

NATIONAL UNIVERSITY OF
PHYSICAL EDUCATION AND SPORTS

Sheedi Ali

Optimization of Kinetic Care in Children with Cerebral Palsy

PhD Thesis

Coordinator

Prof. Univ. Emerit Dr. Vasile Marcu

Summary

Child cerebral palsy is a disorder that attracts more and more interest from researchers today. The cases are being treated more and more carefully, and research in the field is becoming more and more extensive. Starting from the research that is now present, we will observe the methods being used today in Romania and will look into how the treatment process can be further improved.

We considered it to be opportune to choose this research because it is a topic that still allows many possibilities of approach in order to increase the effectiveness of the recovery process of children diagnosed with cerebral palsy.

Cerebral palsy describes a group of permanent disorders in the development of motor function and posture, which limits world adaptation, often attributed to nonprogressive dysfunctions occurring in the development of fetal or small childhood encephalopathy. These motor disorders generated by cerebral palsy are often accompanied by sensorial, cognitive, communication, and behavioral disorders, epilepsy and secondary muscular-chest disorders

Albu, C, says that cerebral palsy is a condition mainly determined by the sequelae of infantile chronic encephalopathies, which have a common trunk of manifestations: motoric disorders, and sometimes comical phenomena. He assigns 3 essential groups according to the specific pathophysiological manifestations:

1. Spasticity, as a result of the existence of a pyramidal syndrome characterized by exaggeration of the muscular reflex of the muscles;
2. Dyskinesia due to a pyramidal syndrome manifested in various forms such as atherosclerosis, tremor, dystonia, rigidity etc;
3. Ataxia due to the occurrence of a cerebral lesion or its connection, which is characterized by disorders of coordination and posture.

The etiopathogenesis encountered in infantile cerebral palsy is often mixed and profoundly influenced by the factors that act on the child during prenatal, perinatal and postnatal periods.

Depending on the period in which the determinant factor appears in the occurrence of infantile brain paralysis, we identify the following characteristic features:

Prenatal factors

- Prenatal factors account for approximately 30% of cases of childhood brain paralysis, and most often have the following triggers
- Blood incompatibility between mother and fetus. This can be prevented by administering preventive treatment where appropriate, which is why in the developed countries this cause was predominantly eradicated.
- Teratogenic infections (herpes, toxoplasmosis, rubella, cytomegalovirus), which can all cause embryo malformation. The severity of the damage to the fetus will depend on the nature of the infectious agent.
- Placental abnormalities such as placental decay, placenta praevia, placental bleeding or dystrophy.
- Abortion attempts failed.
- Maternal poisoning of acute or chronic nature as a result of alcohol, nicotine, drugs or teratogenic medications such as antiepileptics, hypotensives or chemotherapy. All of these are substances that will cause infarction of an arterial territory, encephalopathy, or lesions in the subthalamic nuclei, gray central nuclei, the hippocampus or the periventricular area of the fetus.
- Diseases carried by the mother during pregnancy. At this point, we consider it necessary to mention the avitaminosis and the lack of nutrition of the essential factors for growth.
- Maternal endocrine-metabolic diseases, which we consider necessary to recall diabetes mellitus, liver disease or renal failure.
- Cardiac insufficiency or CO poisoning.

Perinatal factors

- Perinatal factors describe a cumulative number of factors that can act on the fetus during childbirth and account for 55% of cases of cerebral palsy. The most common causes are:

- Prematurity. In the prematurely born fetus we often find cerebral hemorrhage , which are determined by the fragility of the arteriovenous bed. Currently, this factor of childhood cerebral palsy has been greatly diminished by improving pre- and perinatal fetal monitoring, which allows for rapid correction of metabolic disorders and / or reduction of the risk of developing / installing major motor sequelae.
- Birth on time, under difficult conditions. In such cases, brain damage often caused by anoxia and / or haemorrhage. From the point of view of the casuistry of lesions, we identify the following
- Hyperflexia of the head during difficult birth, aspect that can affect the vascular bed from the vertebral arteries in their route to the basilar trunk.

