



Recovery of Functional Mobility After Clinical Pilates Intervention in Inclusion Body Myositis: A Case Study

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Abstract

Background: Idiopathic inflammatory myopathies, specifically inclusion body myositis, present a formidable therapeutic dilemma: high-load resistance training risks accelerating microtrauma in fragile myofibers, whereas disuse promotes rapid atrophy and joint contractures. Clinical Pilates provides a specialized, low impact mind body paradigm anchored in neuromuscular re-education, core stabilization, and breath-synchronized kinetic chain recruitment. Despite growing recognition of active movement therapies in neuromuscular pathologies, lines of investigation concerning targeted mind body interventions in this population remain sparse. To address this clinical gap, the primary objective of this retrospective study was to examine the functional and quality-of-life outcomes of a standardized 20-session Clinical Pilates protocol implemented in an individual diagnosed with inclusion body myositis.

Methods: This retrospective observational single-case study examined a 71-year-old female patient presenting with severe baseline impairments, notably an inability to elevate the left upper extremity beyond chest level and profound deficits in stair navigation. The patient underwent a structured 20-session rehabilitation protocol utilizing specialized apparatus (Cadillac, CoreAlign, Wunda Chair, and Reformer) engineered to unload vulnerable tissues while optimizing kinematic alignment. Pre- and post-intervention metrics included physical range of motion, independent ambulatory capacity, and psychometric profiling via the 36-Item Short Form Health Survey.

Results: Longitudinal implementation of the protocol elicited a striking reversal of functional decline. Upper-extremity mobility progressed from severe proximal restriction to active lateral extension and expanded range of motion, while lower-extremity stabilization enabled autonomous stair navigation and continuous, unassisted 2-kilometer ambulation. Psychometric assessment demonstrated a highly favorable post-intervention profile, balancing moderate physical functioning (45%) and vitality (55%) with exceptional psychosocial resilience, including total preservation of emotional role functioning (100%), robust social integration (87.5%), and an optimistic health trajectory evaluation (75%).

Conclusion: These findings provide compelling evidence that equipment-based Clinical Pilates safely restores complex motor patterns and enhances psychosocial vitality in advanced myopathies. By bridging the gap between tissue protection and functional activation, this study challenges the clinical dogma of inevitable deterioration in inclusion body myositis, underscoring this modality as a transformative, integrative component within multidisciplinary patient care frameworks.

Keywords: Inclusion Body Myositis; Clinical Pilates; Neuromuscular Rehabilitation; Therapeutic Exercise; Functional Mobility

Introduction

Idiopathic Inflammatory Myopathies (IIMs), collectively referred to as myositis, comprise a heterogeneous group of systemic autoimmune disorders clinically characterized by chronic muscle weakness and reduced muscular endurance, and histologically by inflammatory cell infiltrates within skeletal muscle tissue. Traditionally, IIMs are classified into three primary clinical and histopathological subtypes: Polymyositis (PM), Dermatomyositis (DM), and Inclusion Body Myositis (IBM) [1].

Inclusion Body Myositis (IBM) typically manifests as a progressive loss of muscle mass and strength primarily affecting the quadriceps and deep finger flexors. Consequently, fundamental



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daily maneuvers such as ascending and descending stairs, rising from a seated position, grasping utensils, or manipulating zippers and buttons transform into formidable physical obstacles that progressively erode the patient's autonomy and psychosocial wellbeing [2, 3]. The estimated prevalence of IBM varies geographically, with an overall rate of five to nine cases per million adults. However, due to differences in diagnostic criteria and limited epidemiological data, the true prevalence remains uncertain [4].

Additionally, progressive muscle deterioration requires a delicate therapeutic balance. While high-load resistance training frequently poses the risk of aggravating fragile, inflamed tissues, complete immobilization accelerates disuse atrophy, joint contractures, and functional decline [5].

Pilates is a method of exercise and movement re-education rooted in interpretations of the work and teachings of Joseph Pilates [6]. Clinical Pilates (CP) is a subsequent modification of this method adapted for therapeutic use by various health and conditioning professionals, and it can constitute a form of targeted exercise. It involves the use of specialized Pilates equipment to support and guide movement during exercise execution [7].

