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*Original article*

## ISSUES CONCERNING THE ROLE OF PHYSIOTHERAPY IN PARKINSON'S DISEASE OF PATIENTS RECOVERY

FIEROIU EMIL<sup>1</sup>

### Abstract

*Aim.* Changes that occurs with the Parkinson disease in the neuro-function status of the affected people by this illness and recovery by physiotherapy were at the base of making this study which includes an experiment on a 80 years old patient from Center Care and Social Assistance „Deeds for others”. Parkinson disease is a degenerative disease which occurs in the slow destruction and progressive of neurons. Because the affected zone plays an important role in the movement control, patients have rigid gestures, jerky and uncontrollable tremor and postural instability; Parkinson's disease related disorders occur most often between 50 and 70 years; average age of developing the disease is 57 years. At the beginning, the symptoms can be confused with the normal aging process, but progressing their diagnosis becomes evident. In the moment when the first symptoms occurs, it is believed that 60% and 80% of the cells that controls the motor activity are already damaged.

*Methods.* The purpose of this study is to highlight the role of physical therapy in recovery and stopping sequel induced by Parkinson's disease. The physiotherapy objectives that helps recovery from the Parkinson disease, are the following:

- Autonomy maintenance by decreasing the physical and mental performance, Improving the blood circulation, Rehabilitation of the respiratory system, The maintenance of the muscle tone, The maintenance of the joint suppleness, The correction of gait disorders, Education and re-education of stability, motion control and ability, The correction of the posture and awareness

Research methods:

- Literature review, The observation, The history, The conversation, The experiment

The experiment contains a case study on a patient diagnosticated with Parkinson disease which I have worked by 5 months. I have applied physiotherapy exercises for the improvement of motion control.

*Results.* The assessment of patients with Parkinson's disease required a thorough anamnesis, a complete clinical examination, high lighting both the changes induced by muscle rigidity, bradykinesia and lack of coordination due to excessive tremor, as well as a complete set of balance and walking tests.

*Conclusion.* The Physiotherapy type of exercises were applied in the recovery of stability, motion control, orthostatic and walking. People with Parkinson disease are essential, proving their utility by theoretical and practical method.

*Key words:* Parkinson, physiotherapy, autonomy, neurons.

### Introduction

Without knowing the etiology, it is considered that Parkinson's disease is based on progressive degeneration of neurons in locus niger. Clinically, the major signs are rigidity, bradykinesia and unintentional tremor, which in turn determine: postural disorders, gait with small steps and without swaying the upper limbs, impaired correction reflexes with loss of balance, limb deformities, lack of facial expression (Sbenghe, 1987).

Although the etiology of the disease is not completely elucidated, three assumptions are retained:

- Early aging, supported by the similarities that exist between the anatomical brain lesions of elderly people and parkinsonian patients.
- Infectious theory, linked to high frequency of post-encephalic parkinsonian syndromes. It discusses a viral pathology by direct touch or by an indirect way related to an inadequate

<sup>1</sup> Department of Medical Assistance and Cinesotherapy/University of Pitesti, ROMANIA

E-mail address: fiero\_emilius@yahoo.com

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immune response.

- Toxic theory, carbon monoxide and manganese being incriminated as chemicals that are able to selectively kill dopaminergic neurons in locus niger.

From the clinical perspective, it should be noted that this disease begins, typically at an average age of 55 years, is spread on all continents, affects both sexes equally and all social categories. It is worth mentioning the small number of non-smokers. (Kiss, 2004)

On average, 1-2 years pass from the onset until the formation of specific clinical features of Parkinson's disease. At onset: tiredness, slow walking, reduced range of movement of upper limb joint, expressionless face, shaking at the level of fingers, especially unilaterally, anxiety or depressive phenomena. Clinical features are completed by: hypomimia or immobile facial "mask" with rare blinking, without eye or facial movements; hypokinetic or hypophonic dysarthria; dysphagia; small writing (micrographic); reduction of respiratory movement amplitudes; sometimes sharp and medication psychiatric disorders (depression, cognitive disorders, episodes of agitation, sleep disorders, confusion), constipation, sexual deficit, diffuse pains in lower limb, paresthesia, fatigue; (Marcu, 2006)

Cognitive mental disorders in Parkinson's disease observed in approximately 15% of the cases, sometimes in severe forms of the disease able to take an insane aspect, should not be confused with Alzheimer's disease or senile dementia.

