



ORIGINAL ARTICLE

RESTORING BALANCE: PHYSIOTHERAPY TECHNIQUES TO SUPPORT INDIVIDUALS WITH POST-TRAUMATIC STRESS DISORDER (PTSD)

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ABSTRACT

Background: This research explores the role of physiotherapy in supporting individuals with Post-Traumatic Stress Disorder (PTSD), emphasizing the integration of physical and psychological rehabilitation techniques to restore balance. PTSD significantly impacts mental and physical health, necessitating holistic approaches for effective management. This study systematically reviews 50 peer-reviewed articles to assess the potential of physiotherapy in alleviating PTSD symptoms, improve quality of life, and promote recovery.

Objectives: The primary goal of this study is to analyze the effectiveness of various physiotherapy techniques in managing PTSD in individuals, with a focus on stress reduction, physical rehabilitation, and cognitive healing. It investigates how the physical interventions can support to mental health, enhance emotional regulation, and reduce PTSD symptoms through targeted exercises, manual therapies, and relaxation techniques.

Materials and Methods: A comprehensive review of literature was conducted by using a selection of 50 articles published between 2000 and 2024. Databases such as PubMed, Scopus, and Google Scholar were used to identify studies involving individuals with PTSD, physical therapy interventions, and related outcomes. The articles were categorized based on the physiotherapy techniques they examined, including manual therapy, aerobic exercises, yoga, and mindfulness-based practices. A meta-analysis was performed to assess the pooled effectiveness of these interventions on PTSD symptoms.

Results: Physiotherapy interventions, such as aerobic exercises, have shown positive effects on both mental and physical well-being, reducing symptoms of anxiety, depression, and hyperarousal in individuals with PTSD. Yoga and mindfulness practices have been identified as beneficial in improving emotional regulation and reducing stress. Manual therapies, including massage and myofascial release, were found to alleviate muscle tension and promote relaxation, contributing to symptom relief.

The result of this study highlights the importance of incorporating physiotherapy approach and treatment as part of a multidisciplinary approach to PTSD management. These techniques provide individuals with coping mechanisms, improve sleep patterns, and enhance emotional resilience. However, variability in individual responses to interventions underscores the need for personalized treatment plans.

Conclusions: Combining endodontic treatment with apical surgery for managing large periapical cysts demonstrated superior clinical and radiographic outcomes, reduced recurrence, and higher patient satisfaction compared to endodontic treatment alone. This dual approach may be considered more effective for complex cases involving large cystic lesions.

Keywords: PTSD, physiotherapy, rehabilitation, manual therapy, exercise, yoga, mindfulness, mental health, stress reduction, holistic treatment, recovery, meta-analysis.

The Post-Traumatic Stress Disorder (PTSD) remains a critical mental health issue of any individuals, affecting their daily functioning, emotional well-being, and the overall quality of life. Originating from exposure to traumatic events during the service of an individual or past life, PTSD manifests in various forms, including flashbacks, nightmares, anxiety, hypervigilance, and emotional detachment¹. Traditional treatments of PTSD primarily focus on the psychotherapy and pharmacological interventions. However, now a days recent development in integrative medicine suggest that the physiotherapy can play a pivotal role in enhancing the mental health outcomes, particularly by restoring the mind-body connection².

Physiotherapy is often perceived as a purely physical rehabilitation protocol however; its benefits extend beyond musculoskeletal and physical recovery. Movement-based therapies, manual interventions, and mind-body practices have demonstrated the potential to alleviate psychological stress and enhance the emotional regulation³. This this type of changes calls for an in depth of examination, how physiotherapy can be tailored to address the complex interplay between the overall physical and psychological symptoms of PTSD^{4,5}.

This study explores the efficacy of the physiotherapy in supporting individuals diagnosed with PTSD. By evaluating the evidence from 50 peer-reviewed studies, the research evaluates various techniques such as aerobic exercise, manual therapy, yoga, and mindfulness. The study aims to establish physiotherapy as a complementary and integrative strategy in PTSD management, offering individuals a holistic path toward recovery.

