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PHYSICAL EXERCISE MODERATES THE RELATIONSHIP BETWEEN THE QUALITY OF LIFE AND COGNITIVE OUCOMES IN PARKINSON'S DISEASE PATIENTS

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Abstract

Aims. Exercise is essential to maintain good health and reduce the risk of chronic illness. Studies show that exercise can improve symptoms related to Parkinson's disease. The purpose of this paper is to discover the reasons why the adoption of a regular exercise regime can improve mobility and quality of life in Parkinson's disease.

Methods. A lot of 10 patients with Parkinson's disease has been analyzed from a neurological point of view, taking into consideration the participation of the patient's lot into a sport program. The programs generally consisted of 40-60 minutes of balance exercises, but also exercises designed to strengthen the body's muscles, but especially the muscles of the legs. A series of psychological analyses and tests using the questionnaire method were applied to patients before and after practicing sports programs, on cognitive, emotional, depression, anxiety and quality of life. The comparison was made with a lot consisting of 10 patients with Parkinson's disease, the control group, that did not perform any sport activity. The both group of patients were on the same stage on Hoehn and Yahr Scale.

Results. One of the goals of the exercises is to prevent a possible fall, because people with Parkinson's disease may be affected by their ability to control their body movements. Motor disorders caused by Parkinson's disease cause emotional and cognitive difficulties, but studies showed that working on muscle balance can improve patients' mental and emotional states, because patients with Parkinson's disease often have associated emotional disorders such as depression, anxiety and irritability, insomnia. Our sport group of Parkinson's disease patients showed improvements, in comparison with the control group regarding to Unified Parkinson's Disease Rating Scale (UPDRS).

Conclusions. A variety of studies were made, with the results consisting of the improvement of the life of patients with Parkinson's disease through the prism of sport and physical activity. Exercise can improve movement, thinking and memory. Also, physical exercises can have a positive impact on the physical appearance, mood and social interactions.

Key words: Parkinson's disease, physical activity, emotional disorders, cognition.

Introduction

Parkinson's disease (PD) is characterized by being a neurodegenerative disorder of the elderly population that affects mainly the dopaminergic neurons of the substantia nigra, resulting in the dopamine loss in the striatum. These anatomical entities are included in the Central Nervous System (CNS), with an action on the modulation of movement. An injury in these components deviates the normal functioning with the following changes: bradikinesia, akinesia, stiffness, tremor and postural instability. PD is a representative for the highest

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encountered neurodegenerative diseases in the elderly.

Related in the studies of Dmochowski et all., the etiology of PD is yet not defined, having the following components: genetics, stress, exposure to toxic and infectious environments and yet, various other factors (Dmochowski, 1999).

Larumbe et al, introduced the notion that the loss of neural tissue may happen due to the oxidative stress, and also be caused by the decrease of glutation, which is a valuable antioxidant system specialized in neutralizing free radicals, although there is no clear cause for this degeneration (Larumbe, 2001).

The dopamine loss has an important effect on the extrapyramidal system, identifying disfunctionalities in muscle coordination and muscle activities, reflecting in the incapacity in maintaining posture and fine coordination, imbalance in gait, and muscle tightening.

Taking into consideration the anatomical and the functionality of the systems affected by Parkinson's disease, rises the hypothesis stating that physical exercises (PE) can improve the quality of life in PD patients and also or delay the onset and the intensity of signs and symptoms and providing the maintenance of patients' independence.

In 1967 Hoehn and Yahr classified the evolution of Parkinson's disease in stages, which show the level of difficulty of the patient, on a scale from I to V. "Stage I: signs and symptoms on one side of the body, mild but not disabling symptoms, usual presence of tremor in one of the upper limbs; stage II: bilateral symptoms, minimal dysfunction, impaired posture and gait; stage III: significant slowness of body movements, dysfunction of gait and orthostatic balance as well as moderately severe generalized dysfunction; stages IV and V: severe symptoms, limited locomotion, stiffness and bradykinesia, total loss of independence, inaccurate responses to levodopa and neuropsychiatric diseases".

The tremor in Parkinson's disease has the frequency of 4 to 6 Hz, representing a cardinal symptom of the diseas, is noticed in rest, decreasing or disappearing at the initiation of movement.

Methods

The lot of 10 patients was recruited from the neurological private clinic of dr Docu Axelerad Any, all the patients were diagnosed with Parkinson's disease by a neurologist. Inclusion criteria for entering the study were: Parkinson's disease, ability to self-care, EDSS < 3,5. Patients were also excluded if their diagnosis was not clearly established, they were suffering severe cognitive deficits, or had signs of any psychiatric disease. Individuals did provide the signed consent associated with the program to ensure that all procedures and tests, their risks and benefits are fully understood.

The sessions were 1 hour / 1 hour and the average duration, twice/ three times a week, with short breaks of 5-10 minutes (to avoid fatigue), for six months. The beginning of the courses started with 5-10 min warm-up, accentuating the range of movement.

