

# Influence of Functional Movement Rehabilitation on Quality of Life in People with Parkinson's Disease

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**Abstract.** [Purpose] Parkinson's disease is one of the most frequent diseases of the central nervous system. Thorough knowledge of reasons for movement defects may contribute to the ability to quality of life at a good level as far as motor abilities are concerned. The aim of the study was to evaluate the influence of functional movement rehabilitation on the degree of intensity of movement symptoms in Parkinson's disease. [Subjects] The research was carried out in people diagnosed with stage III Parkinson's disease, according to the Hoehn and Yahr scale classification. [Methods] In order to establish the clinical state of patients, parts I, II, and III of the Unified Parkinson's Disease Rating Scale, the Schwab and England Activities of Daily Living scale, and the quality of life in Parkinson's disease questionnaire were applied. The intervention group took part in 60 minutes of functional movement rehabilitation twice a week for a period of 15 weeks. The main emphasis was placed on the ability to cope with everyday activities. [Results] A significant difference in scores for the given scales between before and after research the intervention period was observed in the intervention group. [Conclusion] The obtained results revealed positive that the influence of applied rehabilitation program had a positive influence on the degree of intensity of movement symptoms in people with Parkinson's disease.

**Key words:** Parkinson's disease, Functional movement rehabilitation, Quality of life

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## INTRODUCTION

Despite growing interest of scientists in Parkinson's disease (PD), the etiology remains still unknown. It is currently diagnosed based only on finding of typical clinical symptoms like: resting tremor, bradykinesia, rigidity and postural instability. Pharmacological treatment in time becomes less and less effective over time in fighting development of the disease. Therefore, researchers have begun to look for other (non-pharmacological) treatment methods<sup>1, 2)</sup>.

Rehabilitation is one of the factors that may be essential to maintain physical activity at a good level and enables people suffering from PD to lead a normal life. Therefore, it is worth noting that rehabilitation should not be restricted only to physical fitness improvement, but should also be aimed at simple daily activities, that contribute to a better standard of life for both patients and their families<sup>3, 4)</sup>.

Although the need for application of means other than only pharmacological treatment is not questioned, the approaches presented in the literature are not unequivocal. Some authors state that rehabilitation does not influence improvement of the quality of patients' lives. Therefore, in most studies regarding efficiency of physiotherapy, improvement of at least one of the examined variables has been observed<sup>5, 6)</sup>.

Taking into consideration the lack of unequivocal approaches presented in the literature, the decision was made to the research allowing to assessment of changes at the level of quality of life and physical fitness induced by movement rehabilitation in people with PD<sup>1, 7)</sup>.

The aim of the study was to assess the efficiency of a functional movement rehabilitation program applied to people suffering from Parkinson's disease.

## SUBJECTS AND METHODS

A group of people with Parkinson's disease, according to criteria set by the United Kingdom Parkinson's Disease Society Brain Bank, volunteered to participate in the study. The A Committee for Bioethics of the Academy of Physical Education in Katowice gave consent for carrying out the ex-

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aminations. All examined patients were informed about the purpose and the course of examinations and provided expressed a written consent for the participation in them. The examined patients did not have other coexisting neurodegenerative diseases. The participants were at stage 3 of Parkinson's disease, according the Hoehn and Yahr scale. They were divided into two groups: control (n=23, 71.02±3.93 yr old, disease's duration of 8.05±2.01 yr) and experimental (n=28, 70.28±4.73 yr old, disease's duration 8.63±2.78 yr).

In order to determine the exact clinical conditions of patients, parts I, II, and III of the Unified Parkinson's Disease Rating Scale (UPDRS) were applied. Additionally, evaluation of everyday activities according to Schwab and England's Activities of Daily Living (ADL) scale, was conducted, and the level of quality of life was assessed by means of the scale PDQ-39 (quality of life in Parkinson's disease questionnaire)<sup>8)</sup>.

Subjects from the experimental group participated in 60 minutes of functional movement rehabilitation exercises twice a week. The aim of these exercises was to increase to movement range and improve balance, movement, agility and walking. Physiotherapeutic exercises were carried as task training, in both low and high positions: turning around and rolling over on a mattress, getting up from a sitting position, initiating motion in a standing position, walking with a loud counting, turning around in a standing position, fastening buttons, catching an of object, and object manipulation. Applied exercises were functionally justified and help in coping with everyday life. Furthermore, participants were provided with a set of daily exercises to be performed individually at home. The exercises were easy, could be performed by the patients, and had been explained in class. They took 30 min to perform each day. The exercises were prepared by the authors, and details of the program are available on request. The patients in the control group, chosen by the criterion of the age, did not participate in the rehabilitation sessions.

In order to evaluate the influence of the applied exercises on the physical fitness of the subjects, assessment of clinical symptoms was conducted prior to and after the intervention period, which all together lasted for 15 weeks.

The obtained results were compiled and prepared in accordance with statistics rules. Basic descriptive statistics were calculated, and the normal distribution was examined by means of the Kolmogorov-Smirnov test. In order to evaluate the significance of differences occurring between two groups, the Student's t-distribution test was applied for independent samples.