Muscle stiffness imprints a semi-flexion of body segments, with slow movements, reaching the impossibility to move in advanced stages. (Cezar 1997).

Waxy plastic hypotonia is translated by Noica sign highlighted by increasing tone in wrist, when the patient will raise the lower limb simultaneously with flexion-extension imprinted to the joint. We notice hyper tonicity with decontraction in sudden movements, in forearm flexion and extension on the arm, which is the sign of gear. Increasing postural reflex occurs near anterior leg insertions through the dorsal flexion of the foot, when that muscle tendon stands out, with the slow decontraction of the patient. Tendon reflexes are present. We can also see the "so-called" gear in eyeball movements. Speech is slow, monotonous, with palilalia, by repeating the first syllable. Writing suffers alterations. Hyperkinesias

consists of a rhythmic, involuntary, rest, continuous tremor exacerbated by emotion, particularly in fingers (rouleau sign). Also we note tremors of the lips, chin, head, feet and tongue for which the EMG exam is very useful even in the early stages. (Critchely, 1992)

Balance disorders can occur in Parkinson's disease, where the patient presents the tendency to fall backward or frontward, caused by hypertonicity of lumbar or abdominal muscles. At this time, in order not to lose balance, the patient is forced to make a few steps in that direction. (Ochiană, 2006)

Differential diagnosis shall be made with post-encephalitic Parkinsonism, senile tremor, specific striation and pseudobulbar syndrome. The lesion is in the globus pallidus under the form of gaps, cellular alterations with the catching of dendrites and ferric pigment load.

Arteriosclerotic brain lesions can produce Parkinson's disease in the elderly, the intensity of clinical features depending also on the number of altered neurons in the black substance and putamen. The Complex Parkinson – dementia is noticed, a complex which would include some heterogeneous degenerative diseases with certain clinical similarities, which are: progressive dementia and spastic paraplegia, progressive dementia. (Stamatoiu, 1992).

Objectives:

- maintenance of autonomy, by decreasing the limitation of physical and mental performances (prophylactic and recovery assistance by physical training);
- improvement of circulation;
- breathing reeducation;
- maintenance of muscle tonus;
- maintenance of joint grace;
- correction of walking disorders.
- education and reeducation of stability, controlled movement and ability;
- correction and posture awareness.

Means and techniques used:

- warming exercises;
- mobility and coordination exercises;
- balance exercises;
- ankle mobility exercises;
- mimic exercises;
- postures;
- exercises with objects;
- respiratory gymnastics;
- walking on grass, gravel and sand, to stimulate

balance reactions.

- elements from occupational therapy,
- group therapy;
- sports elements without competitive feature;
- hydrokinesiotherapy

**Methods**

- Literature analysis
- Observation
- Anamnesis
- Conversation
- Experiment
- Hypotheses

1. Kinetic means have a positive effect on balance optimization and walking reeducation.
2. Establishment of the extent to which the practice of kinetic program influences the functionality of neuro-mio-arthrokinetic, globally;

**Results**

The assessment represents all actions aiming at a correspondence between the subject and measurement unit by applying control-tests or techniques in order to gather results or data to know precisely the effects of the methods and techniques applied.

In examining motor deficit and especially in assessing the functional recovering results objective means of assessing the value of a movement are necessary.

The assessment of patients with Parkinson's disease required a thorough anamnesis, a complete clinical examination, highlighting both the changes induced by muscle rigidity, bradykinesia and lack of coordination due to excessive tremor, as well as a complete set of balance and walking tests.