The Burden of PTSD in Veterans

The prevalence of PTSD among veterans is significantly higher than in the general population. According to U.S. Department of Veterans Affairs, about 11–20% of veterans who was served in Operations Iraqi Freedom and Enduring Freedom have PTSD in a given year. The complex symptomatology of PTSD not only disrupts the emotional stability but also contributes to physical ailments, including chronic pain, sleep disturbances, and fatigue, leading to a reduced quality of life [6].

Traditional Treatments and Their Limitations

Standard PTSD treatment modalities that include

cognitive behavioural therapy (CBT), eye movement desensitization and reprocessing (EMDR), prolonged exposure the therapy and medication such as selective serotonin reuptake inhibitors (SSRIs). While these approaches are effective for some, they are not universally successful, and many individuals discontinue treatment due to side effects or the stigma associated with the mental health care. This has prompted the exploration of complementary therapies that provide non-invasive, holistic options⁷.

Physiotherapy: A Bridge Between Physical and Mental Health

Emerging evidence shows that the role of physiotherapy as a therapeutic option for individuals suffering from PTSD. The physical activity has been shown to reduce anxiety, improve sleep, and enhance mood by modulating neurochemical and hormonal levels. Manual therapies, such as massage and myofascial release, help reduce muscle tension and promote relaxation. Yoga and mindfulness, often integrated into physiotherapy sessions, contribute to emotional regulation and stress reduction through breathing exercises and meditative practices⁸.

Evidence-Based Physiotherapy Techniques

1. **Aerobic Exercise:** Regular aerobic activity has demonstrated improvements in mood, cognitive function, and cardiovascular health. In PTSD patients, aerobic exercise helps mitigate symptoms of hyperarousal and depressive episodes.
2. **Manual Therapy:** Techniques such as deep tissue manipulation, myofascial release, and joint mobilizations reduce musculoskeletal pain and provide calming sensory input.
3. **Yoga and Mindfulness:** These practices enhance body awareness, reduce stress hormones, and foster a sense of inner peace. Yoga, in particular, has shown positive outcomes in individuals with complex trauma histories.
4. **Breathing and Relaxation Techniques:** Controlled breathing and progressive muscle relaxation (PMR) are effective in reducing autonomic hyperactivity and promoting parasympathetic dominance.

The literature supports a multidisciplinary approach wherein physiotherapy complements psychological care, leading to more comprehensive and sustainable recovery outcomes⁹.

MATERIALS AND METHODS

Research Design

This study employed a systematic literature review and meta-analysis methodology to assess the impact of physiotherapy techniques on PTSD symptoms among individuals. The review focused on clinical trials, longitudinal studies, and observational studies.

Data Sources and Search Strategy

Research articles and published studies were taken from PubMed, Scopus, and Google Scholar using the following keywords: "PTSD," "physiotherapy," "rehabilitation," "exercise therapy," "yoga," "manual therapy," and "mindfulness." Articles were included which are published between 2000 and 2024, were peer-reviewed, and involved adult individuals who diagnosed with PTSD.

Inclusion and Exclusion Criteria

Inclusion:

Studies involving individuals diagnosed with PTSD, Interventions involving physiotherapy techniques, Outcomes reported on psychological or physical health metrics, key words taken in the article searches are PTSD, physiotherapy, rehabilitation, manual therapy, exercise, yoga, mindfulness, mental health, stress reduction, holistic treatment, recovery, meta-analysis etc.

Exclusion

Studies not involving PTSD, Non-English publications, Interventions not conducted by certified physiotherapists or equivalent, Data Extraction and Categorization. Fifty eligible studies were extracted and categorized based on the type of intervention: aerobic exercise, manual therapy, yoga, or mindfulness practices. Each category was evaluated for its methodological quality using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines.

Meta-Analysis

A meta-analysis was conducted using pooled effect sizes to determine overall efficacy of physiotherapy interventions on PTSD symptom reduction. Standardized mean differences (SMD) and confidence intervals (CI) were calculated to compare intervention effects.

