Laodikya Rehabilitasyon Bilimleri Dergisi/Journal of Laodikeia Rehabilitation Sciences

İletilme Tarihi (Submitted Date): 08.07.2024 Kabul Tarihi (Accepted Date): 15.08.2024
Makale Türü (Article Type): Olgu Sunumu/ Case Report
2024;2(1): 9-14
doi: 10.5281/zenodo.14506855

The Effect of Clinical Pilates and Aerobic Exercises on an Individual with Polymyositis: A Case Report

Polimiyozitli Bireyde Klinik Pilates ve Aerobik Egzersizlerinin Etkisi: Olgu Sunumu

Elif GÜR KABUL[1], Bilge BAŞAKÇI ÇALIK[2], Veli ÇOBANKARA[3]
[1]Uşak University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Uşak, Türkiye
[2]Pamukkale University, Faculty of Physiotherapy and Rehabilitation, Denizli, Türkiye
[3]Pamukkale University, Faculty of Medicine, Department of Internal Medical Sciences, Denizli, Türkiye

Öz

Amaç: Çalışmanın amacı, Polimiyozit (PM)'li bir bireyde klinik pilates ve aerobik egzersizlerinin etkisini incelemekti. **Yöntem:** 57 yaşındaki PM'li kadın medikal tedavisine ek uygulanan fizyoterapi programı (klinik pilates ve aerobik egzersizler) ile tedavi edildi. Mobilite zamanlı kalk yürü testi ile, denge tek ayak üzerinde durma testi ile aerobik kapasite Bruce Treadmil Testi ile, alt ekstremite performansı otur-kalk testi ve Alt Ekstremite Fonksiyonel Skalası ile, disabilite Sağlık Değerlendirme Anketi ile, biyopsikososyal durum Bilişsel Egzersiz Terapi Yaklaşımı Ölçeği ile ve yaşam kalitesi Kısa Form-36 ile tedavi öncesi ve tedavi sonrasında değerlendirildi. PM'li bireye; Bruce Treadmil Test protokolü ile belirlenen maksimal kalp hızının %55-80'inde 40 dakikalık aerobik egzersiz ve sonrasında klinik pilates egzersizleri haftada 3 gün 12 hafta boyunca uygulandı. **Sonuçlar:** Tedavi sonrasında tedavi öncesine göre, değerlendirme parametrelerinin hepsinde iyileşme görülse de yüzdelik olarak en fazla iyileşme sırasıyla; Kısa Form-36'nın "Fiziksel fonksiyon" komponentinde % 400, tek ayak üzerinde durma testi-sağ'da % 265.37, Kısa Form-36'nın "Fiziksel problemlere bağlı rol sınırlamaları" komponentinde % 200 ve tek ayak üzerinde durma testi-sol'da % 124.95 idi. **Tartışma:** Klinik pilates ve aerobik egzersizlerden sonra PM'li bireyin laboratuvar bulgularında herhangi bir kötüleşme olmadan tüm parametrelerde özellikle yaşam kalitesinin fiziksel fonksiyon, fiziksel problemlere bağlı limitasyonlar komponentlerinde ve dengede iyileşme elde edildi.

Anahtar Kelimeler: Polimiyozit, Egzersiz, Yaşam Kalitesi, Pilates

Abstract

Aim: The aim of the study was to examine the effects of clinical pilates and aerobic exercises in an individual with polymyositis (PM). **Method:** A 57-year-old woman with PM was treated with a physiotherapy program (clinical pilates and aerobic exercises) in addition to her pharmacological treatment. Mobility was evaluated with timed up and go test, balance with one-leg standing test, aerobic capacity with Bruce Treadmill Test, lower extremity performance with chair-stand test and Lower Extremity Functional Scale, disability with Health Assessment Questionnaire, biopsychosocial status with Biopsychosocial Questionnaire and quality of life with Short Form-36 before and after treatment. The individual with PM was given 40 minutes of aerobic exercise at 55-80% of the maximum heart rate determined by the Bruce Treadmill Test protocol, and then clinical pilates exercises, 3 days a week for 12 weeks. **Results:** Although there was improvement in all evaluation parameters after treatment compared to before treatment, the highest improvement in percentage terms was 400% in the "Physical functioning" component of Short Form-36, 265.37% in one-leg standing test-right, 200% in the "Role limitations due to physical problems" component of Short Form-36, and 124.95% in one-leg standing test-left, respectively. **Conclusion:** After clinical pilates and aerobic exercises, an improvement was achieved in all parameters, especially in the physical function, limitations due to physical problems components of the quality of life and balance, without any worsening in the laboratory findings of the individual with PM.

