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## Case Report

# THE VALUE OF REHABILITATION OF CAMPTOCORMIA

## Abstract

Parkinson's disease is a neurodegenerative disorder characterized by progressive loss of muscle control, stiffness, slowness, and impaired balance. In the later stages, posture disorders can be seen. In this study we aimed to present the successful results of rehabilitation therapy in three patients with Parkinson's disease and camptocormia.

A patient-centered rehabilitation program was started. We aimed to improve functional capacity, balance, coordination and postural control. Home exercise programs were prepared to enhance patients' daily living activities. After a six-week rehabilitation program, significant improvement was observed on the Schwab-England Activities of Daily Living Scale and patients could walk on flat ground while maintaining erect posture for at least 50 meters with one-side support. On the second month of follow-up, the clinical improvement continued.

These cases showed that effective exercise therapy and patient education may improve the quality of life and functionality in Parkinson's disease and therefore rehabilitation should be part of treatment at all stages of the disease.

***Key Words:*** Camptocormia; Parkinson's Disease; Rehabilitation; Treatment.

## Olgu Sunumu

# KAMPTOKORMİA TEDAVİSİNDE REHABİLİTASYONUN YERİ

## Öz

Parkinson hastalığı ilerleyici kas kontrolü kaybı, sertlik, yavaşlık ve denge bozukluğu ile karakterize ileri aşamalarda duruş bozukluklarının görülebildiği bir nörodejeneratif hastalıktır. Bu çalışmada Parkinson hastalığı ve kamptokormia tanılı üç hastada rehabilitasyon tedavisinin olumlu sonuçlarını sunmayı amaçladık.

Hasta odaklı rehabilitasyon programıyla fonksiyonel kapasiteyi arttırmak, denge, koordinasyonu ve postüral kontrolü sağlamak amaçlandı. Hastaların günlük yaşam aktivitelerinin yapılandırılması için ev egzersiz programları hazırlandı. Altı haftalık rehabilitasyon programı sonrasında hastalar dik postürü daha uzun süre koruyarak düz zeminde tek taraflı destekle en az 50 metre yürüyebilir seviyeye geldi. Schwab-England günlük yaşam aktiviteleri ölçeğinde belirgin iyileşme gözlendi. İkinci ay kontrolünde klinik düzelme devam etti.

Bu olgularla Parkinson hastalığında egzersiz ve hasta eğitimi yaşam kalitesi ve işlevselliği arttırmıştır. Rehabilitasyon hastalığın her aşamasında tedavinin bir parçası olmalıdır.

***Anahtar Sözcükler:*** Kamptokormia; Parkinson Hastalığı; Rehabilitasyon; Tedavi.

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## INTRODUCTION

Parkinson's disease (PD) is a neurodegenerative disorder characterized by resting tremor, rigidity, bradykinesia and postural instability. In the advanced stages of the disease, postural disorders may be seen (1). Anteflexion posture, camptocormia and Pisa syndrome may be seen due to the impaired orientation component, while postural instability may occur due to the impairment of the balance component (1). The objective of this presentation is to highlight the positive results of the rehabilitation program applied in three PD cases with camptocormia.

### Case 1

A 73 year-old female patient, admitted to the neurology clinic presenting with complaints of inability to stand upright and difficulty in walking for a year was referred to a physical therapy and rehabilitation (FTR) clinic. From the history we learned that she received a PD diagnosis seven years ago and was on levodopa/benserazide HCL 300/75 mg/day, rasagiline 1 mg/day, and pramipexole 3 mg/day. No other known diseases were described. During visual gait analysis conducted on a flat surface with floor support jack on one side, her hips and lumbar spine were flexed and her knees were semi-flexed in order to limit her step length. While getting an erect posture from a forward bend she got support with her hands from the pelvifemoral region and stood still for only one second (Figure 1).

**Table 1—** Selected Characteristics of Chases

| Characteristics | Case-1 | Case-2 | Case-3 |
|---|---|---|---|
| Gender | Female | Female | Female |
| Age | 68 | 69 | 72 |
| Disease duration (year) | 7 | 18 | 1 |
| Duration of spinal deformity | 2 years | 3 years | 2 months |
| Hoehn and Yahr score | 4 | 4 | 3 |
| Mini-mental state test | 27 | 27 | 28 |

### Case 2

A 69 year-old female patient who had been diagnosed with PD for 18 years was admitted to the neurology clinic complaining of an inability to stand upright without assistance for the last three years. Her history showed that she had been diagnosed with rheumatoid arthritis, osteoporosis, gout and coronary artery diseases. She was on rasagiline 1 mg/day therapy and refused to use levodopa because of side effects. While gaining an erect posture from a forward bend she got support with her hands from the pelvifemoral region and stood still for only ten seconds.

