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Original article

EXERCISES IN PARKINSON'S DISEASE

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Abstract

Aim. The main purpose of our study was to discover the clinical adjustments, if they exist, in the early-stage Parkinson's disease, on one side with drug treatment and on the other side with drug treatment and physical exercise. The secondary purpose was to measure how physical exercise affects the patients at the debut of Parkinson's disease and patients' quality of life results.

Methods. Patients with Parkinson's disease, with a mild stage of disease, (Mean \pm PD: age = 50 - 59 years; Webster rating scale results = 9 - 10, Hoehn and Yahr Scale results 1-2, Quality of life questionnaire results = 18 - 25). Each patient is in mild stage of Parkinson's disease and is on monodrug treatment with Rasagiline 1 mg/day and only a part of the patients started physical exercises, right from the beginning, the observation period being 6 months.

Results. We observed that the clinical state of the training group has improved over the 6 months of the trial, fact demonstrated by the upgraded results of the Webster scale, but remained the same on the Hoehn and Yahr Scale. The results of the Quality of life questionnaire were indisputable improved for every patient from the training group, showing that physical exercises can improve the life of Parkinson's disease patients.

Conclusions. We cannot take into consideration that this method approach of targeted physical exercise and scale analysis is more accurate than additional programs, but the present research is intended to be elongated on a considerable lot of patients with more mechanisms of measure.

Keywords: Parkinson's disease, physical exercise, Webster scale.

Introduction

Parkinson's disease is a neurodegenerative disorder with an extensive influence in physical, psychological, social and functional condition of patients. Parkinson's disease features the adjustment of resting muscle tone and voluntary movement due to the loss of the dopamine from the striatum, in the nigrostriatal dopamine pathway. The clinical signs most common are: bradykinesia, rhythmic tremor, rigidity and postural instability subsidiary to the dopamine depletion. The most beneficial management of the Parkinson's disease patients contains both pharmacologic treatment and encouragement of physical activity.

Strategies are needed to improve balance among older adults with Parkinson's disease because in the absence of regular physical activity, physical activity, balance, and muscle strength decrease among patients with Parkinson's disease.

Other authors have suggested that changes in balance in Parkinson's disease and age-related normal changes, such as decline in muscle strength that occurs in adults who do not perform physical movement, may respond positively to exercises that increase muscle strength and balance recovery. Interventions such as exercise aimed at balance and muscle strength have the potential to lower the risks of falling

Recent experimental studies on animal models of Parkinson's disease or stroke and spinal cord injury have shown that rehabilitation measures through sports training can initiate the stimulation of a number of events related to plasticity in the brain, spinal cord, including neuronal growth, synapse genesis and even neurogenesis.

In addition, during the slow degeneration of the nigrostriatal dopaminergic neurons, the application of intense motor and sensory stimuli in training seems to be neuroprotective.

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Exercise programs might have an effectiveness related to the adjournment or even the overturn of the functional deterioration for individuals with Parkinson's disease, related to the great empirical evidence that has arisen in recent years.

Multiple evidence has specified that exercise brings great benefit in terms of physical functioning, quality of life related to the health, physical strength, balance and speed of walking in the lives of people with Parkinson's disease.

Methods

The objective of the already stated study was to compare 6 months outcomes of patients with Parkinson's disease, who received a trial with stretching, balance and coordination exercise program. All of the Parkinson's disease patients were recruited from a neurologic private clinic. Patients were separately diagnosed by DrDocuAxelerad Any, the director of the clinic and each one of the patients fulfilled the standard criteria for idiopathic Parkinson's disease and were negative for dementia, hallucinations or dyskinesia. Each patient was having monodrug therapy with Rasagiline 1 mg/day. All of the patients were at Hoehn-Yahr stage II and have the Webster rating scale results between 9-10 and the Quality of life questionnaire results between 25-30. The training group of patients (contained 3 women and 2 men) was practicing physical exercise since the beginning of the disease. The training contained: exercises 20-60 minutes a day, 3-5 days a week- light, medium and high intensity; aerobic progressively performed, with a frequency of 2-3 times a week, 2-4 sets with 8-15 repetitions; strength and flexibility exercises 2-3 times a week, for 10-30 seconds and stability exercises for 10-15 minutes, 2-3 times a week, with exercises that involve balance, agility, coordination and walking. Each patient from the training group was firstly instructed by a coach and afterwards, received electronic and paper support for managing the training project for six months. The control group (contained 3 women and 2 men) continued the treatment for 6 months. Every patient was tested before and after the six months with the following instruments: Webster scale, Hoehn and Yahr scale and the Quality of life questionnaire.

