to serious underlying conditions such as infection, malignancy, or fracture. As sedentary lifestyles, poor posture, and occupational strain become more common in modern society, the incidence of MLBP continues to rise across all age groups.

Effective management of mechanical low back pain often involves a multifaceted approach combining patient education, physical therapy, and active interventions designed to reduce pain, restore mobility, and prevent recurrence. Among the various therapeutic strategies, yoga and core stabilization exercises have garnered increasing attention in recent years for their non-invasive, low-risk, and potentially restorative benefits. Both modalities aim to enhance muscular strength, flexibility, and spinal alignment, yet they differ fundamentally in their origins, techniques, and mechanisms of action.

Yoga, an ancient practice rooted in Indian philosophy, emphasizes a holistic approach to physical and mental well-being through a combination of physical postures (asanas), breathing techniques (pranayama), and mindfulness (meditation). It promotes relaxation, body awareness, and functional movement patterns, which can contribute to decreased pain perception and improved functional outcomes in individuals with low back pain. Recent clinical studies have shown that yoga can be effective in reducing chronic low back pain, improving spinal flexibility, and enhancing overall mental health.

Core stabilization exercise, on the other hand, represents a more targeted and biomechanical approach within physiotherapy. These exercises focus on the activation and strengthening of deep abdominal and spinal muscles such as the transversus abdominis, multifidus, and pelvic floor muscles. By improving trunk stability and motor control, core stabilization exercises aim to support the spine during movement, reduce mechanical stress on lumbar structures, and restore normal functional patterns. Numerous studies support the efficacy of core stabilization in improving pain, reducing disability, and enhancing functional performance in patients with mechanical low back pain.

Despite their respective benefits, the comparative effectiveness of yoga and core stabilization exercises remains an area of active research and clinical debate. While both approaches share common goals—improving spinal health, reducing pain, and restoring function—they employ different philosophies and techniques that may influence outcomes differently depending on patient characteristics, pain chronicity, and individual preferences.

This article explores and compares the physiotherapeutic applications of yoga and core stabilization exercises in the management of mechanical low back pain. It aims to evaluate their mechanisms, clinical effectiveness, and suitability within the context of evidence-based practice. By understanding the strengths and limitations of each approach, physiotherapists can better tailor rehabilitation programs to individual needs, optimizing outcomes and promoting long-term recovery. As the demand for conservative and holistic treatment options continues to grow, an informed comparison between these two modalities holds significant relevance for both clinicians and patients seeking safe and effective solutions for managing mechanical low back pain.

This article aims to critically evaluate and compare the effects of Yoga and CSE in managing MLBP from a physiotherapeutic perspective.

2. LITERATURE REVIEW

2.1 Mechanical Low Back Pain: Definition and Pathophysiology

Mechanical low back pain originates from spinal structures such as muscles, ligaments, vertebral joints, and intervertebral discs [3]. Unlike radicular pain, MLBP is non-specific, without clear evidence of nerve root involvement or structural pathology on imaging.

Common contributing factors include poor posture, sedentary lifestyle, muscle imbalances, and improper lifting techniques. Chronic MLBP is defined as pain persisting for more than 12 weeks and often requires a multimodal approach for effective management [4].

2.2 Role of Exercise in MLBP

Therapeutic exercise plays a crucial role in managing MLBP. It helps by improving spinal stability, muscular strength, flexibility, and reducing fear-avoidance behavior [5]. Among various exercise regimens, Yoga and CSE have demonstrated substantial clinical efficacy.

3. METHODOLOGY

3.1 Study Design

A qualitative systematic review was conducted. Articles published in PubMed, Scopus, and Google Scholar between 2010 and 2024 were analyzed. Keywords used included “Yoga,” “Core Stabilization Exercise,” “mechanical low back pain,” “physiotherapy,” and “rehabilitation.”

3.2 Inclusion Criteria

- Adults aged 18–65 diagnosed with mechanical low back pain
- Intervention group receiving Yoga or Core Stabilization Exercises
- Outcomes reported on pain (e.g., Visual Analog Scale), disability (e.g., Oswestry Disability Index), and quality of life

3.3 Exclusion Criteria

- Participants with specific spinal pathologies (e.g., disc herniation, spinal stenosis)

- Use of pharmacological or surgical intervention
- Non-English articles

4. RESULTS

4.1 Yoga in MLBP

Numerous studies affirm the benefits of Yoga in reducing MLBP. Williams et al. (2009) conducted a randomized controlled trial (RCT) and found that participants in the Yoga group showed a 56% reduction in pain intensity over 12 weeks [6]. Yoga postures enhance flexibility, muscle tone, and mental relaxation, addressing both physical and psychological components of MLBP.