CP bridges this rehabilitation gap as a specialized mind-body framework anchored in core stabilization, precise biomechanical alignment, diaphragmatic breathing control, and dynamic fascial recruitment. Rather than imposing excessive external loads upon compromised myofibers, it optimizes trunk stability, re-educates kinetic chains, and restores movement efficiency. Through focused neuromuscular execution and breath-synchronized control, it offers a safe, non-invasive paradigm for rebuilding central and articular functional stability without provoking exercise-induced microtrauma [8].

Beyond physical manifestations, the burden of IBM heavily compromises Health-Related Quality of Life (HRQoL), frequently precipitating social isolation and emotional distress. Because CP fuses postural alignment with cognitive focus and intentional breathing, its therapeutic efficacy extends deeply into psychological domains. Validated evaluative instruments, such as the 36-item Short Form Health Survey (SF-36), demonstrate that the restoration of physical agency directly enhances emotional resilience, vitality, and social reintegration [9, 10].

Despite growing recognition of active movement therapies in neuromuscular pathologies, lines of investigation concerning targeted mind-body interventions in IBM remain sparse. To address this clinical gap, the primary objective of this retrospective study was to examine the functional and quality-of-life outcomes of a standardized 20-session CP protocol administered to an individual diagnosed with inclusion body myositis.

Case Report and Methods

Study design and baseline clinical status

This research utilized a retrospective observational single-case study design to evaluate the clinical and functional trajectories of a 71-year-old female patient with a confirmed clinical and histopathological diagnosis of inclusion body myositis.

Prior to commencing the intervention, baseline clinical assessments documented profound functional impairments stemming from advanced muscle degeneration. The patient exhibited marked motor restrictions, particularly the inability to elevate her left arm

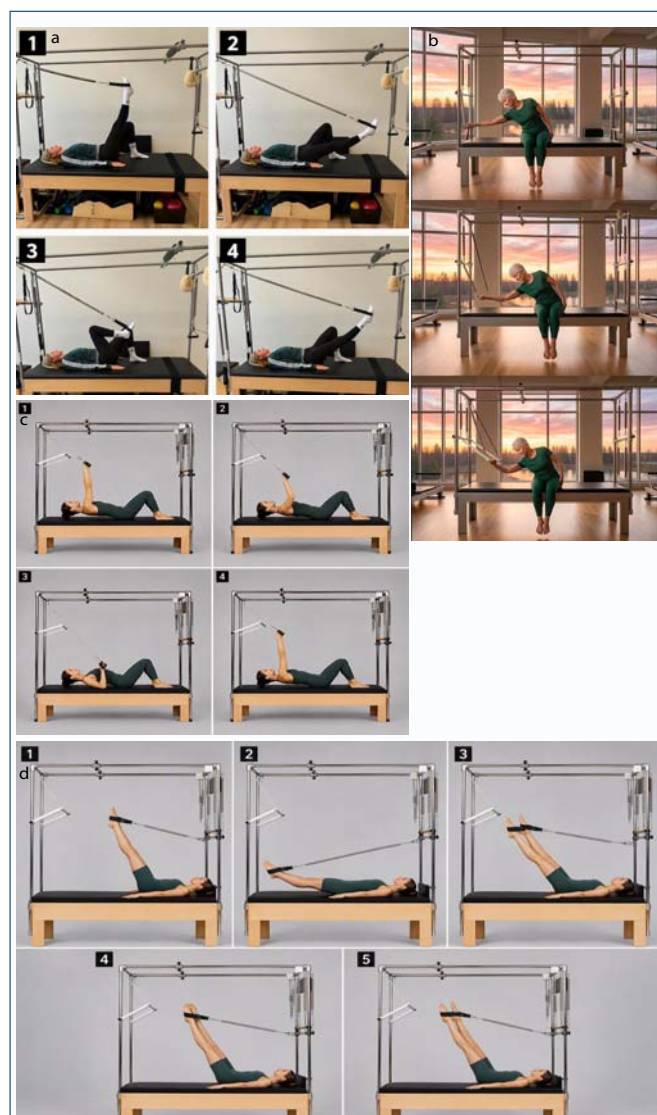


Figure 1: Representative clinical pilates exercises performed on the Cadillac apparatus during the rehabilitation protocol (a-d).

beyond chest level. In addition, she experienced significant functional deficits in lower extremity mechanics, reflected by a marked difficulty in safely ascending and descending stairs without physical support. These baseline physical barriers severely constrained her independent mobility and execution of daily tasks.

