

Case report



## KINESITHERAPEUTIC APPROACH IN PATIENTS WITH ACUTE DEMYELINATING POLYRADICULONEUROPATHY - GUILLAIN BARRE SYNDROME

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### ABSTRACT:

The **aim** of this article is to study patients who have experienced acute demyelinating polyradiculoneuropathy and to propose an individually developed kinesitherapy program to overcome the functional deficit and improve their quality of life.

**Material and methods:** The study included 5 patients (three men and two women) with an average age of 52.5 years. The study was conducted from March 2023 to March 2024 at the University Hospital "Saint Marina" Varna - Second Clinic for Nervous Diseases, and after their discharge, continued at home. Patients were admitted due to pain, numbness and muscle weakness of the distal parts of the lower extremities, as well as difficulty in walking. During the first days of the inpatient stay, an increase in neurological symptoms was observed, with the progression also covering the upper extremities. After the acute condition was controlled, an individual kinesitherapy program was prepared and applied to the patients, which was carried out for a period of 3 months.

**Results:** the study showed that after the individual physiotherapy program, muscle weakness, postural and balance abilities, and gait were positively affected, all of which led to an improvement in the general condition and quality of life of the patients. To assess the results achieved before and after the applied physiotherapy program, we examined the functional abilities and limitations of the patients. The most significant results were recorded in the restoration of muscle strength in shoulder joint movements.

**Conclusion:** the study showed that the appropriate selection of kinesitherapy methods and means in patients with Guillain Barre syndrome, tailored to their individual functional capabilities, has a positive impact during the recovery period, both in terms of functional deficit and in terms of improving their quality of life.

**Keywords:** kinesitherapy, acute demyelinating polyradiculoneuropathy, individual approach,

### INTRODUCTION

Recently, there has been an increase in the prevalence and incidence of autoimmune diseases of the nervous system. One of the representatives of this group is acute demyelinating polyradiculoneuropathy – Guillain Barre syndrome. The etiology and pathogenesis of the disease are not fully understood, it is assumed that autoimmune processes are of significant importance, 1/3 - are without an clarified cause, and in about 75% of patients the body encounters a respiratory or gastrointestinal infection before the onset of the disease (1 - 4 weeks) [1, 2, 3, 4, 5]. The clinical picture in most patients is typical - characterized by sensory symptoms (spontaneous pain in the lower back and lower limbs, paresthesias, etc.), the appearance of symmetrical flaccid paresis of the lower limbs, impaired postural control, the presence of an ascending form of Landry-type disease with the spread of paresis to the upper limbs for a period of 1 to 3 weeks. In the course of the disease, in some cases, involvement of the respiratory muscles is observed, autonomic dysfunction (rhythmic disorders, disturbed vascular and vasomotor activity, fluctuations in blood pressure, etc.), urinary retention is observed, and cranial nerves may also be affected. All this necessitates the hospitalization of these patients, and sometimes their placement on mechanical ventilation for the treatment of type II respiratory failure [6, 7]. Treatment for patients with Guillain-Barre syndrome aims to reduce the body's "attack" on the nervous system and uses two main therapeutic methods - plasmapheresis, which filters antibodies and helps remove them from the bloodstream, and the administration of intravenous immunoglobulins (IvIg), which neutralize the damaging antibodies and the causes of inflammation. The correct choice of the type of treatment depends on the patient's condition, as combining the two methods is not applicable and will not lead to greater effectiveness [8, 9].

The aim of this article is to study patients who have experienced acute demyelinating polyradiculoneuropathy and to propose an individually developed kinesitherapy

program to overcome the functional deficit and improve their quality of life.

### MATERIAL AND METHODS

The study involved 5 patients (three men and two women) with an average age of 52.5 years. The study was conducted from March 2023 to March 2024 at the University Hospital “Saint Marina” Varna - Second Clinic for Nervous Diseases, and after their discharge from the clinic, they continued at home. Patients are admitted due to pain, numbness and muscle weakness in the distal parts of the lower extremities, as well as difficulty in walking. During the first days of the hospital stay, an increase in neurological symptoms is observed, with the progression also involving the upper extremities. After an examination by a neurologist, a limited volume of movement in the cervical and lumbar region was established due to the pain, weakened tendon-supine reflexes, Babinski (-) bilaterally and the presence of severe flaccid quadriplegia. The study was conducted for a period of 3 months, and at the beginning and end of the applied physiotherapy program, we examined the functional capabilities and limitations of the patients through changes in muscle strength with MMT and the Bartel test to assess the degree of disability and ability to self-care.