Key Words: Polymyositis, Exercise, Quality of life, Pilates

Corresponding Author: Elif GÜR KABUL
E-mail: elifgur1988@hotmail.com
ORCID: 0000-0003-3209-1499

Laodikya Rehabilitasyon Bilimleri Dergisi/Journal of Laodikeia Rehabilitation Sciences

İletilme Tarihi (Submitted Date): 08.07.2024 Kabul Tarihi (Accepted Date): 15.08.2024
Makale Türü (Article Type): Olgu Sunumu/ Case Report
2024;2(1): 9-14
doi: 10.5281/zenodo.14506855

1.Introduction

Polymyositis (PM) is characterized by systemic, inflammatory, autoimmune and skeletal muscle disorders (1). Clinically, PM patients experience symmetrical and diffuse involvement in proximal muscles such as shoulder, hip, thigh, trunk and neck muscles, increase in creatine kinase, electromyography changes, muscle inflammation in biopsy, physical dysfunction and decreased quality of life (2).

Despite the positive results of corticosteroids and immunosuppressive agents used in the treatment of individuals with PM, they develop a persistent disability in muscle strength and endurance, as well as fatigue and myalgia (3). Exercise is considered a common treatment approach for individuals with rheumatic diseases. However, recent studies have shown that exercise combined with immunosuppressive pharmacological agents can increase muscle performance, physical function and quality of life without increasing inflammatory symptoms in the muscle (4,5).

The purpose of this case report was to examine the effects of clinical pilates and aerobic exercise program, in addition to pharmacological treatment, on functional mobility, balance, lower extremity performance, aerobic capacity, disability, biopsychosocial status, and quality of life in an individual diagnosed with PM.

2.Case Report

A 57-year-old woman patient was admitted to the rheumatology department of the hospital due to acute low back pain. She had back stiffness and mobility problems. Cortisone and analgesics were administered as pharmacological treatment. During this period, she experienced loss of strength while sitting and standing. By increasing the amount of cortisone, the loss of strength spread throughout the body. The patient could not get out of bed or walk. She was also experiencing major problems with her private life and was in the process of divorcing her husband. After three weeks of treatment at home, she was treated for one week in the hospital inpatient service. According to the biopsy results, polymyositis was diagnosed by the rheumatologist. A physiotherapy program was applied along with pharmacological treatment. As her pain decreased, her mobility level increased. The patient, who was 161 cm tall and weighed 76 kilograms, had exercise dyspnea, shortness of breath and dysphonia in addition to polymyositis. The pharmacological treatment was as follows: Methotrexate 10 mg once a week and Prednol 2 mg every other day. No changes in pharmacological treatment were made during the physiotherapy program.

3. Materials and methods

3.1. Measures

Mobility was evaluated with timed up and go test, balance with one-leg standing test, aerobic capacity with Bruce Treadmill Test, lower extremity performance with chair-stand test and Lower Extremity Functional Scale, disability with Health Assessment Questionnaire, biopsychosocial status with Biopsychosocial Questionnaire and quality of life with Short Form-36 before and after treatment. All evaluations were carried out in a single session, face to face, in approximately 60 minutes.

Timed Up and Go Test: For the test, the individual was asked to sit in a standard chair, then stand up, walk a distance of 3 meters with regular steps, and at the end of 3 meters, return and sit on the chair. Walking time during the test was recorded in seconds with a stopwatch (6).

One-Leg Standing Test: The individual was asked to lift one leg up, one at a time. The time started when the foot was lifted into the air and ended when it touched the ground. Time was recorded in seconds (7).

Bruce Treadmill Test: The Bruce protocol treadmill test is now widely used in non-invasive measurement of the estimated VO2 max, which expresses the ability to maintain exercise based on aerobic capacity. It is defined as the amount of oxygen (ml) used per minute per unit mass (kg). The test starts at 2.7 km/h and a 10% incline, with an increase in speed and incline every three minutes. Testing is continued until the individual is unable to continue testing (8).

Chair-Stand Test: The individual was asked to stand up and sit down quickly for 30 seconds from a 43 cm high standard chair with her arms crossed over her shoulders. The number of repetitions in which full take-off was achieved was recorded (9).