Intervention protocol

The patient completed a structured, supervised rehabilitation regimen consisting of 20 individual CP sessions. The protocol was deliberately tailored to counteract progressive weakness while avoiding excessive strain on vulnerable muscle groups. Core components emphasized neuromuscular re-education, diaphragmatic breathing mechanics, scapular and pelvic girdle stabilization, and fascial integration. Comprehensive functional evaluations and health-related quality-of-life profiles were recorded before and after the intervention using the standardized SF-36 Health Survey.

Clinical pilates intervention

During the 20-session CP intervention, the rehabilitation program was systematically structured to incorporate targeted equipment-based exercises designed to optimize neuromuscular

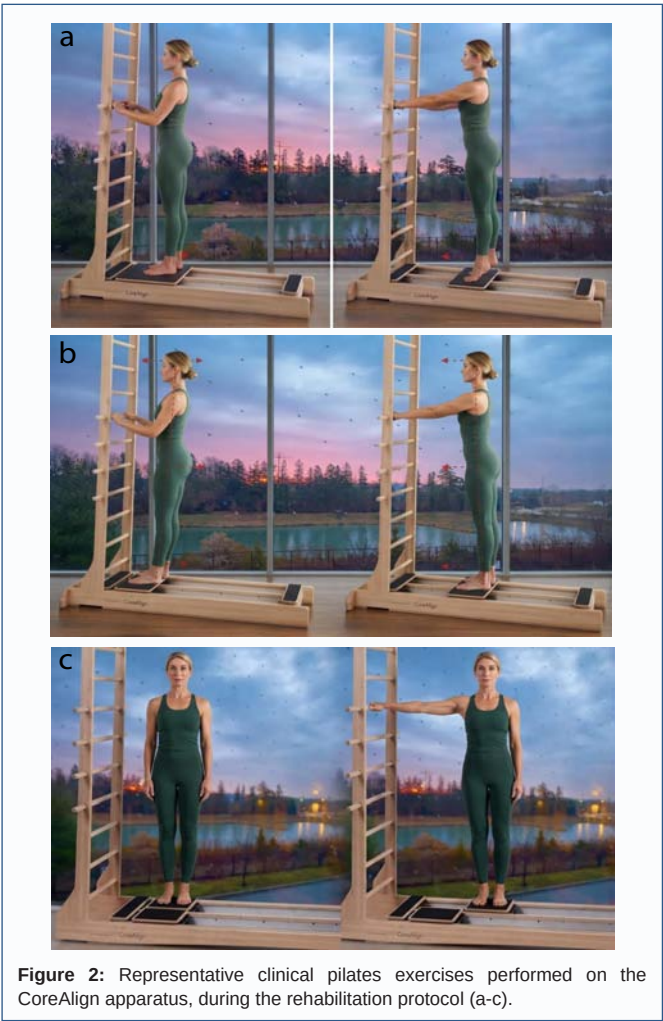


Figure 2: Representative clinical pilates exercises performed on the CoreAlign apparatus, during the rehabilitation protocol (a-c).

control, stability, and functional movement. Below is an overview of the specific apparatus utilized and the corresponding exercises performed, accompanied by representative illustrations of the key movements implemented throughout the rehabilitation protocol:

- CADILLAC
- Lat Press Sitting, Lat Press Single Arm, Side Bend, Push Thru Seated, Push Thru Arms, Developpe Supine Single Leg, Developpe Side, Leg Circle on The Side, Parallel Circles Single Leg, Parallel Circles, Sagittal Scissors & Bicycle (Figure 1).
- COREALIGN
- Kneeling Single and Double Arms, Statue on Wheels Front, Statue on Wheels Front Point, Statue on Heels Side, Hoof & Hoof and Lunges (Figure 2).
- WUNDA CHAIR
- Forward step hands on handle (Figure 3).
- REFORMER
- Lunges (Table 1).

Results and Discussion

The implementation of a 20-session CP protocol elicited remarkable physical and functional recoveries, effectively reversing

