



# Neurological Diseases and My Experience in the Physiotherapy Internship-Part 1

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## Editorial

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**Abbreviations:** CVA: Cerebral Vascular Accident; WHO: World Health Organization; PNF: Proprioceptive Neuromuscular Facilitation; FES: Functional Electrical Stimulation; TENS: Transcutaneous Electrical Neurostimulation.

## Editorial

In the experience I acquired in the Physiotherapy internship, 6 consultations were carried out with neurological patients, 4 of them with Cerebral Vascular Accident (CVA), so in this present study I will talk about neurological diseases, especially stroke.

Neurological diseases have a high incidence in Brazil and in the world; in relation to rehabilitation, an initial assessment is necessary to conduct treatment planning, which needs to consider impairment, disability, tonus, strength, balance and kinesthetics. At physiotherapeutic evaluation the techniques and methods are intended to detect the true state of the patient, and then project the objectives to be obtained through the clinical conditions of the patient [1].

The neurological deficiency resulting from the stroke is defined by clinical manifestations, which demonstrate the impairment of the various body systems. Such clinical manifestations often include motor and sensory changes that affect physical function. Thus deficits in cognitive, perceptive, emotional function may be present after stroke [1].

The Cerebral Vascular Accident (CVA), as its name says, is the result of cell damage due to ischemia or hemorrhage in the brain tissue. Therefore, it is the main cause of disability in the world in adults, resulting in very difficult clinical situations that always involve the sensorimotor system [2].

According to the World Health Organization (WHO), stroke is defined as the interruption of blood supply to the brain, resulting from a blockage (ischemic stroke) or rupture of a vessel (hemorrhagic stroke), which leads to brain damage. This disorder affects both sexes, in 80% of cases ischemic stroke. Among the main causes of death and permanent disability in adults and one of the main public health problems [3,4].

When this happens, the intervention must be carried out within four and a half hours of the onset of symptoms, which is subject to recovery if it exceeds that time. If neurological symptoms disappear spontaneously and completely, in less than 24 hours, it is called transient ischemic attack [5].

According to the World Health Organization (WHO), each year, 15 million people around the world suffer a stroke. So far, it is the most common cause of disability, representing the first cause of severe disability of neurological origin in adults. Of ischemic stroke survivors, 50% have a permanent disability and a third of whom are disabled [6].

In Europe, demographic projections indicate that the incidence of stroke will increase. It is estimated that by 2025, the percentage of stroke occurrence will increase by 37% in men and 38% in women. Stroke will occur in 35% of the population aged 65 and over, which will increase worldwide due to demographic changes. This propensity will certainly lead to a growing demand for rehabilitation programs aimed at improving the functional status and quality of life of patients [7].

The physical damage that frequently appears to the affected patient is hemiplegia, defined as complete paralysis of the upper and lower limbs, and hemiparesis, defined as

partial paralysis, weakness, debility and non-immobility, thus the most common deficit that affects 80% of patients in the acute phase and 40% of them in the chronic phase. So that the risk they predispose

to stroke include systolic or diastolic arterial hypertension, hypercholesterolemia, smoking, diabetes mellitus, high alcohol consumption, sedentary lifestyle, stress and use of oral contraceptives [8].

Such focal brain injuries cause dysfunctions, paralysis and deficits that damage various modalities of the innumerable functions of the brain, functions that ensure in human beings their unsurpassable adaptability to the most diverse and inhospitable environments. It is a complex adaptive mechanism that allows the partial recovery of cortical functions, which happens through an intrinsic property of the nervous system that modifies its structural and functional organization in response to repeated stimulations [9].

Neuronal plasticity is a mechanism whose basic definition leads us to understand how the Central Nervous System behaves after an injury. The modification methods can be summarized in two different situations: first, intact neurons seek alternative ways to produce the motor response, thus synapsing with neurons that change in relation to their effectiveness. After a given injury, different circuits and nerve pathways are sought. Processes that seem to be the same, but differ in their neurophysiology [10].

According to the IBGE, with the growth of the elderly population every decade, by 2025 the number of elderly people will be 15 times greater, and consequently there will be an increase in cases of stroke. The disease is responsible for 10% of all deaths in the world, it reaches 85% in developing countries, in the United States and Europe there is a prevalence of 200 to 300 new cases per 100,000 inhabitants per year in that order [11].

In physiotherapy, there are several effective resources proposed for the recovery of stroke, but they must always respect the limitations of the patient, it is the professional's full responsibility to develop an attractive and appropriate treatment program for the case, according to his assessment. Therefore, goals must be set that can be achieved with commitment and dedication [12].

In the treatment of stroke, the importance of the motor approach is an important point to be improved, but only an accurate kinetic-functional diagnosis that the health professional can develop an adequate treatment. Good quality of function and movement needs to be maintained throughout treatment, avoid spasticity, compensations, fixations and related reactions [1].

Physiotherapeutic treatments have increased and what proves to be effective in the rehabilitation of patients who have had brain injuries is precisely this stimulation of neuronal plasticity. It is a rehabilitation process based on the belief that the human brain is a dynamic and adaptive organ, prepared to change due to new environmental conditions or the functional limitations imposed by brain injuries [13].

During the internship, care was provided to a 63-year-old patient with infantile paralysis due to poliomyelitis. According to Zhou, et al. [14] the technique of Proprioceptive Neuromuscular Facilitation (PNF) is feasible to rehabilitate patients with paralysis due to Poliomyelitis, it helps to significantly improve flexibility, range of motion, muscle strength and change the fibers, proves to be more effective than passive stretching and with active participation by the patient in the rehabilitation process, improvements are shown to be important.

For Ribeiro, et al. [15] PNF is an approach based on the neurophysiological model that has become widely used in clinical conditions. Effectively, it is based on using the maximum resistance of the movement in a spiral and diagonal way, in order to propose a neuromuscular response in proprioceptors, in parallel with this, it provides and explores the posture and favors eccentric muscle contractions in order to stimulate the agonists.

In the physiotherapy internship, in addition to stretching, muscle strengthening exercises and motor rehabilitation, we also learn to use electrotherapy resources such as functional electrical stimulation (FES) and transcutaneous electrical neurostimulation (TENS).

Functional electrical stimulation consists of stimulating a muscle or muscle chain that is deprived of fulfilling its normal function of producing a contraction. It is used to improve or facilitate functional control in patients with spinal cord injury, traumatic brain injury, stroke and other disorders. It is confirmed the increase that the application of the same in the peroneal nerve and to improve the dorsiflexion of the ankle, during the swing phase of the gait in patients that presents muscular rigidity.

Transcutaneous electrical neurostimulation (TENS) is used electrical current for pain control. TENS stimulates large-diameter, low-threshold type A alpha fibers, which are tasked with carrying touch information, this results in presynaptic inhibition in the dorsal root horns, either directly, by gate theory, or descending pain inhibitory pathways. In addition, it is used in cases of functional recovery in patients after stroke and in cases of focal spasticity.

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