The conducted kinesitherapy aims to restore the general vital tone, working capacity and function of the affected muscles in order to protect the patient from complications that are also a result of inactivity. The tasks that we set ourselves and had to solve are: positive influence on the psycho-physical state of the patient; prevention of the occurrence of complications (decubitus ulcers, phlebothrombosis); maintenance of cardio-respiratory activity; prevention against the occurrence of contractures and maintenance of muscle trophism; stimulation of the conduction and regenerative processes of the damaged nerves; stimulation of the function of the paretic muscles of the trunk and limbs, as well as restoration of muscle strength; gradual verticalization of the patients; improvement of balance and coordination capabilities; training in walking, climbing and descending stairs; training in

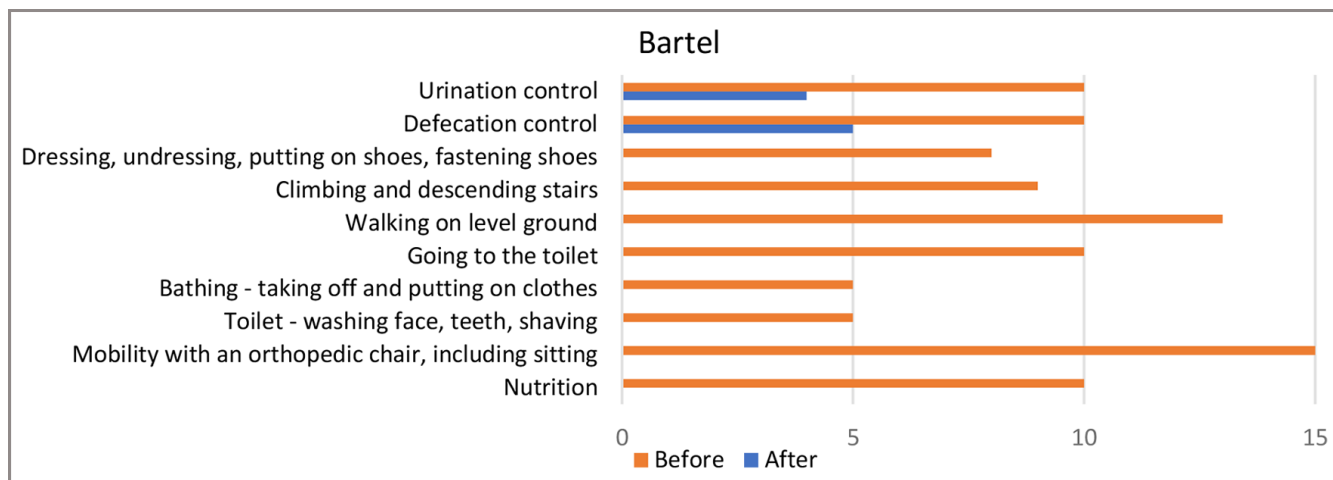
performing normal activities of daily life. To achieve the tasks we set, we used appropriately selected kinesitherapy tools tailored to the general condition of each patient: treatment through position; therapeutic massage; percussive drainage; breathing exercises; passive, actively-assisted and isometric exercises; exercises stimulating contractions of the paretic muscles; analytical exercises against gravity; appropriately selected resistive exercises; facilitating and stimulating techniques from proprioceptive neuromuscular facilitation; exercises in gradual verticalization; coordination and balance exercises; exercises in walking, climbing and descending stairs. We applied the kinesitherapy complex we developed daily during the hospital stay, and after discharge, three times a week for about 20-45 minutes, with each exercise performed by the patients with 5-7-10 repetitions. The exercises were performed at a slow to moderate pace, with more frequent rest between them, and were tailored to the breathing, muscle fatigue, and general condition of the patients. At home, the patients performed the learned kinesitherapy complex.

### RESULTS

The effectiveness of the application of kinesitherapy in patients with Guillain Barre syndrome at each stage of the recovery process is supported by a growing body of literature. In order to monitor the effect of our individual kinesitherapy program tailored to each patient's condition, we examined how the values of the functional assessment tests we applied changed at the beginning and end of the study.

As a result of the three-month kinesitherapy program, we found an improvement in all patients studied, which we confirmed by analyzing the values of the tests we applied. The Barthel test for activities of daily living was not administered to the patients at the beginning of our study due to flaccid quadriplegia and the inability to assume different starting positions and perform self-care.. The exception is the tests for control of urination and defecation, which were available in some patients (Fig. 1).

Fig. 1. Barthel test for assessing activities from daily life



The above results show improvements in all activities of daily living, with the most significant achievements observed in terms of “Moving with an orthopedic chair, including sitting”, “Walking on level ground”.

Manual muscle testing (MMT) also reported an improvement in limb muscle strength, with three patients performing movements independently against gravity and

against resistance at the end of the study, while two patients reported greater muscle weakness in the lower limbs. At the beginning of our study, all patients had MMT limb scores ranging from 1+ to 2+, and after kinesitherapy, the scores changed to 3+ and 4+, with movements independently against gravity (Table 1 and Table 2).