The following were assessed:

- joint mobility;
- balance;
- walking;
- daily activities

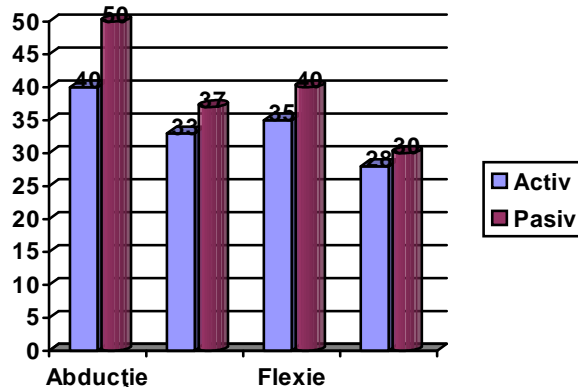
**1. Joint mobility.**

We assessed the mobility at the level of the shoulder, hip and knee

When assessing the joint mobility at the shoulder level, the following degrees of mobility were recorded in the initial testing:

Shoulder mobility	Abduction	Adduction	Flexion	Extension
Active	40°	33°	35°	28°
Passive	50°	37°	40°	30°

**Table 1 – Distribution of the degrees of mobility in the initial testing**

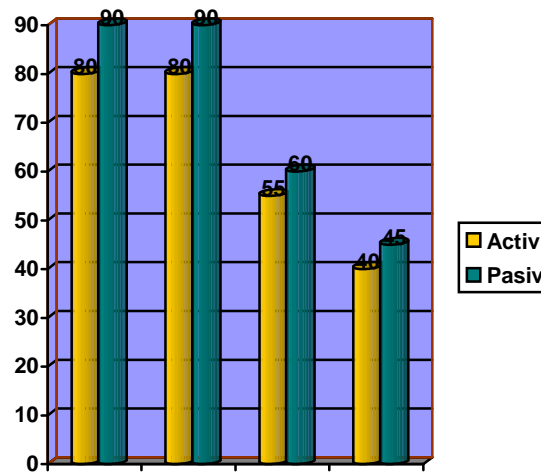


**Chart 1 – Degrees of mobility of the shoulder in the initial assessment**

When assessing the joint mobility at the shoulder level, the following degrees of mobility were recorded in the final testing:

Shoulder mobility	Abduction	Adduction	Flexion	Extension
Active	80°	45°	80°	40°
Passive	90°	50°	85°	45°

**Table 2 – Distribution of the degrees of mobility in the final assessment**



**Chart 2 – Degrees of mobility in the final assessment**

**Table 3 – Joint testing at the hip level**

Movement	Initial testing	Final testing	I.T. – F.T. difference

Flexion	30°	90°	60°
Extension	10°	20°	10°
Abduction	15°	35°	20°
Adduction	10°	25°	15°

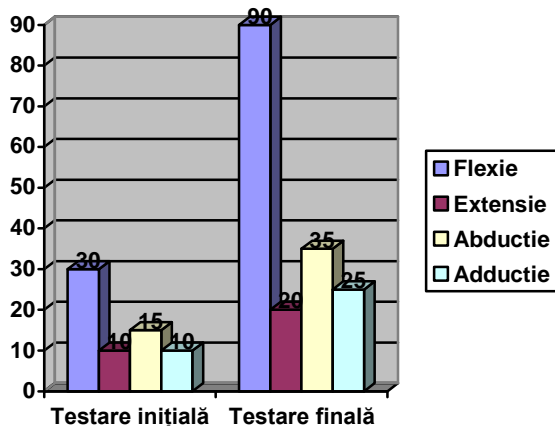


Chart. 3 – Degrees of mobility in the final assessment

When assessing the joint mobility at the knee level, the following degrees of mobility were recorded in the initial testing:

Knee mobility	Flexion	Extension
Active	25°	25°
Passive	30°	30°

Table 4 – Distribution of the degrees of mobility in the initial assessm

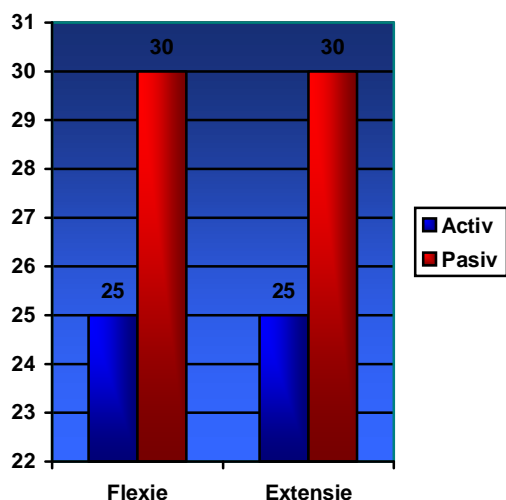


Chart 4 – Degrees of mobility of the knee in the initial testing.