### Case #3

A 72 year old female patient who had had PD for 1 year was referred to our clinic complaining of an inability to stand upright. She had also suffered from neck and lower back pain for 2 months. Her history showed that she had received a

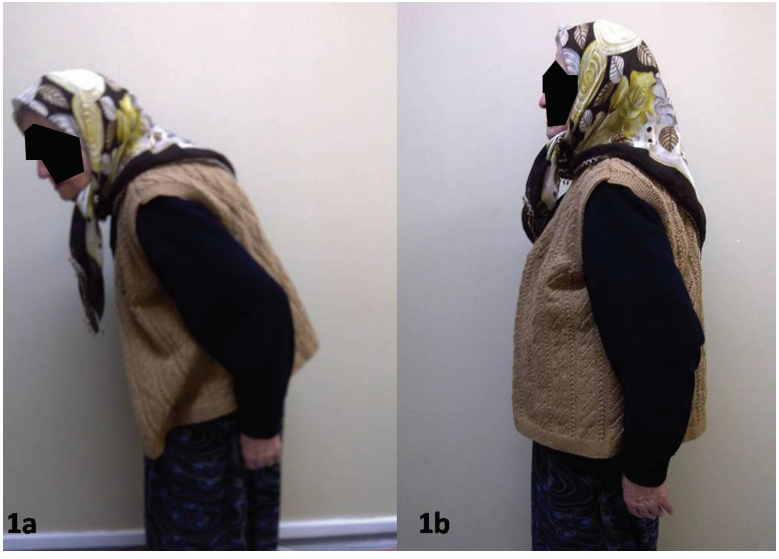


**Figure 1—** P-D-camptokormia-p

diagnosis of hypertension and heart failure. She was on levodopa/carbidopa/entacapone 300/75/600 mg/day, rasagiline 1 mg/day, and ropinirole 8 mg/day therapy. Gaining an erect posture from a forward bend, she got support with her hands from the pelvifemoral region and stood still for only 30 seconds.

Patients' demographics and examination data before treatment are summarized in Table 1.

### Treatment

After each case was evaluated, the objective was to enhance functional capacity and to maintain balance, coordination and postural control with a patient-focused rehabilitation program. Home exercise programs were designed to reconstitute patients' daily life activities. Warm-up and cool-down exercises were performed for ten minutes at the beginning and at the end of a rehabilitation program that lasted a total of 60 minutes. The rehabilitation program was scheduled for six weeks (Table 2).

Family members were included in the home exercise program and were trained in home safety.

At the end of the rehabilitation program, all patients were able to maintain their upright posture for a longer duration and walk for a minimum of 50 meters with a floor support jack on one side. A significant improvement was observed on the Schwab-England Activities of Daily Living Scale. On the second month of follow up, no clinical deterioration was observed. Patients' examination findings and test scores before and after treatment are summarized in Table 3.

## Discussion

Camptocormia is the term used to describe the abnormal posture that occurs as a result of extreme forward flexion of the thoracolumbar spine (1). Rarely reported in the literature, camptocormia was first reported by Brodie in 1818 and in 1915 Souques and Rosanoff-Saloff drew attention to this disorder in their presentation of 16 cases (1). The prevalence of camptocormia in Parkinson's disease is around 3-17.6 % (2). Camptocormia increases during the day and when sitting and walking; however, while lying in the supine position it disappears completely. Prevalence increases in male patients, in advanced age, as the disease duration becomes longer and in the presence of motor fluctuations and autonomic symptoms. It has been reported that camptocormia may rarely develop within weeks after onset of PD or may develop after an average of 14 years (1). Two out of three female patients that we present in the current study developed camptocormia in the early stages of the disease, which progressed rapidly, drastically affecting the patients' quality of life.