**Table 1.** Results of manual muscle testing - before the study.

MMT – at the beginning						
Movements	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Arithmetic mean
Shouder joint flex.	2	1.25	1.75	1.75	2.25	1.8
Shouder joint ext	2	1.25	2	1.75	2.25	1.85
Shouder joint abd.	2	1.25	1.75	1.75	2.25	1.8
Shouder joint add.	2	1.25	2	1.75	2.25	1.85
Elbow joint flex.	2	2	2	1.25	2	1.85
Elbow joint ext.	2	2	1.25	1.25	1	1.5
Hip joint flex.	1	3	1.75	1	1	1.55
Hip joint ext.	1	3	1.75	1	1	1.55
Hip joint abd.	1.25	2.75	1.75	2	1.25	1.8
Hip joint add.	1.25	3	1.75	2	1.25	1.85
Knee joint flex.	2	2	1.75	1.75	1.25	1.75
Knee joint ext.	1.25	1.75	1.75	1.75	1.25	1.55
Ankle joint pl. flex.	1	2.25	1.25	1.75	1.25	1.5
Ankle joint dor. flex.	1	2.25	1.25	1.75	1.25	1.5

**Table 2.** Results of manual muscle testing – after the study.

MMT – at the end						
Movements	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Arithmetic mean
Shouder joint flex.	4.25	3.75	4.25	4	4	4.05
Shouder joint ext.	4.25	3.75	4.25	4	4	4.05
Shouder joint abd.	4.25	3.75	4.25	4	4	4.05
Shouder joint add.	4.25	3.75	4.25	4	4	4.05
Elbow joint flex.	4	4	4	3.75	4	3.95
Elbow joint ext.	4	4	4	3.75	4	3.95
Hip joint flex.	4	3.75	4	4.25	3.75	3.95
Hip joint ext.	4	3.75	4	4.25	3.75	3.95
Hip joint abd.	4	3.75	4	4.25	4	4
Hip joint add.	4	3.75	4	4.25	4	4
Knee joint flex.	3.25	3.75	4	4	3.25	3.65
Knee joint ext.	3.25	3.75	4	4	3.25	3.65
Ankle joint pl. flex.	3.75	4	4	4	4	3.95
Ankle joint dor. flex.	3.75	4	4	4	4	3.95

## DISCUSSION

Novak P et al. (2017) conducted a study to evaluate the effect of rehabilitation in patients with Guillain-Barré syndrome. They studied 45 patients (20 women, 25 men) who underwent functional tests at admission and after discharge. Their abilities were assessed using a functional independence test and two walking tests (6 minutes and 10 meters), which showed statistically significant improvements in all outcomes. The authors presented an improvement in the physical abilities of the patients after 3 months of rehabilitation. According to them, multidisciplinary care for this contingent of patients is effective, since clinically important and statistically significant improvements in motor abilities are achieved even during the relatively short inpatient rehabilitation period [10].

Dimitrova A and colleagues (2017) studied the impact of kinesitherapy on the functional recovery of a patient (a 34-year-old woman) with complicated Guillain-Barré syndrome and a 4-month hospital stay. The study was conducted after discharge from home and for two months. The authors conducted the kinesitherapy program 3-4 times a week for 1 hour, at moderate intensity, without reaching fatigue. The means they applied were treatment through position, passive-active and analytical exercises, abdominal muscle strength exercises, breathing exercises, balance and coordination training from sitting to standing, as well as therapeutic massage. To assess the results of the kinesitherapy treatment, they applied two tests for mobility and moving in bed, a five-time sit-to-stand test (FTSTS) and a 10-meter walk test (10MW). The results show that after two

months of intensive physical activity, the patient's functional abilities and mobility improve [11].

Daniel P. Torok (2020) starts with movement treatment while the patient is still in the intensive care unit in order to avoid secondary complications and progression of the disease. A common symptom in these patients is fatigue, which, according to him, should be avoided during physiotherapy, because this would further slow down the recovery process. At the beginning, and according to the patient's capabilities, passive and active exercises are applied, and after stabilization of the patient's condition, the patient is moved to gradual verticalization. Another important point of the physiotherapy program, according to the author, is passive and prolonged stretching of two sets of 90 seconds each aimed at preventing the occurrence of contractures. The author also recommends the placement of a boot-type orthosis (Multi Podus Boot) to avoid the occurrence of plantar-flexion contractures, external rotator of the hip joint and heel decubitus ulcers [12].

## CONCLUSION

Based on the results obtained after our study and the literature data we received, we came to the conclusion that the appropriate selection of methods and means, which make up the individual kinesitherapy program in patients with acute demyelinating polyradiculoneuropathy, restore motor, sensory, balance functions, gait, neuromuscular conduction and orthostatic reactivity. All this led to an overall improvement in the general condition and quality of life of the patients.

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