

## ROLE OF MEDICAL REHABILITATION IN POSTPOLIOMYELITIS SYNDROME. A CASE REPORT

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### Abstract

*Postpoliomyelitis syndrome is characterized by a sudden or progressive loss of muscle strength, muscle atrophy, muscle pain, fatigue, intolerance to cold, after a period of at least 15 years from the acute polio virus infection, a period of neurological and functional stability. No therapeutic benefit of the evaluated drug agents (pyridostigmine, steroids, amantadine) has been reported. The reason for this presentation results from the fact that clinical studies have demonstrated that isokinetic and isometric muscle training can prevent the loss of muscle strength and reduce muscle fatigue. Rehabilitation programs through physical-kinetic therapy are the only way to limit functional deficit, playing an important role in the long-term management and care of patients. The particularity of this case is the fact that the symptoms occurred after a 40 year period of neurological stability. The regular monitoring and inclusion of the patient in complex medical rehabilitation programs are important in order to limit the functional deficit and increase the quality of life of these patients.*

**Keywords:** post-polio syndrome, medical rehabilitation, treatment, kinesitherapy.

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### Introduction

The term post polio syndrome (PPS) was introduced in 1985 by Halstead. It is characterized by a sudden or progressive loss of muscle strength, new muscle atrophy, muscle pain, fatigue, functional impotence, intolerance to cold after a period of at least 15 years from acute polio virus infection, a period of neurological and functional stability, in the absence of other medical explanation [1]. The reported prevalence of PPS is between 15% and 80% of all patients with previous poliomyelitis virus infections [2,3]. The few studies available regarding drug therapy have reported no efficiency of the studied drug agents: steroids, pyridostigmine, amantadine in the management of fatigue and muscle strength [4,5,6]. Non-randomized studies with kinesitherapy programs with a duration between 6 weeks and 7 months, involving isokinetic and isometric endurance muscle training, demonstrated an increase of muscle strength in patients with mild and moderate loss of muscle strength and a reduction of muscle fatigue [7,8,9]. In a randomized study, a significant reduction in pain, depression, fatigue, as well as an improvement of walking following hydrothermotherapy were described [10]. Rehabilitation pro-

grams through physical-kinetic therapy are the only way to limit functional deficit, playing an important role in the long-term management and care of patients. The aim of the study is to clinically and functionally assess the efficiency of an individualized rehabilitation program in the case of a patient with PPS.

### Material and method

DV, aged 57 years, with a history of poliomyelitis since the age of 2, had walked with crutches with armpit support since the age of 5. In October 2012, he sought medical attention for a progressive loss of muscle strength, particularly in the lower limbs, fatigue, muscle atrophy, intolerance to cold, impossible standing and walking, symptoms occurring a year before, and worsening in the last month. At the age of 30, he had a right tibial fracture, operated with osteosynthesis material. Since the age of 50, he had had high blood pressure values, currently receiving drug treatment and a low sodium diet. The objective examination of the osteoarticular system revealed marked dorso-lumbar scoliosis, scapula alata, scapulo-humeral (SH) pain, left SH stiffness (joint testing shows 120° flexion, 30° extension, 90° abduction, 50° internal rotation, 50° external rotation), reducible flexum of the knee, bilateral hollow foot, lower limb muscle atrophy, impossible orthostatism and walking. Active segmental movements absent in the

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right lower limb, diminished to the left. Muscle strength: 1/5 right lower limb, 3/5 left lower limb, 4/5 bilateral upper limbs. Loss of osteotendinous reflexes, normal sensory examination, imperative micturition and dyspnea were observed. Paraclinical investigations showed biological tests within normal limits, moderate restrictive ventilatory dysfunction at functional respiratory tests. EKG was normal. EMG examination evidenced chronic denervation and rare fasciculations, without any nervous conduction abnormalities. X-rays of the cervico-dorso-lumbar spine showed spondylarthrosis changes. Computed tomography (CT-scan) of the cervical spine showed cervical arthrosis without stenosis.