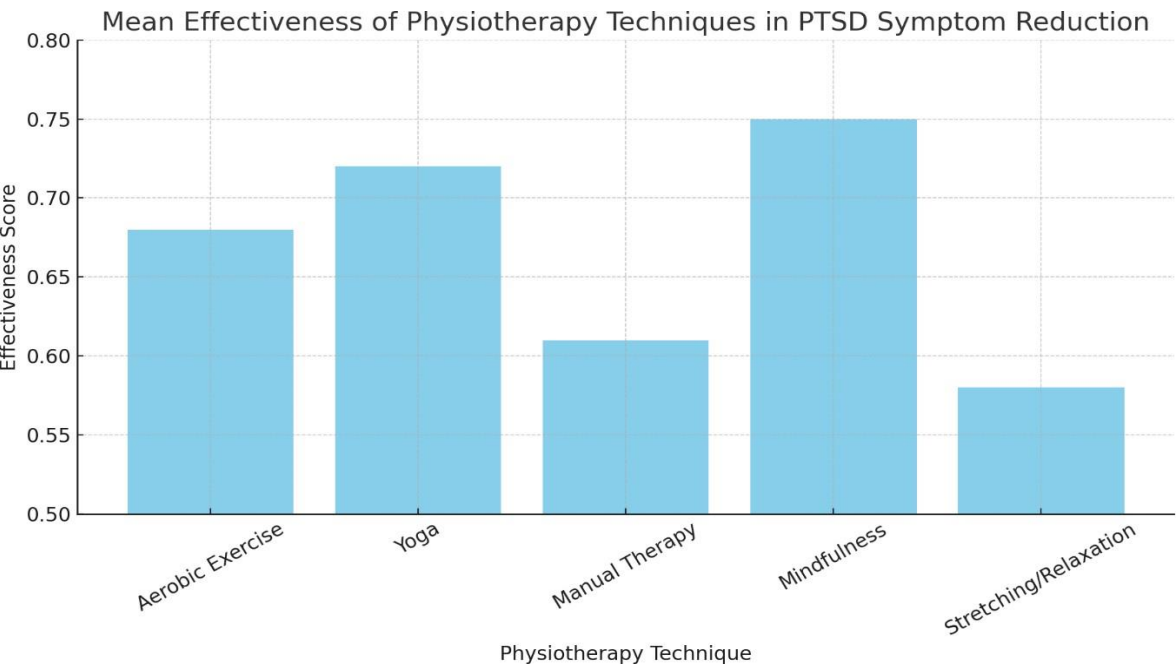
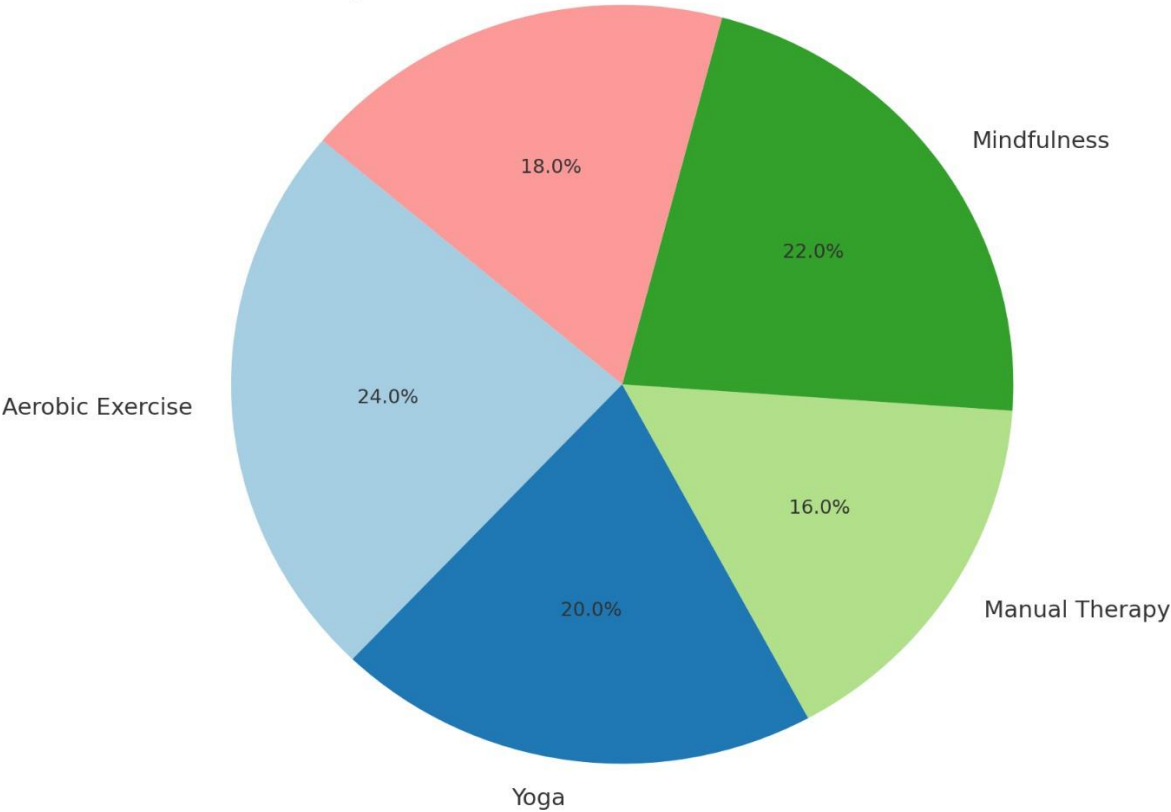
RESULTS