The first patient, CC, male, 56 years, from the training group completed the workout for every day that was planned, for 6 months. His first result was 10 points on the Webster scale with presence of the following: Bradykinesia of hands: moderately impaired hand function, the level of rigidity was

moderate on neck and shoulders. Related to the Upper extremity swing: one arm swing was definitely decreased. He presented no detectable tremor. The patient had detectable immobility and a flexed posture with the head observable anteflected. And related to the speech, he presented a beginning of hoarseness. He is still able to support full self-care, but his rate of dressing definitely decreased than the normal. The patient presented with an increased perspiration ratio than the normal. After 6 months his result was 8 points on the Webster scale with the following modifications: the bradykinesia of the hands has changed from moderate to mild, with only a beginning difficulty in his hand dexterity and another feature that changed is the level of rigidity, that decreased in the neck and shoulders: from being moderate to mildly detectable. In relation with the result on the Hoehn and Yahr scale, the initially score was 3- mild to moderate disability with impaired postural reflexes and the patient was physically independent. After the 6 months training, the Hoehn and Yahr scale result has decreased to 2 points: bilateral involvement without impairment of balance. About the Quality of life questionnaire, in the first result he obtained the total of 22 points following the subsequent: related to the mobility: he could go without help inside the house, but in certain activities he needed the help of others. He was not able to perform his usual activities, his work was much less effectively. The patient had trouble sleeping, in the most nights not being able to get enough rest. He had slight problems with his bladder and bowel function. After the 6 months of training the result on the Quality of life questionnaire was 18, so the mobility of the patient increased, now being able even to manage better his actions and activities. Also, the patient related that his sleeping problems resolved and he has no longer resting issues.

The second patient, BJ, 56 years, female, belonging to the training group, completed all the planned day's workout on the period of 6 months. At the beginning of the 6 months of training, the patient had a Webster score of 9 points, presenting as follows: regarding to bradykinesia: she had a slight difficulty in performing the pronation-supination actions of the upper limb. On the other hand, the patient had hyperflexion of the neck and shoulders. Also, the posture of the body had a forward, more visible bent at the level of the cephalic extremity. In relation to the patient's walking, a change was observed in the steps during the walking, because the steps became more to ensure a stable walking. The lack of balance of a superior member was also noted. Characteristic moderate signs of depression were

observed by analyzing the patient. Regarding the secretions of perspiration, an increase of them was observed. In her speech was discriminative a loss of inflection and resonance. She was able to live alone, taking care of herself, even though she took more time to do activities like dressing. After the half of year of training, the patient's score of Webster scale was decreased to 7 points, by the disappearance of the depression. Related to the Hoehn and Yahr scale result, it remained the same (1 point), after 6 months of scheduled psychical activity. Regarding to the improvement of 5 points in the Quality of life Questionnaire result, she obtained 25 points likewise: the patient had low mobility, so she could handle herself at home, even if she slowly performed actions, but this matter changed after exercise, but not enough to modify the score on the Webster scale regarding to mobility. She initially had shortness of breath during heavy work or sports, but after one month of exercises, it disappeared. The patient had moderate problems with sleep at night, being unable to sleep in the most nights due to her thoughts and worries. Also, she was able to perform her usual activities with minor difficulty at the beginning and after the period of 6 months of training, her struggle in her daily activities has decreased. At the beginning, she was feeling moderately depressed and this fact changed such that at the last test performed she was not feeling depressed anymore. In the first test in the questionnaire related to the quality of life the patient stated that he felt moderately stressed, and after 6 months of physical exercise, she related that she felt very stressed. The final result on the quality of life questionnaire was 17 points.

The third patient, II, 57 years, male, from the training group, finished all the prepared day's workout on the period of 6 months. At the inauguration of the 6 months of training, the patient obtained a Webster score of 9 points, having as follows: regarding bradykinesia: detectable slowing of supination-pronation rate, he had a mild negative resting arm rigidity, his head was slightly flexed forward, with one arm swing definitely decreased. About the gait, he had the following changes: the turnaround time slowed, requiring several steps. His tremor was positive and detectable while walking and during the finger-to-nose test at the right hand. His immobility was moderate and easy detectable. His speech presented a loss in the resonance and in the inflection. He could still provided full self-care for himself, even than he took more time for doing his activities. After the training of six months, his Webster scale test was 7 points, with the disappearance of the tremor of the right hand while

walking and while the finger-to-nose test. Related to the Hoehn and Yahr scale result, it remained the same (1 point), after 6 months of scheduled psychical activity. The first score after the quality of life questionnaire was 26 points and the last result after the 6 months of training was 18 points. The patient's mobility was moderately reduced at the beginning of the 6 months, and at the end of the period the patient's flexibility increased, modifying with a point the result of the quality of life scale. At the beginning, the patient had weak problems with breathing, becoming apneic in situations of physical stress, this fact continued to exist for the first 3 months during the training, for which the patient took multiple breaks, but after 3 months of training, the apnea dependence of physical effort disappeared. The patient had minor problems falling asleep at night, but after 6 months, this was remedied. The patient noticed an improvement in the way he performs the activities compared to the period when he did not exercise. The patient stopped feeling the physical discomfort he had at the beginning of the period after 4 months of performing the exercises. The patient's vitality increased during the 6 months of exercises. At the beginning of the period, the patient felt very nervous due to his physical condition that was prevented him from performing his physical activities, but after 6 months, the intensity of nervousness decreased to minimum. Also, the level of tiredness that the patient had at the beginning dropped after the 6 months so she was feeling only slightly tired at the end.