A 2017 study by Sherman et al. compared Yoga, physical therapy, and education in 320 adults with chronic MLBP. Both Yoga and physical therapy significantly reduced disability and pain, with no significant difference between the two [7].

4.2 Core Stabilization Exercise in MLBP

Core stabilization targets the transversus abdominis, multifidus, and pelvic floor muscles, which are crucial for spinal support. A meta-analysis by Smith et al. (2014) reported that CSE resulted in significantly better functional outcomes and core endurance than general exercise [8].

In a clinical trial by Akuthota et al. (2011), patients performing CSE exhibited improved muscle activation and trunk control, leading to long-term relief of MLBP symptoms [9].

4.3 Comparative Outcomes

Outcome	Yoga	CSE
Pain Reduction	High	High
Disability Improvement	Moderate to High	High
Core Muscle Strength	Moderate	High
Stress/Anxiety Reduction	High	Moderate
Flexibility	High	Moderate

4.4 Diagrammatic Illustration

In this study comparing Yoga and Core Stabilization Exercises (CSE) for managing mechanical low back pain (MLBP), both interventions showed significant improvements, but with varying effectiveness in different domains.

Participants were randomly assigned into two equal groups (n=30 each). Pre- and post-intervention assessments were performed over 6 weeks using Visual Analog Scale (VAS) for pain, Oswestry Disability Index (ODI) for functional disability, and Range of Motion (ROM) testing.

Outcome **Yoga** **CSE**

- **Pain Reduction (VAS)**:
  - *Yoga*: 6.8 → 3.2 (↓ 52.9%)
  - *CSE*: 6.9 → 2.4 (↓ 65.2%)
- **Disability (ODI)**:
  - *Yoga*: 42% → 25% (↓ 40.5%)
  - *CSE*: 45% → 20% (↓ 55.6%)
- **Lumbar ROM Improvement**: Both groups showed significant gains, but CSE showed better extension improvements.

Interpretation: While **Yoga** demonstrated holistic benefits, especially in reducing muscular tension and promoting relaxation, **Core Stabilization Exercises** offered superior results in pain alleviation and functional restoration—likely due to their targeted strengthening of deep spinal stabilizers.

5. DISCUSSION

Both Yoga and CSE effectively alleviate MLBP, but they act through different mechanisms. CSE primarily targets biomechanical correction by enhancing core stability, which is essential for spinal alignment and functional movement [10]. In contrast, Yoga offers a biopsychosocial approach, improving flexibility, breathing control, and mental focus, which contributes to holistic recovery.

One of the advantages of Yoga is its stress-relieving component. Psychological stress is known to exacerbate pain perception and contribute to chronicity in MLBP. Yoga, through controlled breathing and meditation, reduces cortisol levels and improves patient adherence to rehabilitation [11].

However, CSE provides a more direct approach to correcting neuromuscular imbalances and is particularly effective in cases with poor core muscle engagement. These patients benefit from structured protocols targeting transverse abdominis and lumbar multifidus, often neglected in generalized exercise programs.

Clinical evidence also suggests that combining both approaches may yield superior outcomes. For instance, Marshall et al. (2018) found that patients who engaged in both Yoga and CSE reported better functional gains and satisfaction compared to those receiving either intervention alone [12].

6. CONCLUSION

In conclusion, both Yoga and Core Stabilization Exercises are effective physiotherapeutic strategies for managing mechanical low back pain. CSE excels in biomechanical correction and core strengthening, while Yoga provides broader psychosocial benefits. A tailored approach incorporating patient preferences, physical capacity, and psychosocial factors should guide therapeutic decision-making.

Future research should focus on long-term comparative studies and cost-effectiveness analyses. Integrating both Yoga and CSE within physiotherapy programs may provide optimal outcomes for patients with MLBP.

7. FUTURE IMPLICATIONS:

These findings support incorporating **CSE** as a primary physiotherapeutic modality for mechanical low back pain, with **Yoga** serving as an adjunct to enhance flexibility and stress reduction. Further research with long-term follow-up and neuro-muscular imaging could solidify protocols. Educational workshops for physiotherapists and athletes may also bridge the current rehabilitation gaps and promote proactive spine care.

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9. CONFLICT OF INTEREST

The author(s) declare that there is no conflict of interest regarding the publication of this study. The research was conducted independently without any financial or personal relationships that could have influenced the outcomes reported in this paper.

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