The intervention program that was followed consisted in simple movements including flexion, extension, rotation and all the movements possible aiming movements in the whole body. The intervention was also be attended by a doctor, in charge of performing neurological evaluations and a physiotherapist.

The results of the training were tested using UPDRS Test. The results of the training were statistically assesed using measures of paired samples test. A value of $p < 0.05$ was taken as significant. All analyses were performed using IBM SPSS Statistics 20.

Results

At the UPDRS test performed before the period of physical therapy training, the active group of patients obtained a mean score of 51.50 ± 2.87 points. At the UPDRS test performed after the period of dance movement therapy training, the active group of patients obtained a mean score of 43.70 ± 1.49 points. The difference between the scores before and after the training period were statistically signifficant $p < 0.001$.

The control group of patients did not obtain significantlly different results at the UPDRS Scale Test before and after the six months.

The results show a significant difference between the scores obtained by the active group of patients, meanwhile, the control group did not experience any difference in the interval of the study.

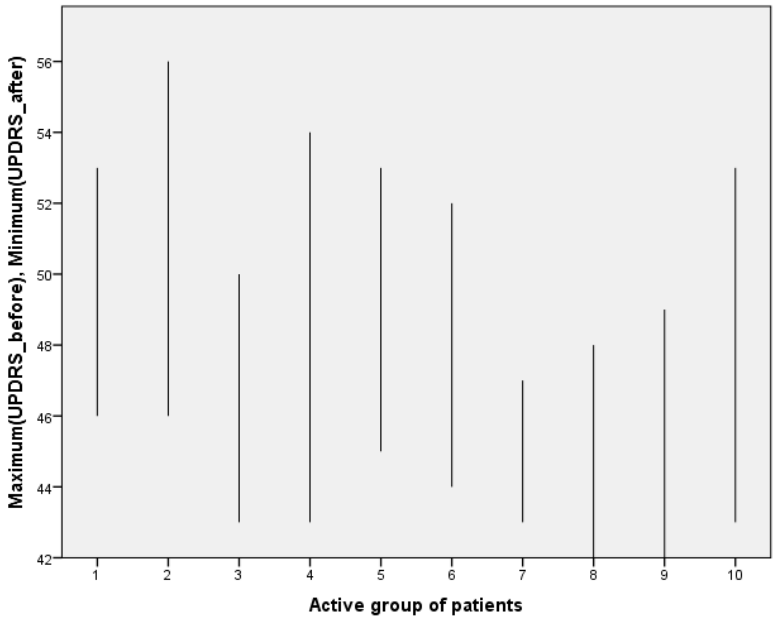

Figure 1. Mean scores of the Parkinson's disease patients in the active group obtained at the UPDRS before and after the period of training.

Discussions

Physical therapy and exercises have a beneficial result in the scores ofactive group of Parkinson's disease patients (Docu Axelerad, 2020), (Dantes, 2020). Smith and Zigmond et al. relate that in the initial phase of PD, physical activity can decrease the loss process of dopaminergic neurons and also, reduce the development of disease symptoms (Smith, 2003).

At the initial part of the disease's evolution, patients can approach behavioral therapies as melotherapy or religiosity (Docu Axelerad, 2019) to decrease the motor system' s disfunctionalities, this fact is oftenly seen in animal models, which, when compelled to us the limb with the first caracteristics of the disease, demonstrated a decrease in the evolution of symptoms (Stroe,

2019), (Stroe, 2020), (Docu Axelerad, 2019), (Docu Axelerad, 2020).

In the studies performed, Miyai et al. described that that walks with partial support of body mass provided an important aid to the amplitude and speed of the stride, concluding in an amelioration and stability of gait (Miyai, 2000).

In a further study comparing physical therapy and gait training with partial body mass support, Miyai et al. provided new information, completing the previous study by reporting that this type of activity has a persisting result on the gait of PD patients. The authors also concluded that this practice is beneficial for the medication's action time by decreasing the patient's "off" phase (Miyai, 2002).

Pohl et al. reported that treadmill gait exercises is a encouraging therapy for the rehabilitation of patients with gait difficulties, and latterly used in patients with PD, concluding in enhancement in gait, with a much more beneficial effect compared to conventional therapies (Pohl, 2003).

In another neurological diseases, physical exercise has been seen as an adjuvant in the quality of the neurological patients' lives (Sirbu, 2003), (Sirbu, 2006), (Sirbu, 2020), (Scalzo, 2012), (Falup-Precurariu,2019).

Conclusions

Physical exercise is not expected to cure Parkinson's disease, but it can have a favorable effect in controlling the aggravation of a sequence of symptoms that decrease the quality of the patient's lives, as following: reduced joint torque by reducing the muscular tone and endurance, decreased capacity to complete definite assignments due to muscle stiffness and akinesia, improving motor coordination impaired by Parkinson's tremor, muscle rehabilitation, adjusting dysfunctions in gait and balance, diminishing the effects of bradykinesia, preserving the patient's physical independence and into rejoining the patient's social life and routine (Docu Axelerad, 2020), (Stroe, 2020).

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