When assessing the joint mobility at the knee level, the following degrees of mobility were recorded in the final testing:

Knee mobility	Flexion	Extension
Active	70°	70°
Passive	85°	85°

Table 5 – Distribution of the degrees of mobility in the final assessment.

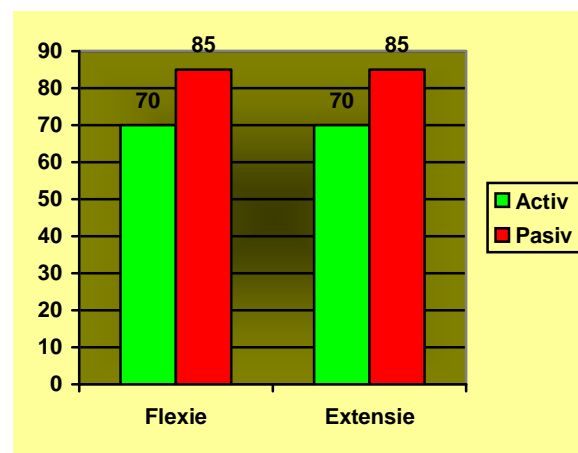


Chart 5 – Degrees of mobility of the knee in the final testing.

## 2. Balance

Balance was assessed by means of Tinetti test with 3 degrees of estimation.

At the initial testing the patient was not capable of sitting down, could not stand up in upright position, could not maintain the balance in upright position therefore she was rated with 0 which means incapable of achieving balance. At the final testing the patient was assigned the rating 1 because she managed to stand up by herself from dorsal bed sore in sitting position, to stand up from sitting position to upright position with the holder and to keep balance in upright position for 12 seconds.

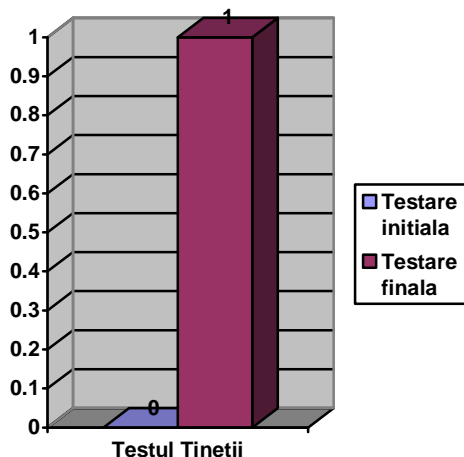


Chart 6 – Balance assessment by Tinetti test

**3. Walking** was assessed with Tinetti walking test with 3 degrees of estimation, being an analysis of several components of walking which is carried out at the patient's regular speed or increased speed.

In the initial testing the experimental case of my study did not walk. At the final testing the patient managed to walk with the holder, shows small difficulties in making the first step, shows walking continuity and manages to cover a distance of 22 meters without pause, therefore I assigned her the value 1.

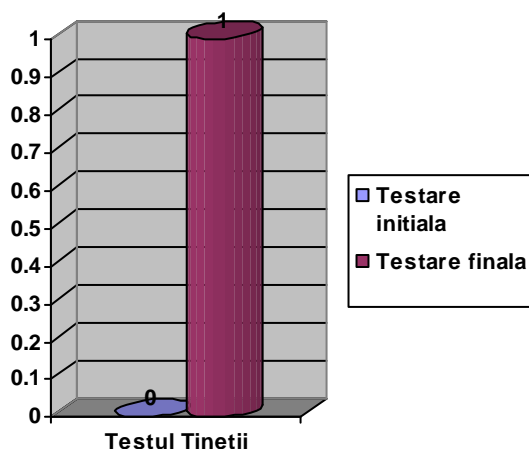


Chart 7 – Walking assessment by Tinetti test

**4. Daily activities** were assessed with **Barthel Daily Activity Index**. It measures the development of essential life activities, being duly noted with a number of points that are totaled up, with a maximum of 20 – normal person.

