THE EFFECTS OF KINESITHERAPY IN PRESERVING FUNCTION IN CHILDREN WITH CEREBRAL PALSY

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Keywords: physical therapy, brain damage, preservation, child.

Abstract

The case study presented highlights the pathological physiological genesis and evolutionary dynamics of different neurogenic diseases which in most cases can cause changes in the neuro-myo-arthro-kinetic apparatus such as functional incapacity through installed paralysis. Repercussions of neurological conditions are also harmful to the normal function and n development of the neurological child, the earlier the disease is established or the greater the complexity of the neurological pathology.

Physical therapy through the variety of methods and techniques used judiciously can lead to the realization of a program for the preservation of somatic-functional structures, preventing their deconditioning

Introduction

Cerebral motor disability (BMI) is the permanent and definitive consequence of a non-evolutionary and non-hereditary brain injury, which affected the brain at the beginning of life, characterized by the dominant motor symptomatology. [9 p.148] To understand the etic-pathogenic mechanisms of we will present some physio pathogenetic aspects from literature.

Cerebral palsy (central palsy - in the English literature) brings together a multitude of very diverse etiological and clinical entities, having in common a number of characteristics;

- the definitive character of BMI, may be improved but not cured by treatment;

- the early appearance of a lesion on a developing brain has a number of consequences: long delays in motor development; motor impairment influences mental development;

- the non-evolutionary nature of the lesion determines some comments: the differential diagnosis between BMI and evolutionary lesions (tumors) is particularly important; non-evolutionary character refers to a brain injury but its peripheral consequences are transferred during the child's development; [9 p.148]

Because this paper is directly related to a brain injury, we will specify some aspects regarding its onset, reported in the neurology course of the Institute of Medicine and Pharmacy Iasi, Neurological Clinic, prof. Dr. Doc.Gh. Pendefunda 1986 Iași.

Under the name of congenital malformations involving changes in the morphology and structure of the CNS and its sheaths, which are detected by chance or during investigations, they result from a developmental defect during embryo- or organogenesis and are most often found at birth or shortly afterwards bearing the name of - congenital. [3 p. 362]

Cerebral motor disability is the consequence of an injury that affects the brain at the beginning of life. Its causes can be located temporarily at birth or in the postnatal period in the first year of life:

- neonatal anoxia (oxygen deprivation during birth) considered the main cause of BMI approx. 40% of cases, can occur without any apparent abnormality during labor;
- prematurity determines approx. 30% cases of BMI, may be isolated or associated with a pathology of pregnancy or childbirth;
- other rarer causes: post maturity, associated with neonatal anoxia severe hemolytic jaundice;
- pathology of pregnancy, meningitis, encephalitis, cranial trauma. (in 10% of cases in the anamnesis none of these cases can be highlighted) [6 p. 26; 9 p.149]

Classification of clinical forms based on the analytical description of motor disorders: there is an international classification that recognizes 5 main forms of cerebral motor disability:

- *athetotic form;*
- *form with parkinsonian rigidity;*
- *form with tremors;*
- *ataxic form;*
- *spastic form.* [9 p.150]

Regardless of level, the lesions affecting the pyramidal bundle *central neuron motor syndrome,* have the following characteristics:

- paralysis, the motor deficit is wider, generally includes one or more limbs (monoplegia, hemiplegia, paraplegia, tetraplegia) predominating on the muscles of finer and differentiated voluntary action (flexor muscles for upper limbs and extensors to lower limbs);
- disorders of muscle tone, characterized by a pyramidal hypertonicity called spasticity;
- osteotendinous reflexes (ROT) are exaggerated, Babinski, Hoffman, abolished abdominal and cremaster reflexes are present;

- muscle trophicity is generally preserved;
- in the medullary lesions appear the medullary automatism reflex (the triple flexion reflex at upper extremities)
- synkinesis, movements that do not occur voluntarily but occur in paralyzed muscles at the same time as some voluntary movements of intact muscles.

Pyramidal syndrome (central motor neuron) occurs in the following diseases that affect the brain and spinal cord (CNS): strokes; tumors, abscesses; trauma; inflammatory processes: encephalitis and myelitis; anoxic encephalopathies at birth, infantile cerebral palsy. [1p.30; 4 p.150-151; 5 p.24-25; 7].

In the evaluation of children who are suspected of cerebral palsy, an investigation is required which must include;

- neuro-motor assessment of the child suspected of having BMI: the attitude of the body lying down; examination of muscle tone; studying postural function; movement coordination disorders; associated orthopedic disorders; level of motor evolution;
- psychological examination; determining the development coefficient; the existence of verbal comprehension and space-temporal disorders;
- complementary examinations: ophthalmological examination; Brain CT; Brain MRI; EEG.[2 p.91-133; 8; 9 p.156]

Purpose and objectives of the study

Aim of the work is improving the application is specific means of kinesitherapy and that in the recovery of children with cerebral palsy to achieve a morphological - functional status as close to physiological nominal parameters.

Research objectives - analysis of the specialized literature regarding the recovery of the child with cerebral motor disability

- identification of the optimal clinical aspects, examination and investigation methods used as well as the applied physiotherapy program;
- the arguments of the effectiveness of the physiotherapy program carried out in order to maintain a positive morpho-functional status of the neuro-myo-arthro-kinetic apparatus.