**Figure 1.** CT-scan cervical spine - Cervical arthrosis.



**Figure 2.** CT-scan cervical spine - Cervical arthrosis.

Drug treatment used included NSAIDs, antispasmodics, vitamins. Clinical and functional assessment were performed at the beginning of the rehabilitation treatment and after the two weeks of treatment. Pain on the visual analogue scale (VAS), articular mobility using joint evaluation, muscle strength using muscle testing, and transfers were monitored. Rehabilitation treatment consisted of sedative paravertebral massage and toning massage of the upper and lower limbs, posturing with the upper limbs in slight abduction, the elbows and knees in extension, in order to prevent tendinous retractions and joint stiffness. Paraffin packing with analgesic and myorelaxant effect was used for the left shoulder. Passive mobilizations of the lower limbs were performed in order to prevent potential complications of the immobilization syndrome, such as joint stiffness, increase in muscle hypotrophy, immobilization osteoporosis and thrombophlebitis; active mobilizations of the upper limbs were aimed at increasing the range of joint motion. Transfers in bed, as well as from bed to wheelchair, postures facilitating respiration, and respiratory gymnastics for the improvement of respiratory function were also carried out. Isotonic and isometric muscle training for preventing the loss of muscle strength was monitored for exercise duration and the rest period. Stretching exercises and muscle relaxing exercises were also performed. The ergotherapy program consisted of techniques for the improvement of ADLs.

The agreement of Ethic Commission of research of the Clinical Rehabilitation Hospital Cluj-Napoca was obtained.

### Results

After two weeks of drug treatment and rehabilitation, the intensity of pain in the shoulder decreased (VAS before treatment 9 and after treatment 5). The patient was able to perform by himself transfers in bed and also, from bed to wheelchair, having a higher degree of independence in the wheelchair. Mobility in the left scapulo humeral joint significantly improved (150° flexion, 70° extension, 120° abduction, 70° external rotation, 70° internal rotation). Muscle testing also improved: 2/5 right lower limb, 3/5 left lower limb, 4/5 bilateral upper limbs.

### Discussion

Post-polio syndrome (PPS) may be difficult to diagnose in some people because both neurological diseases and other medical conditions can explain aggravation of a previous stable motor deficit. It is important to clearly establish the origin and potential causes for declining strength and to assess progression of weakness not explained by other health problems. Magnetic resonance imaging (MRI) and computed tomography (CT) of the spinal cord, electrophysiological studies, and other tests (muscle biopsy or a spinal fluid analysis) are frequently used for the differential diagnosis. Neurological conditions that involve progressive aggravation of a motor deficit are

cervical myelopathy, syringomyelia, amyotrophic lateral sclerosis, motor neuropathies and myopathies. In our case, the CT scan of the cervical spine (MRI could not be performed due to metallic implants) ruled out the spinal cord compression; the lack of sensory signs at clinical and electrophysiological studies excluded radiculo- and neuropathies, and also myopathies, which have a typical EMG aspect. Other medical conditions can mimic motor deficit with fatigue: shoulder osteoarthritis from walking with crutches, a chronic rotator cuff tear, or a progressive scoliosis causing breathing insufficiency. Pain, weakness, and fatigue can result from the overuse or disuse of muscles and joints.

Rehabilitation treatment's complexity depends on the goals established after osteoarticular and muscular system examination. To obtain the best efficacy, association between different physical methods of treatment is necessary (massage, kinethotherapy, hydrothermotherapy and occupational therapy).

The study reveals the benefits of physical-kinetic therapy for the maintenance and increase of joint mobility, the improvement of pain, muscle strength and respiratory function. The data in literature show that the excessive use of muscles and training can aggravate PPS symptoms and decrease muscle strength [11]. However, there are no prospective studies demonstrating that increased muscle activity or training can induce a decrease of muscle strength compared to no training or minimal muscle activity. Patients with regular physical exercise had fewer symptoms and an increased functional level compared to physically inactive patients. The majority of the studies based on physical exercise were conducted under monitoring, with submaximal exercise, intermittent pauses and rest periods in order to prevent overstrain effects [11,12].

### Conclusions

Rehabilitation programs through physical-kinetic therapy: massage, kinesitherapy, thermotherapy, hydrothermotherapy, occupational therapy are the only way to limit functional deficit, playing an important role in the long-term management and care of patients. Long-term prognosis is unfavorable, and the regular follow-up of patients and their inclusion in complex medical rehabili-

tation programs are important for ensuring the highest possible autonomy and increasing the quality of life of these patients. Rehabilitation is a complex process, which involves high costs at an individual, psycho-emotional level, as well as at the social level.

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