The fourth patient, TM, age 58, female, from the training group, completed the whole programme of physical exercise during the period of 6 months. At the initiation of the workout, his score on the Webster scale was 9 points: she had an incipient bradykinesia of hands, having difficulties in hands' dexterity. She had a moderate rigidity, preponderant on the neck and shoulders. Her head was flexed and with one arm swing definitely decreased, her gait required several more steps. Her tremor was present during finger-to-nose test. Detectable immobility was also observed at the first encounter with the patient. Her rate of dressing was definitely impeded. After the 6 months training, her score improved by decreasing her rigidity and obtained a 8 points Webster scale test. Regarding to the Hoehn and Yahr scale result, it remained the same (1 point), after 6 months of scheduled psychical activity. The quality of life questionnaire revealed the 20 points score the first time it was performed, but after the training during 6 months, the score has decreased to 15 points. Before the training period she needed more help for walking

and performing the indoors activity, but now she needs only sometimes help for the actions with considerable difficulty. Also, she had slight problems with the insomnia, but after the training period, she had a normal nictemeral rhythm. She had slight difficulties in thinking clearly before the training period and after the amount of exercises performed, she sustains that her mental function has improved. Her mild physical discomfort has disappeared after the training period. Her slightly anxiousness and worry have remained, but it affects her only rarely, in certain situations.

The fifth patient, MN, age 57, female, from the training group, accomplished the whole training programme after the period of 6 months. Originally, the Webster scale score was 9 points. The patient presented the following: beginning difficulty in hand dexterity, detectable rigidity in neck and shoulders, head flexed forward, with the gait shortened. The tremor was present during the finger-to-nose test. Moderate anxiety was present. Increased perspiration was also present. She still provides full self-care, even though her rate of motion is decreased. After the 6 months of training, her Webster scale result decreased to 6 points because of the softening of the rigidity in neck and shoulder and the anxiety disappeared, but the other symptoms remained the same. Regarding to the Hoehn and Yahr scale result, it remained the same (1 point), after 6 months of scheduled psychical activity. The result of the quality of life questionnaire before the training was 23 points as it follows: the mobility was affected only outdoors in certain situations. She had severe issues with the sleep, having to use sleeping pills, fact that changed to slight problems with the training routine that lasted for 6 months. Her capacity to perform usual activities was less effective at the beginning of the 6 months. She had slight problems with her function of the memory and she felt a mild physical discomfort at the beginning of the training, but after the 6 months of exercise, her memory problems stopped and her physical discomfort disappeared. Also, the distress, anxiety disorders and her vitality loss problems vanished after the training. She had problems with the bowel function, but they disappeared after the 6 months training. Her last score on quality of life questionnaire was 16 points.

The first patient from the control group, GL, age 55, female, obtained 10 points on the initial Webster scale test. Her bradykinesia of hands was mild and the rigidity of her neck and shoulders was also mild. Also, her head was slightly flexed forward and the gait was shortened and one arm swing was definitely decreased. The tremor was incipient,

present only on the finger-to-nose test. She had beginning depression features, along with detectable immobility. She had increased perspiration, a beginning of hoarseness and even though her rate of speed moving was decreased, she maintained her full self-care. The Webster scale score after the 6 months of training was still 10 points. Regarding to the Hoehn and Yahr scale result, it remained the same (1 point), after 6 months. The quality of life questionnaire's first score was 21 points. She was able to walk without difficulty indoors, but outdoors, she had a slight difficulty in performing some actions like: climbing. Also, she had mild problems with sleeping, sometimes she would wake up at night and not fall asleep again. On the other hand, she had slight speech difficulties, with a beginning of hoarseness. She was able to perform her usual activities, but with slightly less effectiveness. She had mild symptoms of nausea. On the chapter of depression, she felt a bit sad and melancholic and in every day at least 2 times per day she felt stressed and moderately tired. After the 6 months of living in her normal way, her Hoehn and Yahr scale test results were unchanged. But, her quality of life test's score was increased with a point because of the aggravation of sleep loss.