Postnatal factors

After birth, usually in the first 3-4 years, the development of the nervous system is a major process, but it can be disturbed by a number of factors that often cause infantile brain paralysis. Among them we find it helpful to remember:

- Cranial traumas.
- Infectious agents such as meningitis and encephalitis.
- Metabolic disorders such as hypoglycaemia or hypocalcemia.
- Anoxia or hypoxia as an effect of epileptic seizures or seizures.
- Cerebral haemorrhages and / or emboli, most often with an unknown aetiology

The major objectives of child recovery with infantile brain paralysis are: autonomy of movement and self-service capacity. The factors that will help in choosing the type of therapy are:

- Type of motor abnormality (spasticity / dystonia);
- Level of spasticity and its causes;
- The general physical condition and level of development of the child;
- Other motor disorders that affect mobility;
- Strength and muscle control;
- Balance and balance;
- Functional skills;
- The child's age.

Once the therapeutic goals have been established, therapeutic methods will be recommended, as follows:

- Physiotherapy and physical therapy;
- Occupational Therapy ;
- Logopedia;

- Orthosis;
- Orthopedic surgery;
- Oral medication.

Physical therapy usually objectives include:

1. Prevention of bone deformities;
2. Improving mobility;
3. Maintaining muscle tension and movement amplitude;
4. Reducing pain;
5. Reducing spasticity;
6. Preventing hypotonia and muscle damage due to non-use;
7. Increasing the amplitude of motion;
8. Re-education of proprioception and sensory stimulation;
9. Reducing abnormal motion patterns;
10. Combating abnormal posts;
11. Promotion of normal motion patterns;
12. Delay or prevention of surgery by therapy;
13. Global functional fragmentation;
14. Improving self-care abilities of the totally dependent patient.

Objectives of kinetic treatment:

1. Adoption of positions to achieve the relaxation of contracted muscles, together with abnormal posture changes;
2. Prevention of muscle and / or tendon retractions by suppressing reflex tonic activity;
3. Inhibition of muscle hypertonia and its associated reactions;
4. Facilitation of voluntary motor activity;
5. Develop and strengthen steady-state reflexes and support;
6. Optimization of body mapping and development of motor control;

Neuro-motor recovery methods use these inhibitory and / or facilitating processes to accelerate the formation of voluntary motor control and global amelioration. The information of the exteroceptive, proprioceptive, labyrinthine, vestibular nature of the purpose of education and formation of the automated motricity underlying the voluntary active command is transmitted by therapeutic programs to the neuromotor centers with functional disorders.

The purpose of the research

The purpose of our judgment is to observe the impact that interdisciplinary treatment, through the collaboration of specialists (neurologist, orthopedist, psychiatrist), kinetherapist and orthopedist, on the evolution of neuro-psycho-motor infantile cerebral palsy during a long-term treatment .

Objectives of the research

The objectives we have set for this research are as follows:

1. Identification of a sample of relevant subjects in order to make the proposed observations;
2. Neurological, anatomical and functional evaluation of patients;
3. Monitor the evolution of patients over a 12-month period.

Research tasks

The tasks we have proposed for this research are as follows:

1. Establishing the group of subjects for research;
2. Establish test and sample batteries and apply them to subjects;
3. Making the second test battery;
4. Collecting and systemizing the data obtained from test batteries;
5. Analyzing and interpreting the data obtained,
6. Develop conclusions

Hypotheses of the preliminary research

In elaborating the paper I started from two hypotheses:

1. Early kinetic intervention may be the premise of a favorable motor development of the child with cerebral palsy.
2. On the basis of the modern guidelines for child rehabilitation with PC, real trends can be established regarding the psychomotor development of the child.

Research Methods

In the present paper, we used the following research methods:

1. Review of literature. In this regard, I had in mind the deepening of personal theoretical knowledge, to which I sought to discover the latest methods and methods used in the field.