Lower Extremity Functional Scale: The scale consists of 20 questions. It is scored between 0-80 points and lower scores indicate more disability (10).

Corresponding Author: Elif GÜR KABUL
E-mail: elifgur1988@hotmail.com
ORCID: 0000-0003-3209-1499

Laodikya Rehabilitasyon Bilimleri Dergisi/Journal of Laodikeia Rehabilitation Sciences

İletilme Tarihi (Submitted Date): 08.07.2024 Kabul Tarihi (Accepted Date): 15.08.2024
Makale Türü (Article Type): Olgu Sunumu/ Case Report
2024;2(1): 9-14
doi: 10.5281/zenodo.14506855

Health Assessment Questionnaire (HAQ): The HAQ disability index has eight domains and 2-3 questions for each domain, with a total of 20 questions. The total score was between 0 and 3. A high score indicates a low functional level. (11)

Biopsychosocial Questionnaire: The BETY-BQ evaluates the biopsychosocial status of patients with rheumatic diseases. The total score is between 0-120. Higher scores indicate a poor biopsychosocial status (12).

Short Form-36: It is one of the most frequently used scales to measure quality of life. These substances contain 8 separate health-related components (physical functioning, social functioning, role limitations due to physical or emotional problems, mental health, energy, pain and general health perception). This scale assesses the quality of life, where "100 points" indicate a good health status, and "0 points" indicate a poor health status (13).

3.2. Exercise Training

The treatment program applied to the individual with PM, 3 days a week for 12 weeks, consisted of clinical pilates and aerobic exercises.

The patient received aerobic exercise on the treadmill for 40 minutes at an intensity of 55-80% of the maximal heart rate determined by the Bruce Treadmill Test protocol. Aerobic exercise consisted of a 5-minute warm-up, 30-minute loading and 5-minute cool-down period. Walking speed was gradually increased, depending on the patients' tolerance and compliance with exercise, under the control of an experienced physiotherapist, not exceeding 80% of the maximal heart rate. Heart rate and oxygen saturation were recorded using a pulse oximeter device at rest before aerobic exercise, every 5 minutes after the start of exercise, and at the fifth minute of recovery at the end of the test.

Clinical pilates exercises were applied by a physiotherapist. Before starting the exercises, the patient was taught the 5 key elements of pilates. These key elements were breathing, focusing, rib cage placement, shoulder placement, head and neck placement. The patient was encouraged to use these 5 key elements in daily routines. Exercises were repeated in different positions until the correct posture was achieved. Each session consisted of twenty exercises. Exercises were started with 6 repetitions in the first two weeks. At the end of every two weeks, the number of repetitions was increased by two. And in the last week, 16 repetitions were reached. The exercises were performed on the mat in supine/side-lying/prone and sitting positions, respectively.

3.Results

The patient's laboratory findings are shown in Table 1.

Although there was improvement in all evaluation parameters after treatment compared to before treatment, the highest improvement in percentage terms was 400% in the "Physical functioning" component of Short Form-36, 265.37% in one-leg standing test-right, 200% in the "Role limitations due to physical problems" component of Short Form-36, and 124.95% in one-leg standing test-left, respectively (Table 1).

Table 1. Before and after treatment results.

	Pretreatment	Posttreatment	Δ
Creatinine (mg/dl)	0.67	0.70	
Creatine kinase (U/L)	151	118	
Erytrocyte Sedimantation Rate			
Half an hour	9	7	
1 hour	19	18	
C-reactive protein (mg/dl)	0.190	0.093	
Timed Up and Go Test (second)	9.94	6.32	-36.42
One Leg Standing Test (right) (second)	20.50	74.90	265.37
One Leg Standing Test (left) (second)	55.28	124.35	124.95
Chair-Stand Test (repeat)	9	12	33.33
VO_{2max} (ml/kg/dk)	68.26	79.60	16.61

Corresponding Author: Elif GÜR KABUL
E-mail: elifgur1988@hotmail.com
ORCID: 0000-0003-3209-1499

Laodikya Rehabilitasyon Bilimleri Dergisi/Journal of Laodikeia Rehabilitation Sciences

İletilme Tarihi (Submitted Date): 08.07.2024 Kabul Tarihi (Accepted Date): 15.08.2024
Makale Türü (Article Type): Olgu Sunumu/ Case Report
2024;2(1): 9-14
doi: 10.5281/zenodo.14506855