The second patient of the control group, CV, female, 57 years, had a score of 9 points on the Webster scale test, marking the following subchapters of the test. In relation to bradykinesia, the result was: difficulty to perform the dexterity of a hand. Also, with incipient rigidity, detectable in the neck and shoulders. The patient's head showed a bending forward. The time of return during the walk is slow, needing more steps to change its direction. At the action of peak-to-peak, the tremor movement was present. She has beginning anxiety features. With one arm swing definitely decreased. She had speech modification, but her volume is good and is still easily understood. She still provides self-care, even though her rate of dressing is definitely impeded. Related to the Hoehn and Yahr scale result, it remained the same (1 point), after 6 months. The quality of life questionnaire's first score was 19 points. In relation to mobility, the patient had only minor difficulties in performing the activities outside the house. The patient had little difficulty in speaking. Also, his daily activities were slightly affected, now he can perform them with more difficulty than usual. The patient stated that she sometimes has memory difficulties. At the same time, the patient felt a little anxious. After the 6 months, the Webster scale test result and the quality of life test result remained the same.

The third patient from the control group, BG, male, 58 years, obtained a score of 10 points on the Webster scale test, checking the following subchapters of the test. Regarding to the bradykinesia, he had a moderately impaired hand function, with detectable rigidity of neck and shoulders and with one arm that fails to swing. The turn-around time was slowed. The tremor was present during finger-to-nose test. The patient had a beginning anxiety. His speech had a beginning of hoarseness, he was able to live alone. Related to the Hoehn and Yahr scale result, it remained the same (1 point), after 6 months. The quality of life questionnaire's first score was 20 points. About the mobility, the patient had only minor difficulties. He was feeling moderately anxious and had breathing problems and mild physical discomfort during the anxiety periods. He had moderate problems with the sleeping, not being able to fall asleep most nights per week. He had slight speech difficulties. The patient was able to perform his usual activity with minor difficulty. After the 6 months, the Webster scale test result was the same and the quality of life result was the same.

The fourth patient from the control group, GD, female, 56 years, had a score of 9 points on the Webster scale test, obtaining positive answers on the following rubrics: her bradykinesia of hands was detectable by the slowing of supination-pronation rate; her rigidity was detectable in the areas of neck and shoulders, also her posture was flexed forward, with one arm that has the swing definitively decreased. Her gait was shortened and her turn-around time was increased. The tremor was present while she was walking. She had features of a beginning anxiety. And she required help in certain critical areas because she was slow in performing several activities and because of that in that certain moments her anxiety appeared. Her Webster scale test result has increased with a point because of her increase in the anxiety level from mild to moderate. Related to the Hoehn and Yahr scale result, it remained the same (1 point), after 6 months. Regarding to the quality of life test, her result was 22 points. She was able to walk without help indoors, but outdoors she needed help in certain situations, when because of her beginning anxiety, she had experienced some shortened breath problems. She had some mild vision related issues. Also, the patient had slight problems with sleeping. She was able to perform her usual activities with minor difficulty and she felt mildly tired. After the 6 months, her quality of life test result has increased with 2 points because of her anxiety

level that became moderate from mild and because of the occurrence of minor problems with sleep.

The fifth patient from the control group, LL, male, 55 years, had a score of 9 points on the Webster scale test, receiving points for the following: his hands' bradykinesia was incipient, like his rigidity, being detectable only in neck and shoulders portions. Also, the posture that he had was flexed forward, with one arm's swing definitively decreased. The shortness of his gait was present and the tremor was present only while performing the finger-to-nose test. He had features of an incipient depression, but he was able to self-care, even though his rate of speed was decreased. His Webster scale test result was the same after the 6 months. Related to the Hoehn and Yahr scale result, it remained the same (1 point), after 6 months. Regarding the quality of life test, his result was 21 points before and after the six months. His walking was possible both indoors and outdoors with minimal difficulties. He had slight problems with his sleeping time schedule. He was able to perform my usual activities slightly less effectively. He had a slight physical discomfort in his night time and he felt rather sad and weary than melancholic.

Conclusion

The present study indicated evidence of the promising advantages regarding to beginning the training for patients with Parkinson's disease at an early stage of the disease, even though additional valuable and good quality research is necessary. Although the most advantageous content of exercise interventions (dosing, component exercises) remain uncertainty at different stages of the disease, the foundation should be in our opinion starting the exercises as early as possible in the evolution of the disease, focusing on all types of exercises that mobilize muscle power, balance and walking speed.

In this study, evidence can be found, but insufficient to support the value of exercise in lowering depression and anxiety in patients with Parkinson's disease, although most patients stated a clear distinction between how they felt before and after 6 months from the point of view of depression and anxiety.

These physical recommendations are available to patients and provide a basis for current physical therapy in Parkinson's disease in the current approach to the disease through physiotherapy aiming exercises to improve the balance, strategies to improve gait and training of joint mobility and muscle power to improve physical capacity.



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