



# Fascia-Oriented Clinical Pilates in Myalgic Encephalomyelitis/Chronic Fatigue Syndrome with Multisystem Post-Vaccination Sequelae: A Retrospective Case Report



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## Abstract

Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS) is a complex, chronic, multisystem disorder characterized by persistent fatigue, post-exertional malaise, autonomic dysfunction, neuromuscular impairment, and cognitive disturbances. Standard rehabilitation approaches are often poorly tolerated due to symptom exacerbation, highlighting the need for safe, individualized, low-load interventions. Clinical Pilates (CP), emphasizing controlled movement, core stabilization, alignment, and breath work, has emerged as a promising approach for symptom management and functional recovery in chronic multisystem conditions.

This case report describes a 46-year-old female patient with ME/CFS and complex post-inflammatory syndromes, including fibromyalgia, lymphatic dysfunction, endocrine abnormalities, severe neuropathic pain, and profound functional decline. Prior to illness, she engaged in high levels of physical activity, including walking, running, and recreational sports, but became unable to perform basic daily activities. An individualized, fascia-focused CP program was implemented, emphasizing pain-free fascia stretching, low-load movement patterns, neuromuscular modulation, core stabilization, thoracic expansion, and breath-focused exercises, progressed according to patient tolerance.

During the intervention period, the patient demonstrated meaningful improvements in pain, functional capacity, respiratory mechanics, neuromuscular coordination, and performance in daily life. These observations underscore the therapeutic potential of individualized, low-load CP, enabling patients with ME/CFS and complex post-inflammatory syndromes to regain function without triggering symptom exacerbation. This case reinforces CP as a central rehabilitation tool for multisystem chronic fatigue, establishing it as an evidence-based strategy to guide future research and patient follow-up, while encouraging integration of this methodology into patient-centered rehabilitation by both clinicians and certified CP instructors.

**Keywords:** Myalgic Encephalomyelitis/Chronic Fatigue Syndrome; Post-vaccination Multisystem Syndrome; Clinical Pilates; Fascia-focused Rehabilitation; Neuromuscular Modulation

## Introduction

Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS) is a chronic, heterogeneous, multisystem disorder [1] characterized by persistent, disabling fatigue, post-exertional malaise, autonomic dysfunction, neuromuscular impairment, and cognitive disturbances [2]. Its pathophysiology is multifactorial, encompassing immune dysregulation, neuroinflammation, autonomic imbalance, and impaired energy metabolism. Patients often present with musculoskeletal pain, respiratory limitations, spinal instability, and reduced functional capacity. Globally, ME/CFS affects approximately 0.9% of the population [3].

Patients with ME/CFS frequently experience cognitive and psychological comorbidities, including sleep disorders, depression, and anxiety, which are often linked to neuroinflammatory processes [4, 5]. High levels of proinflammatory cytokines and microglial activation correlate with

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symptom severity, suggesting neuroinflammation as a contributing factor to both cognitive and systemic dysfunction. Concurrent fibromyalgia syndrome (FMS) is prevalent, amplifying pain and sensitivity [6].

Physical activity and exercise, core competencies of professionals in physical medicine and physiotherapy, are commonly recommended to manage symptoms in individuals with ME/CFS [7]. Historically, graded exercise therapy (GET) was suggested; however, patient-reported outcomes and updated clinical analyses have questioned its safety and efficacy, highlighting potential symptom exacerbation and long-term deterioration [8].

Despite several consensus diagnostic criteria (e.g., Canadian Consensus Criteria, Fukuda, Oxford, International), no commercial blood test exists, and misdiagnosis remains a significant challenge [9]. Similarly, a clear therapeutic approach is still lacking. Meta-analyses and clinical trials have demonstrated robust evidence supporting cognitive-behavioral therapy (CBT) and GET [10, 11], but research on safe, low-load rehabilitation modalities remains limited.

Clinical Pilates (CP) is increasingly recognized as a therapeutic intervention to improve movement patterns and reduce pain [12]. Emerging evidence indicates that Pilates training can induce changes in muscle strength, recruitment, and activation patterns [13]. CP has emerged as a highly promising intervention for complex fatigue-related disorders, owing to its integration of controlled respiration, core stabilization, graded motor activity, and neuromuscular modulation, collectively facilitating the restoration of functional capacity and enhancing sensorimotor efficiency [14]. Systematic reviews further indicate that CP can improve pain, functional capacity, posture, and psychological well-being, with lower adverse event rates compared to higher-load modalities [15].

It is imperative to evaluate the best available evidence on Clinical Pilates to determine its efficacy in eliciting specific functional and neuromuscular adaptations. The aim of this case study is to examine the effects of an individualized Clinical Pilates program on functional capacity, pain, and neuromuscular outcomes in a patient with ME/CFS and complex fatigue-related syndromes, providing evidence to guide clinical decision-making and inform patient-centered rehabilitation strategies.

## Case Presentation

The patient is a 46-year-old female with a complex medical history, including ME/CFS diagnosed according to Institute of Medicine criteria, muscle dystrophy, multilevel disc pathology (L1–S5) initially considered for surgical intervention, scoliosis, chronic asthma requiring daily medication, fibromyalgia diagnosed in 2023, lymphatic dysfunction, severe neuropathic pain characterized by burning sensations across the skin, endocrine dysfunction with critically low cortisol levels (32 ng/dL in June 2023), and a post-vaccine multisystem inflammatory reaction encompassing mast-cell activation, encephalitis, neuropathic pain, and significant weight gain. This constellation of conditions resulted in a profound loss of muscle memory and overall physical capacity, leaving her unable to perform basic activities of daily living at baseline.