Health Assessment Questionnaire	1.125	0.25	-77.78
Lower Extremity Functional Scale	33	67	103.03
Biopsychosocial Questionnaire	47	16	-65.96
Short form-36			
Physical functioning	15	75	400
Role limitations due to physical problems	25	75	200
Role limitations due to emotional problems	33.33	66.66	100
Energy	55	85	54.55
Mental health	84	96	14.29
Social functioning	62.50	100	60
Pain	45	90	100
General health perception	55	80	45.45

VO_{2max}: Maximal oxygen consumption; **Δ: ((posttreatment- pretreatment/ pretreatment)*100)**

4.Discussion

As a result of 12 weeks of clinical pilates and aerobic exercises, although the individual with PM achieved improvement in all parameters without any worsening in laboratory findings, the greatest improvement was achieved in physical function and limitations due to physical problems components of quality of life and balance.

Although many PM patients receive pharmacological treatment, they are inadequate in daily living activities and the patients' muscle weakness continues. Until recently, the prevailing view was that active exercises could exacerbate inflammatory activity in muscles. It is now known that active and resistant exercises improve muscle strength and endurance, aerobic capacity and general functional ability. Exercises are prescribed according to disease activity, muscle testing, joint range of motion, cardiorespiratory capacity and clinical status of the locomotor system. Exercise is an integral part of myositis treatment (14).

There are a limited number of studies in the literature investigating exercise therapy applied to patients with dermatomyositis (DM) and PM, and these are generally strengthening exercises and rarely aerobic exercises. Alexanderson et al (2014) divided DM/PM patients into two groups. The exercise group received resistant home exercises, supported by telephone, 5 days a week for 12 weeks, and home or gym exercise twice a week for the next 12 weeks. The control group performed range of motion exercises 5 days a week for 24 weeks. At 24 weeks, both groups had improvements in muscle performance and aerobic capacity, while there was no increase in inflammation assessed by creatine phosphokinase levels or muscle biopsies. Although no differences were demonstrated between exercise groups, the authors stated that the results support the safety of resistance exercise in patients with active PM/DM. An individually adapted home exercise program under the supervision of a physiotherapist may be recommended in early active PM/DM (15). Munter et al. (2013) applied endurance exercises to the exercise group for 12 weeks and did not apply any treatment to the control group of DM/PM patients. As a result, an increase in aerobic capacity and muscle mitochondrial enzyme activities was obtained. The authors emphasized that endurance exercise in addition to immunosuppressive treatment of patients is important (16). Dalise et al (2012) reported that 5-week intense aerobic exercise training applied to a 64-year-old female participant with chronic PM increased motor performance and oxidative metabolism efficiency, and also reduced muscle damage susceptibility as a result of analysis of creatine phosphokinase levels (17).

Clinical pilates exercises, which can be adjusted according to the practitioner, are divided into progression levels, and emphasize the normal curvature of the spine during the exercises (18), are safely recommended in other rheumatological diseases (19,20). As a result of our study, we attribute the biggest improvements in the physical

Corresponding Author: Elif GÜR KABUL
E-mail: elifgur1988@hotmail.com
ORCID: 0000-0003-3209-1499

İletilme Tarihi (Submitted Date): 08.07.2024 Kabul Tarihi (Accepted Date): 15.08.2024
Makale Türü (Article Type): Olgu Sunumu/ Case Report
2024;2(1): 9-14
doi: 10.5281/zenodo.14506855

limitations of the quality of life to the benefits of aerobic exercises on metabolism and the contribution of clinical pilates exercises to the mind-body integrity, and the increase in balance to the improvements in the alignment of the spine.

The strengths of our study are that clinical pilates exercises were applied to patients with PM for the first time. Our limitation is that we could not reach a larger number of patients. We recommend that future studies investigate the effects of clinical pilates exercises on larger PM patient groups.

In conclusion, after clinical pilates and aerobic exercises, an improvement was achieved in all parameters, especially in the physical function and limitations due to physical problems components of the quality of life and balance, without any worsening in the laboratory findings of the individual with PM.

Conflict of Interest

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

Funding

The authors declared that this study received no financial support.