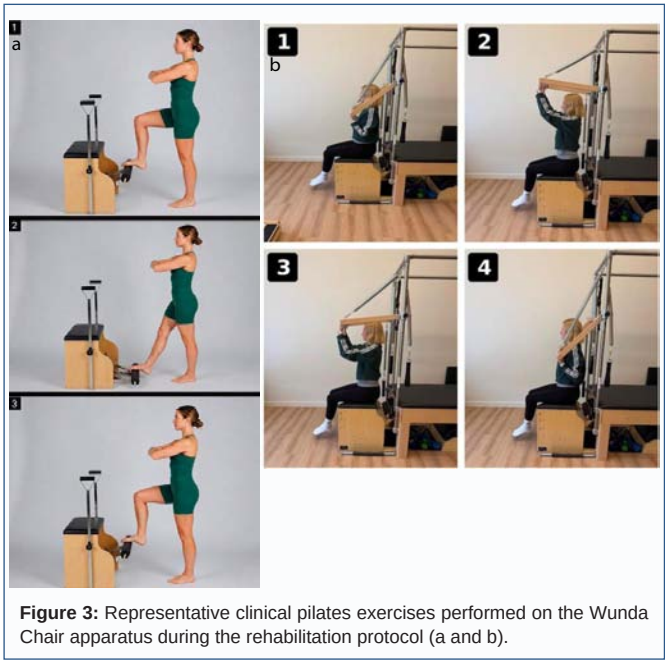


Figure 3: Representative clinical pilates exercises performed on the Wunda Chair apparatus during the rehabilitation protocol (a and b).

Table 1: Health-related quality of life outcomes assessed via the 36-Item Short Form Survey (SF-36) following the 20-session Clinical Pilates intervention.

SF-36 Domain	Post-Intervention Score	Clinical Interpretation
Physical Functioning	45%	Moderate capacity maintained in basic daily physical tasks
Role-Physical	0%	Persistent restrictions in heavy occupational tasks due to physical burden
Role-Emotional	100%	Total absence of task interference derived from psychological distress
Energy / Fatigue	55%	Moderate vital capacity and manageable subjective fatigue levels
Emotional Well-being	72%	Favorable psychological resilience, mood stability, and inner calm
Social Functioning	87.5%	High social integration with minimal health-related impairment
Bodily Pain	45%	Mild-to-moderate discomfort with manageable functional interference
General Health	40%	Health perceptions aligned with chronic systemic pathology
Health Change	75%	Highly optimistic evaluation of health trajectory compared to the previous year

the patient's baseline decline. While baseline assessments highlighted substantial upper extremity restrictions and severe limitations in stair navigation, post-intervention evaluations demonstrated a dramatic restoration of physical capacity. Mobility of the left upper extremity progressed from severe restriction at chest level to active lateral extension and expanded range of motion, whereas lower extremity force production and trunk stability improved sufficiently to enable the patient to ascend and descend stairs autonomously. Furthermore, ambulatory capacity underwent a profound transformation, with the patient successfully executing continuous, unassisted 2-kilometer walks. According to the participant, these objective gains represented an extraordinary transformation in both her functional capacity and overall quality of life.

Standardized psychometric characterization via the SF-36 instrument contextualized these physical milestones within a holistic framework of health-related quality of life. The quantitative profile highlights a balanced recovery: alongside moderate physical functioning (45%) and vital energy levels (55%), the patient

demonstrated exceptional psychological and social outcomes, including complete preservation of emotional role functioning (100%), robust social integration (87.5%), and an optimistic perception of health change (75%). This synergy of physical independence and psychological vitality underscores the comprehensive efficacy of the intervention.

These physical milestones align closely with mounting evidence establishing that appropriately structured physical conditioning is both safe and beneficial for patients with idiopathic inflammatory myopathies. As demonstrated in prior clinical evaluations of adapted Pilates and functional training in inflammatory myopathies, low-impact individualized movement protocols consistently avoid elevating serum creatine kinase levels or accelerating muscle inflammation while successfully preserving functional capacity. Moreover, our findings corroborate broader neurological rehabilitation data showing that core-centered stability training significantly enhances balance confidence and movement efficiency in degenerative conditions [11-14].

The present findings provide compelling evidence that a longitudinal CP intervention serves as a transformative therapeutic paradigm, fundamentally reshaping the trajectory of functional decline in inclusion body myositis. By demonstrating that targeted, equipment-based mind-body rehabilitation can safely restore complex motor patterns, independent ambulation, and robust psychosocial vitality, this case study challenges the antiquated clinical dogma that relentless deterioration is inevitable in advanced myopathies. Furthermore, these outcomes highlight that CP should not be viewed as an isolated therapy, but rather as an essential, integrative component of a broader multidisciplinary healthcare team working collaboratively to optimize patient care. Ultimately, these results broaden the recognized boundaries of functional recovery in neuromuscular disorders and establish a vital foundation that strongly warrants large-scale prospective trials to validate these life-changing outcomes across the wider patient population.

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