2. The method of observation. This method was needed to obtain results after performing functional tests with the subjects of the research.
3. Investigation method by questionnaire. Through this method, we mainly collected data about the social environment, the mother's condition and evolution, and all the pre-natal aspects, as well as data about it.
4. Statistical and mathematical method. We used the method to link the data obtained from the two data collection phases and to draw conclusions in this regard.
5. Graphic and spreadsheet method. This has helped us to quantify in a visible way the recorded results, and to organize in the most efficient way all the observations made during the study.

Operational approach to research

Between April 2014 and May 2016, we analyzed the patients from the Kineto Dema Group Recovery and Rehabilitation Center.

Test subjects

The subjects selected for our study were children with the following characteristics:

1. A total of 28;
2. Equal gender distribution, respectively 14 boys and 14 girls;
3. Be suffering from a form of infantile brain paralysis;
4. Age between 5 and 42 months;
5. Ethnicity - Romanian.

The data was collected through discussions with the primary caregiver and parents of the children concerned.

Infantile cerebral palsy is the most common cause of childhood disability affecting between 2 and 2.5 children in 1,000 newborns. The disorder can occur under a wide range of clinical manifestations, from mental retardation and deep motor abnormalities to isolated dysfunctions of walking, cognition, speech, language and perception. The full assessment of the neurodevelopment of the child with cerebral palsy is carried out by a team of multidisciplinary clinicians, and should include in-depth examination of the clinical and functional status, etiological risk factors, associated manifestations, and environmental factors that influence participation and quality of life.

Increasing the survival rate in preterm infants combined with increasing rates in term infants means that cerebral palsy will continue to contribute to widespread and persistent disability among the population. New discoveries about the factors responsible for the premature white brain vulnerability and the mechanism of hypoxic ischemic lesions, in conjunction with a deeper understanding of the development of the corticospinal system and the plastic potential, can lead to new treatment strategies for the future.

Early discovery of disability enables the multidisciplinary team to intervene promptly and quickly. It all depends on the opening of the prisoners and how they assess their child, then the decision to go to a specialist, and the acceptance of entering a specialized program.

By actively participating in the kinetic program, where play is stimulated with a rich palette of information, it succeeds in time to improve the quality of life. It is important to respect the neural and motor development that a healthy child goes through in one year, and the child with disabilities is out of this period, acquiring these stages much later, or never in more serious cases. Through the multitude of methods the physical therapist can use, a body image or an experience of how to move and relate to the environment must be embedded.

Conclusions

Based on data interpretation, there is a greater chance of recovery in hemiparetic and paraparetic patients than in diparetic or tetraparetic patients because the central nervous system is less affected and the neuroplasticity phenomenon is more effective and effective. It is known that these stages must be progressive, and in multiple stages. The percentage of body damage is higher in the whole body (39%) than in a region(18%), which is also noted in specialized journals.

Spasticity is a long and laborious process. The affected muscles are the antigravity ones. In the studied group, the most affected were the biceps brachii, the thigh adductors, the sciatic and the calves muscles.

The treatment of spasticity on the upper limbs has a better effect than those on the lower limbs according to the results of the studied group.

The role of the sciatic biceps (femoral biceps, semitendinosus, semimebranos) is to maintain posture in orthostasis and in support of the unipedal, and flexor of the knee in the balancing phase for the possibility of step execution. Isolated performs the knee flexion, and accessory for the extension of the thigh and rotation of the calf in some movement. Their spasticity prevents the acquisition of stages such as sitting, orthostasis, walking.

The role of the biceps brachii as an important flexor of the elbow, the forearm of the forearm. It assists the flexion of the shoulder arm due to its origin on the coroid apophysis of the shoulder blade and the Glenoid sponge. The eccentric contraction assists the extension of the elbow not to be exaggerated, and intervenes in various activities where it acts as a stabilizer or main muscles such as climbing, nausea, writing, feeding, etc. Any decontracting action on it will have an impact on everyday life.

This cumulative positive result leads to an improvement in the amplitude of movement, thus increasing the level of independence and self-esteem, seen from the perspective of the peers, but also of the evaluation.

The conclusion of the study is that the treatment produced a clinically significant improvement two years after the start of the treatment, but that the results did not show calculation errors, it would have been better to have a larger number of subjects studied.