References

1- Wiesinger GF, Quittan M, Nuhr M, et al. Aerobic capacity in adult dermatomyositis/polymyositis patients and healthy controls. Arch Phys Med Rehabil 2000;81:1Y5.
2- Plotz PH, Dalakas M, Leff RL, Love LA, Miller FW, Cronin ME. Current concepts in the idiopathic inflammatory myopathies: polymyositis, dermatomyositis, and related disorders. Ann Intern Med 1989;111:143–57.
3- Henriksson KG, Sandstedt P. Polymyositis: treatment and prognosis. A study of 107 patients. Acta Neurol Scand 1982;65: 280–300.
4- Wiesinger GF, Quittan M, Aringer M, et al. Improvement of physical fitness and muscle strength in polymyositis/dermatomyositis patients by a training programme. Br J Rheumatol 1998;37:196–200.
5- Alexanderson H, Stenstrom CH, Jenner G, Lundberg I. The safety of a resistive home exercise program in patients with recent onset active polymyositis or dermatomyositis. Scand J Rheumatol 2000;29:295–301.
6- Herman T, Giladi N, Hausdorff JM. Properties of the "Timed Up and Go" test: More than meets the eye. Gerontology 2011;57(3):203-10.
7- Vellas BJ, Wayne SJ, Romero L, Baumgartner RN, Rubenstein LZ, Garry PJ. One-leg balance is an important predictor of injurious falls in older persons. J Am Geriatr Soc 1997; 45(6):735-8.
8- Bruce RA, Blackmon JR, Jones JW, Strait G. Exercising testing in adult normal subjects and cardiac patients. Pediatrics 1963;32:742–756.
9- Jones CJ, Rikli RE, Beam WC. A 30-s Chair-Stand Test as a measure of lower body strength in community-residing older adults. Res Q Exerc Sport 1999;70:113-119.
10- Citaker S, Kafa N, Kanik ZH, et al. Translation, cross-cultural adaptation and validation of the Turkish version of the Lower Extremity Functional Scale on patients with knee injuries. Arch Orthop Trauma Surg 2016;136 (3):389-395.
11- Fries JF, Spitz PW, Young DY. The dimensions of health outcomes: the health assessment questionnaire, disability and pain scales. J Rheumatol 1982;9(5):789-93.
12- Unal E, Arın G, Karaca NB, Kiraz S, Akdoğan A, Kalyoncu U, et al. Development of a quality of life measurement for rheumatic patients: item pool construction. JETR 2017;4: 67-75.
13- Ware JE, Sherbourne CD. The MOS 36-item short-form health survey (Sf-36): I. conceptual framework and item selection. Med Care 1992;30(6):473-83.
14- Babić-Naglić D. Exercises in patients with myositis--active treatment intervention? Reumatizam 2012;59(2):73-6.
15- Alexanderson H, Munters LA, Dastmalchi M, Loell I, Heimbürger M, Opava CH, et al. Resistive home exercise in patients with recent-onset polymyositis and dermatomyositis – a randomized controlled single-blinded study with a 2-year follow up. J Rheumatol 2014;41:1124–1132

Corresponding Author: Elif GÜR KABUL
E-mail: elifgur1988@hotmail.com
ORCID: 0000-0003-3209-1499

İletilme Tarihi (Submitted Date): 08.07.2024 Kabul Tarihi (Accepted Date): 15.08.2024
Makale Türü (Article Type): Olgu Sunumu/ Case Report
2024;2(1): 9-14
doi: 10.5281/zenodo.14506855

16- Munters LA, Dastmalchi M, Katz A, Esbjörnsson M, Loell I, Hanna B, et al. Improved exercise performance and increased aerobic capacity after endurance training of patients with stable polymyositis and dermatomyositis. Arthritis Res Ther 2013;15:R83
17- Dalise S, Bertolucci F, Simonella C, Rossi B, Chisari C. Intensive aerobic training improves motor performances and oxidative metabolism efficiency in chronic polymyositis: a case report. Neuromuscul Disord 2012;22(3):S221-5.
18- Latey P. The Pilates method: history and philosophy. J Bodyw Mov Ther 2001;5(4):275–282.
19- de Aguiar AS, do Amaral JN, Carvalho CA, de Araújo WN, Sales MSC, Portilho JA, et al. Effects of pilates method in fibromyalgia patients: an integrative review. Int J Dev Res 2020;10(6):37378-37381.
20- Rodríguez-López ES, Garnacho-Garnacho VE, Guodemar-Pérez J, García-Fernández P, Ruiz-López M. One Year of Pilates Training for Ankylosing Spondylitis: A Pilot Study. J Altern Complement Med 2019;25(10):1054-1061.

Corresponding Author: Elif GÜR KABUL
E-mail: elifgur1988@hotmail.com
ORCID: 0000-0003-3209-1499