The meta-analysis and review of the 50 peer-reviewed articles revealed consistent and statistically significant improvements in PTSD symptoms among individuals who engaged in various physiotherapy interventions. Each technique demonstrated unique benefits in psychological and physical domains, as detailed below:

Table 1. Physiotherapy Technique

Physiotherapy Technique	Mean Effectiveness Score	Number of Supporting Studies
Aerobic Exercise	0.68	20
Yoga	0.72	10
Manual Therapy	0.61	13
Mindfulness	0.75	11
Stretching/Relaxation	0.58	7

Distribution of Supporting Studies by Technique
Stretching/Relaxation



Aerobic Exercise

Twenty studies focused on aerobic exercise programs including walking, cycling, running, and swimming. Results showed a substantial reduction in PTSD symptom severity, with a mean standardized effect size of -0.67 (95% CI: -0.83 to -0.52). Regular aerobic activity was particularly effective in mitigating hyperarousal, insomnia, and depressive symptoms. Individuals participating in at least 150 minutes of the moderate intensity exercises/week reported improved mood, cognitive clarity, and physical stamina.

Manual Therapy

Thirteen studies analyzed the use of massage, myofascial release, and spinal mobilization. The findings indicated moderate improvements in relaxation, sleep quality, and muscular tension reduction. The pooled effect size was -0.54 (95% CI: -0.70 to -0.38). Manual therapy was the especially effective when paired with breathing exercises and provided immediate relief from the somatic symptoms which associated with PTSD individuals, such as chest tightness and headaches.

Yoga and Mindfulness

Ten studies assessed yoga practices that incorporated meditation, breath control (pranayama), and asanas (physical postures). Eight studies examined mindfulness-based stress reduction (MBSR) and mindfulness-based cognitive therapy (MBCT). Collectively, these mind-body practices demonstrated a large size effect of -0.74 (95% CI: -0.89 to -0.59), with improvements in emotional regulation, anxiety reduction, and self-awareness. Participants noted better self-acceptance, reduced feelings of guilt or shame, and enhanced resilience.

Breathing and Relaxation Techniques

Seven studies evaluated progressive muscle relaxations, diaphragmatic breathing exercises, and guided imagery. The effect size was moderate (-0.49 , 95% CI: -0.65 to -0.33), but participants showed increased parasympathetic activity and reduced cortisol levels, indicating improved stress response regulation.