At the initial assessment, the patient's Barthel index totaled the following scoring 2 (10%) of the normal value from **Table no. 6** and it is noted that daily activities lack almost totally, the patient being completely immobile, and the detailing per activities is found in table no. 6

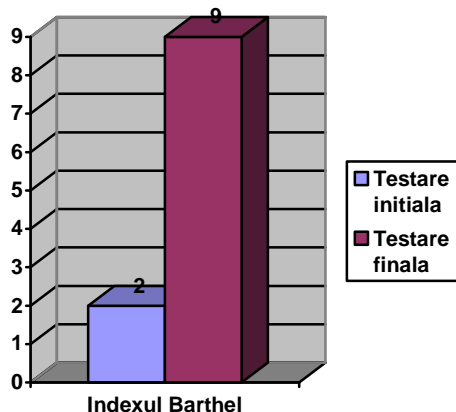
Activity	Patient
Intestinal transit	1
Urinary bladder	1
Personal care	0
Toilet use	0
Feeding	0
Transfer from one place to another	0
Mobility	0
Dressing up	0
Stair climbing	0
Bathing	0
<b>TOTAL</b>	<b>2</b>

Table no. 6 – Barthel Daily Activity Index, per activities in the initial testing

After applying the recovery and cinesotherapy program, the patient's Barthel index totaled up 9 points at the final testing.

Activity	Patient
Intestinal transit	2
Urinary bladder	2
Personal care	1
Toilet use	1
Feeding	1
Transfer from one place to another	0
Mobility	1
Dressing up	1
Stair climbing	0
Bathing	0
<b>TOTAL</b>	<b>9</b>

Table no. 7 – Barthel Daily Activity Index, per activities in the final testing



**Chart 8. The difference between the initial and final testing at Barthel Daily Activity Index**

#### Discussions

Cevei, Stoicănescu, 2008 make a description of Parkinson's disease, as well as the very important role the kinesiotherapy has in improving the symptoms that occur in this disease in the paper "The role of kinesiotherapy during the onset period of Parkinson's disease".

Băjenaru, 2010 makes a very complex approach, with clinical features, assessment, treatment and also an interventional therapy and neuro-rehabilitation plan in this disease in the book "News in diagnosis and treatment of Parkinson's disease".

Cucos, 2012 makes a very wide presentation of this disease, the treatment, degree of incidence of Parkinson's disease on Romanian regions and also an assessment of the quality of life of the people with this disease in the PhD thesis "Management of Parkinson's disease".

#### Conclusions

In conclusion, Parkinson's disease may affect a person's ability to control body movements. Some of the nerve cells in the brain normally produce a chemical substance called dopamine. Dopamine is a chemical mediator or a neurotransmitter, by which nerve cells control body movements. In Parkinson's disease, these nerve cells that produce dopamine, are destroyed resulting in its low levels. When this happens, problems of body movements can occur.

Parkinson's disease gives a wide range of symptoms and complications.

The treatment can control symptoms in early evolutionary stages of the disease and is started

as soon as the symptoms affect daily activity and the ability to work of the sick person. For example, a right-handed person to whom the tremor is installed on the left side may not feel embarrassed by the occurrence of this symptom and may not feel the need of a treatment until the symptoms become worse. A person who can not perform the job duties due to the disease symptoms will want to start the treatment much faster than a person who does not work or who is not affected in daily activity by any of the symptoms.

The symptoms of this disease usually occur in people aged between 50 and 60 years. The disease progresses slowly and can sometimes go unnoticed by the family, friends and even the person in question. A small number of people develop symptoms on only one side of the body, and these symptoms do not progress on the other side.

Medication can control the symptoms to some extent, but once the disease progressed, they become increasingly ineffective. Parkinson's disease can cause a variety of complications as it evolves.

The relation between the Parkinson's disease and the risk factors is still in research. These risk factors can be: genetic factors, age, environmental toxins or free radicals (antioxidants). Although these researches are about to reveal some answers, experts do not know with certainty the cause of this disease. The major objectives of rehabilitation medical assistance program in Parkinson's disease are increasing joint mobility, balance and walking education by obtaining balanced orders on different antagonistic muscle groups and elimination of synkineses, with initial promotion of balance in different biomechanical circumstances.

Kinetic exercises applied in the recovery of joint mobility balance, upright position and walking in people with Parkinson's disease are essential, proving their usefulness by the theoretical and practical reasoning of this method.

#### Aknowledgements

For all of our participants from my study I want to say thank you.



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