Prior to the onset of her illness, the patient was highly active, participating in hockey, running, swimming, and walking up to 8 kilometers daily, maintaining a robust exercise routine and high functional independence. Even during the early stages of illness, she

attempted to maintain physical activity, walking her dog and running sporadically despite experiencing early signs of inflammation, fatigue, and cognitive impairment, demonstrating her pre-morbid physical resilience.

Her illness course was marked by severe systemic inflammation, beginning after her first SARS-CoV-2 vaccination in May 2021 and intensifying by March 2023, which manifested as generalized inflammation, dramatic weight gain exceeding 70 pounds, dysregulated body temperature, persistent pain, tremors, vertigo, and extreme fatigue. Extensive medical workup ruled out infectious and autoimmune causes, including Lyme disease, lupus, mononucleosis, and Epstein-Barr virus, and revealed multiorgan involvement, including severe asthma, costochondritis, hepatic stress, and adrenal insufficiency. She required multiple medications to manage pain, inflammation, and neuromuscular symptoms, including hydromorphone, pregabalin, anti-inflammatories, and anxiolytics. Despite aggressive pharmacological interventions and multiple rehabilitative therapies, including chiropractic care, massage, osteopathy, and lymphatic physiotherapy, she remained significantly debilitated.

Given her complex presentation, an individualized, fascia-focused Clinical Pilates program was implemented. The intervention emphasized gentle, pain-free fascia stretching, low-load movement patterns, core stabilization, neuromuscular modulation, thoracic expansion, and breath-focused exercises. Exercise progression was symptom-paced, carefully calibrated according to patient tolerance, ensuring safety and minimizing risk of post-exertional malaise, a hallmark of ME/CFS. This approach also accounted for her prior negative experiences with intensive therapies and her refusal of surgical intervention for multilevel disc pathology, highlighting the importance of an individualized, patient-centered strategy.

Throughout her rehabilitation, the patient continued adjunctive therapies including lymphatic physiotherapy, while discontinuing most medications except those necessary for asthma and adrenal support. Her recovery trajectory was monitored meticulously through patient-reported measures, observational assessment of movement and spinal stability, respiratory function evaluations, and detailed documentation of medication and supplement use, in alignment with CARE guidelines for case reporting.

At the time of report preparation, she remained under specialist supervision, including endocrinology for adrenal insufficiency and pituitary monitoring, neurology and neuro-ophthalmology for neurological concerns, and pulmonary care for asthma management. Emotional and cognitive support was also provided via ongoing psychotherapy, which she reported as essential for coping with the prolonged illness, brain fog, and grief related to loss of prior functional capacity and significant life changes.

Given the patient's complex multisystem presentation and extensive functional deficits, an individualized, fascia-focused CP program was designed as the central rehabilitative intervention. This program was tailored to optimize neuromuscular modulation, core stabilization, thoracic expansion, and controlled breathing, while minimizing symptom exacerbation and post-exertional malaise. The structured, symptom-paced progression allowed for careful observation of the patient's response, laying the foundation to assess the therapeutic potential of Clinical Pilates in restoring functional capacity and promoting recovery in highly debilitated patients with

ME/CFS and complex fatigue-related syndromes.

As this is a single-patient retrospective case report, no inferential statistical analyses were conducted. Clinical outcomes were assessed through patient-reported measures, observational evaluation of movement and spinal stability, respiratory function assessments, and medication use documentation. The study was conducted in accordance with the CARE guidelines for case reporting, and informed consent was obtained from the patient prior to inclusion in this report.

## Discussion

This case report demonstrates that an individualized, fascia-focused, symptom-paced CP program may contribute to meaningful improvements in physical function, respiratory capacity, and neuromuscular control in a patient with severe ME/CFS. The patient achieved increased core and trunk stability, restored spinal mobility, reduced pain, and decreased reliance on medications. Pulmonary function improved, with inhaler use reduced to occasional need, and post-exertional malaise was less severe, enabling greater independence in daily activities.

These findings align with evidence that CP is not inferior to equivalently dosed exercises and may be superior to non-equivalent or no exercise in improving core muscle strength [15]. Low-intensity, self-paced exercise has also been shown to improve walk distance, lower limb strength, fatigue, depression, and peak expiratory flow in ME/CFS, without symptom exacerbation [16]. CP's emphasis on neuromuscular modulation, deep muscle activation, and graded, symptom-paced movement likely underpins these functional gains.

Limitations of this report include its single-patient retrospective design, reliance on observational and patient-reported outcomes, and limited longitudinal follow-up. Results may not be generalizable to all individuals with ME/CFS. Future studies should investigate CP in larger, controlled cohorts, incorporating objective assessments of neuromuscular activation, core strength, and functional performance over time.

Despite these limitations, the present findings underscore the potential for individualized CP to serve as a safe, feasible, and effective rehabilitation strategy in highly debilitated patients with ME/CFS. The program's emphasis on low-load, symptom-paced movement, core stabilization, and neuromuscular modulation provides a model for patient-centered rehabilitation that prioritizes safety while promoting functional recovery and improved quality of life.

## Conclusion

This case report highlights the potential of individualized, symptom-paced CP as a safe and effective rehabilitation strategy for individuals with ME/CFS. By focusing on low-load, fascia-oriented movement, core stabilization, neuromuscular modulation, and graded activity, CP can help restore functional capacity and improve musculoskeletal and respiratory function. These findings emphasize the importance of patient-centered, evidence-informed approaches in managing complex fatigue-related syndromes. This case further reinforces the relevance of CP as a central rehabilitation tool for multisystem chronic fatigue, supporting its role in guiding future research and informing clinical practice. Although larger controlled studies are needed to confirm these results, CP represents a promising intervention to enhance functional recovery and quality of life for individuals living with ME/CFS.

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