In Parkinson's disease, exercise treatment is administered in combination with medical or surgical treatment (3-5). Medical or surgical treatment is usually effective for bradykinesia, rigidity and freezing of gait. However medical treatments were not found to be effective on non-dopaminergic symptoms such as lack of balance control and fall risk (6). A regular rehabilitation program is recommended in PD (7). The aim of rehabilitation is to increase functional capacity and reduce the complications that might arise during move-

**Table 2**— Rehabilitation Program

| Duration | Treatment Schedule |
|---|---|
| Days 1-10 | Relaxation exercises (can be performed in a sitting position)<br>Postural exercises<br>Breathing exercises (breathing out through pursed lips)<br>Joint range of motion (ROM) exercises (active and active-assistive ROM exercises for upper and lower limbs)<br>Gait exercise with mobility aids 5. |
| Days 11-20 | Joint range of motion exercises<br>Flexion exercises [active and passive flexion exercises for vertebrae and upper and lower limbs (supine, prone, sitting, standing)]<br>Treadmill exercises (as tolerated) |
| Days 21-30 | Exercises which increase muscle strength and back extensors; isometric exercises which are performed in supine and prone positions<br>Isometric abdominal and lumbar exercises and lumbar stabilization exercises<br>Balance and coordination exercises (can be performed using loads in sitting and standing position) |
| After 30 days | Mobilization and gait training (gait training using lumbopelvic and pelvifemoral extension, flexion and rotation movements in order to transfer the body weight from one leg to the other) |

**Table 3**— Test Scores Before and After Treatment

| Characteristics | Case 1 | Case 2 | Case 3 |
|---|---|---|---|
| Duration of standing upright before treatment | Less than 1 minute (1 sec) | Less than 1 minute (10 sec) | Less than 1 minute (30 sec) |
| Duration of standing upright after treatment (30 sessions) (minutes) | 10 | 22 | 20 |
| ADL evaluation according to Schwab-England Scale (pre-treatment) | 70% | 50% | 70% |
| ADL evaluation according to Schwab-England Scale (post-treatment) | 80% | 60% | 80% |
| Up-go test (pre-treatment) | 34 | 40 | 26 |
| Up-go test (post-treatment) | 28 | 35 | 17 |

Sec: Seconds, ADL: Activities of daily living.

ment. Rehabilitation usually focuses on functional limitations and includes mobilization exercises, gait training, daily activity training, relaxation therapy techniques and breathing exercises (8). Effective rehabilitation treatment has been shown to especially improve activities of daily life and gait (gait velocity and step length), but it has not had a significant effect on neurological symptoms (7,8).

Medical treatment has not been efficient in treating camptocormia. Levodopa, one of the main treatment options used in PD treatment, has a small effect on axial symptoms (6,9). In patients diagnosed with PD, abdominal muscle hyperactivity was observed as a camptocormia symptom, therefore in order to reduce abdominal hyperactivity, botulinum toxin type A was used in a small study. No significant results were obtained (10). Deep brain stimulation via stereotaxic surgery is another method that has been studied. Asahi and colleagues reported in a review that comprised 26 cases that stereotactic surgery might be effective during the early stages of the disease (11). Thoracolumbar spinal fixation was another surgical method tried; however, due to the risk of complications and multiple surgical interventions it is rarely preferred (2,12,13).

The lack of efficiency of medical and surgical treatments put the physiotherapy option forward. Conventional rehabilitation treatment has been regarded as effective on gait, activities of daily life and quality of life, and also on prevention of falls (1). In the current study breathing exercises, postural and mobilization exercises, gait training, and assistance device training were all conducted in the presence of a physical therapist. Patients' relatives were also trained in home safety. As summarized in Table 1, increase in duration of standing upright, decrease in up-go test time and improvement in activities of daily life were observed.

In parallel with the rehabilitation treatment methods we have chosen to use in the cases that we presented, rehabilitation programs reported in the literature comprised intensive sport activities, treadmill exercises, strengthening training, aerobic exercises, home exercise programs and the practice of movement strategies (6). Rehabilitation programs can offer group or individual sessions, session duration and frequency can be variable (in terms of number of sessions per week) and sessions should be scheduled according to patients and their specific needs (6).

In the present study patients were unable to stand in an upright position for one minute, however at the end of 30 sessions of the rehabilitation program they were able to maintain their upright standing position for 10 minutes. In the literature search we have conducted, we came across studies reporting that camptocormia symptoms did not respond well to medical treatment; however, we did not come across any findings concerning the results of rehabilitation programs in camptocormia treatment. In order to evaluate the efficiency of the rehabilitation program, no changes were made to the drug regimen patients received. Even though the patients in our cases had late stage PD, significantly positive results were obtained from the relevant exercise programs performed, which is why we wanted to present these cases.

In conclusion, camptocormia can be described as a rare clinical condition that reduces the quality of life of patients with PD and is very difficult to treat. These findings were worthy of presenting because they showed that an efficient exercise treatment combined with patient training may provide a solution to this severe clinical condition, improve patients' quality of life and enhance their functionality. Rehabilitation should be a part of the treatment procedure in every stage of PD. Clinical studies with a higher number of patients should be conducted in order to evaluate the efficiency of rehabilitation.

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