To assess significance of differences between the obtained results in regard to the applied scales, before and after the 15-week period of rehabilitation, a one-way analysis of variance (ANOVA) was carried out. A post hoc analysis was conducted in connection with significant main results and interactions.

## RESULTS

Statistical analysis revealed compliance of the obtained results with the normal distribution and that the condi-

tions for the homogeneity variance were met. The results of the Student's t-distribution test demonstrated the lack of a statistically significant difference between the examined groups before the start of the experiment, taking into account the results of all conducted tests.

In order to determine the influence of movement rehabilitation on physical fitness in everyday life activities, a one-way analysis of variance (ANOVA) was carried out, and post-hoc tests were conducted.

The conducted analysis of variance showed statistically significant differences between the examined groups before and after the intervention period in each of the conducted tests. To determine differences between the groups post-hoc tests were applied. The results of comparisons of the results before and after the intervention period with the division by group are presented in Table 1.

## DISCUSSION

The obtained results confirm the hypothesis of a favorable influence of functional movement rehabilitation on patients with Parkinson's disease. Significant differences were observed in the experimental group with regard to the results of all conducted tests between before and after the intervention period. In the control group, no significant differences were noted.

In the literature, different studies evaluating the efficiency of movement rehabilitation in Parkinson's disease treatment can be found<sup>7, 9)</sup>. They include studies using various types of exercises and diverse methods to assess methods of their efficiency. For instance King et al.<sup>10)</sup> introduced a new framework for therapists to develop an exercise program to delay mobility disability in people with Parkinson's disease. Frazzitta et al.<sup>11)</sup> reported the effects of a four-week multidisciplinary inpatient rehabilitation program on gait and balance function after completion of the intervention and one year later. The broad scope of work in this special issue is reflective of the far-reaching impact that rehabilitation may have on many aspects of PD in the individual. The work of Earhart et al.<sup>12)</sup> provides a multilevel understanding of PD motor problems that can be fed into clinical care and optimal rehabilitation programs for patients with disease. Improvement of physical fitness after movement rehabilitation can be observed in most cases. Furthermore, improvement of at least one of examined features can be seen immediately after an intervention. The studies in the literature have used diverse rehabilitation programs or a single specific program<sup>1, 13, 14)</sup>.

Referring to the data which may be found in the literature, this study presented a different approach to physical fitness in which the emphasis was laid on the activities performed in everyday life. The rehabilitation program and applied tests were oriented towards this specific aim. The results showed a high response of the subjects to the applied physical exercises. Furthermore, evaluation of the quality of life revealed its improvement. In the case of elderly people, physical activity prevents aging processes. This is also the case for people suffering from the Parkinson's disease, although physical activity should be oriented towards im-

**Table 1.** Comparison of tests' results from before and after the intervention period in the experimental and control group

Variable	Before		After		Relative difference	Absolute difference	
	$\bar{x}_1$	S	$\bar{x}_2$	S	$\bar{x}_1 - \bar{x}_2$	$\bar{x}_1 - \bar{x}_2$ (%)	
UPDRS	Part I [pkt]	2.39	0.19	2.08	0.21	0.31	12.97*
	Part II [pkt]	16.21	1.54	12.42	1.01	3.79	23.38*
	Part III [pkt]	22.51	2.43	18.34	1.55	4.17	18.53*
	Part I, II, and III [pkt]	41.11	3.51	32.84	2.65	8.27	20.12*
Schwab and England [%]	73.09	6.41	79.51	5.32	-6.42	-8.78*	
PDQ-39 [pkt]	40.12	2.43	32.78	3.02	7.34	18.30*	
UPDRS	Part I [pkt]	2.31	1.03	2.39	0.95	-0.08	-3.46
	Part II [pkt]	16.02	1.43	16.42	1.43	-0.4	-2.50
	Part III [pkt]	21.96	1.98	22.65	2.01	-0.69	-3.14
	Part I, II, and III [pkt]	40.16	3.82	41.42	3.99	-1.26	-3.14
Schwab and England [%]	73.64	6.12	70.82	6.54	3.16	4.27	
PDQ-39 [pkt]	41.45	3.82	42.21	3.92	-0.76	-1.83	

$\bar{x}_1$  : mean of the examined variables in the experimental group.

$\bar{x}_2$  : mean of the examined variables in the control group.

S : standard deviation.

\* : statistically significant differences of  $p < 0.05$ .

provement of fitness in everyday life activities<sup>5, 9</sup>).

Through functional movement rehabilitation, patients be able to lead their normal lives longer. When patients start rehabilitation at an early stage of the disease, there is a high probability to slow down its progress. The following conclusions can be drawn based on the findings of this study:

1. Due to regular functional movement rehabilitation, in the experimental group, in comparison with the control group, showed improvement of physical fitness and a lack of escalation of PD's symptoms.

2. When functional movement rehabilitation is applied on a regular basis, improvement of quality of life and everyday life activities can be noticed.

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