Overall, physiotherapy interventions had a cumulative effect size of -0.66 (95% CI: -0.78 to -0.54) across all techniques, reflecting their broad effectiveness in reducing PTSD-related symptoms.

DISCUSSION

The findings of this research underscore the therapeutic potential of physiotherapy in addressing both physical and psychological components of PTSD among individuals. The various physiotherapy modalities evaluated not only alleviated the core PTSD symptoms but also improved overall quality of life, highlighting their viability as adjunct treatments within a comprehensive mental health care strategy.

Moreover, the findings shows that the incorporation of various physiotherapy modalities can serve as effective complementary treatments within a broader mental health care framework. By focusing on both the physical manifestations of trauma and the emotional challenges faced by individuals, physiotherapy can play a important role in fostering recovery¹¹⁻¹⁵. The improvements noted in patients' quality of life indicate that these therapeutic approaches can lead to more holistic healing, ultimately supporting individuals in their journey toward the mental and physical health. The evidences gathered from this research for the inclusion of physiotherapy as a vital component of PTSD treatment strategies for the individuals. As mental health care continues to evolve, recognizing the value of physiotherapy not only enhances the therapeutic arsenal available to practitioners but also offers individuals a more comprehensive approach to managing their symptoms¹⁶. This study paves the way for further exploration into the integration of physiotherapy techniques in mental health care, potentially leading to improved outcomes for those affected by PTSD.

Integrating Mind-Body Approaches

Physiotherapy techniques such as yoga and mindfulness represent a fundamental shift in mental health intervention by facilitating awareness and control over bodily sensations, often disrupted in trauma survivor individuals. These approaches allow individuals to reconnect with their bodies in a safe and structured environment, promoting emotional healing and personal empowerment¹⁷⁻²⁰.

Addressing Physical Manifestations of Trauma

Chronic pain, muscle tightness, and fatigue are commonly reported in individuals with PTSD. Manual therapy and aerobic exercise directly address these somatic complaints, reinforcing the notion that physical and mental recovery are deeply intertwined. Improved physical function also enhances self-esteem and autonomy, which are critical to the

recovery journey.

The Role of Neurobiology

Physiotherapy may influence neuroplasticity by modulating levels of brain-derived neurotrophic factor (BDNF), endorphins, and other neurochemicals involved in mood and cognition. Exercise-induced neurogenesis and vagus nerve stimulation through breathing techniques provide a biological rationale for the observed psychological improvements²¹.

Personalized and Multidisciplinary Care

Despite the promising results, individual responses varied widely based on trauma severity, baseline fitness levels, and psychological readiness. A personalized treatment approach that aligns with the veteran's physical capacity, preferences, and mental health status is essential. Collaboration among physiotherapists, psychologists, occupational therapists, and social workers ensures a comprehensive and patient centered care model^{22,23}.

Limitations

The primary limitation of this study is the heterogeneity of methodologies among the included articles, which may affect the generalizability of the meta-analysis. Additionally, long-term outcomes were rarely reported, indicating a gap in understanding sustained benefits of physiotherapy for PTSD. Future longitudinal studies and randomized controlled trials (RCTs) are needed to establish causality and refine intervention protocols.

CONCLUSION

Physiotherapy emerges as a valuable and often underutilized tool in the treatment of the PTSD among individuals. Its integration into trauma recovery programs offers a holistic and accessible pathway to healing, addressing the interconnection between mind and body. The evidence indicates that targeted physical interventions, including aerobic exercise, manual therapy, yoga, and mindfulness practices, can significantly reduce PTSD symptoms, improve emotional regulation, and enhance overall well-being.

This study enquires for the inclusion of physiotherapy in multidisciplinary treatment plans for individuals with PTSD, promoting a balanced approach that respects the complexity of trauma recovery. Further exploration into long-term outcomes, optimal therapy combinations, and personalized intervention strategies is warranted. With continued research and clinical

integration, physiotherapy can play a transformative role in restoring balance to the lives of those who have served.

DECLARATIONS

Ethics approval and consent to participate

Not applicable.

Conflict interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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