Materials and methods

We will present some aspects of the organization of the experiment, namely specific pathology data subject of this research. We will therefore list a few aspects which are the reference in the clinical picture of the patient with who I worked, according to the document issued by the County Hospital "SF.IOAN CEL NOU “, SUCEAVA - medical letter /

discharge ticket from 10.09.2019. The patient born on 05.08.2008, presents for clinical-biological, neurological and video-EEG evaluation in order to re-evaluate the therapeutic behavior: developmental and epileptic encephalopathy of probable structural cause; pharmaceutical resistant focal epilepsy of structural cause; right focal temporo-occipital cortical dysplasia; mixed spastic-dyskinetic cerebral palsy, complete tetraplegia, paralytic strabismus left eye; blindness; significant cerebral atrophy, especially frontal and bilateral temporal, open fontanelle 3.5 cm. Physical inactivity increases the ATP-ase premise of morpho-functional deconditioning may lead to irreversible degradation of tissue and complications of installing all functions. We performed the functional evaluation of the patient in order to establish the capacity for effort, in order to be able to identify the degree of stress that can be carried out by the patient without the onset of fatigue or stress. We know the influence of stress on a damaged / unstable nervous system, they can accentuate and cause agitation / epileptic states in this case.

In order to obtain information on the child's neuro-motor functional level, the medical letter presented specifies that we are in a rather difficult situation:

- developmental and epileptic encephalopathy of probably structural cause;
- drug-resistant focal epilepsy of structural cause;
- right focal temporo-occipital cortical dysplasia.
- mixed spastic-dyskinetic cerebral palsy, complete tetraplegia.

This residual indicates a severe neuro-motor deficit with chances of rehabilitation from a medically difficult point of view. However, we believe that you can always look for and find resources to manage this complex of neurogenic pathologies. The primary purpose of initiating and starting this program was to preserve, maintain and properly manage the factors that contribute to the deconditioning and degradation of somatic-functional status.

The objectives of the physiotherapy program:

- prevention of and management of bedsores, contractures and vicious positions;
- maintaining joint mobility;
- inhibition or suppression of reflex tonic activity (reeducation and regulation of muscle tone);
- reduction of hypertonicity or intermittent spasms;
- reeducation of sensitivity and proprioception;
- facilitating the integration of higher lifting and balance reactions;
- development of motor skills and re-education of balance;

- reeducation of normal posture.

To achieve the first goal, prevention and management of bedsores, contractures and vicious positions, a permanent program of postures in different positions is required to facilitate blood and lymph circulation. Assisted mobilizations and analytical movements can also cause a stress on muscle tissue and joints, with positive effects. Maintaining joint mobility and here we refer to the upper and lower limbs, can be achieved by analytical movements on segments. Each joint is mobilized starting with the hand joint, elbow and shoulder in all the physiological axes of movement within the contraction segment. Mobilizations are performed at both segments within the range of motion (ROM) without determining / accentuating spasticity. The exercises performed on the scapulohumeral girdle / upper limbs and the pelvic girdle / lower limbs, aim to prevent ankylosis, maintain tissue trophicity, promote blood and lymph circulation in order to limit the progressive deconditioning processes that occur in children with cerebral palsy, his inability to move. Also in this context, the maintenance of joint mobility can also promote voluntary motor skills through the amplitude of movement achieved and maintained on the large joints and beyond. Regarding the realization of processes that can lead and determine, inhibition or suppression of reflex tonic activity (reeducation and regulation of muscle tone), as well as reduction of hypertension or intermittent spasms, we will establish a program of specific postures / mobilizations (KABAT, BOBATH, VOIJTA, PNF)

The recovery program continues with exercises that will allow the unblocking and initiation of mechanisms for re-education of sensitivity and proprioception, as well as facilitating the integration of higher lifting and balance reactions. The development of motor skills and the re-education of balance, implicitly of the normal posture are part of the final objectives of the posture and mobilization program carried out in the next stage. The listed objectives will be achieved through a program of postures in different positions combined with NMAK-induced mobilizations or requests that will determine a positive response, thus favoring the development of proprioceptive mechanisms. It will start with decubitus postures, then on the knees, on all fours, on the Bobath ball, then it will be introduced in a stabilizing program that allows maintaining the orthostatic position.

Results and discussions

In order to present the results of the kinetic program we used our own way of presentation in table no.1

The way in which the items in table no.1 were selected is reflected by the fact that the patient has a limited number of actions that he can perform alone. We had to resort to drawing up our own evaluation method in which to take into account the patient's abilities but at the same time the premise of possible improvements. The pro-perceptual capacities on segments were taken into account by requesting the maintenance of different positions. By stimulating the muscle kinetic chains in different positions, by making movement patterns and stimulating different sensory receptors (auditory, optical, tactile, etc.)The evaluation scale was performed as follows: level 0 indicates the total lack of patient involvement in the stated movement; the level up to 25% indicates the personal ability to perform and the rest is help; over 25% is a personal capacity greater than 25% but not more than 40-50%, the rest is help. This evaluation scale was made in order to present any positive changes that occurred as a result of the program. Regarding the presentation of the evaluation results, the differences between the initial and the final evaluation were made with the help of colors, in order to be able to visualize in a practical and efficient way.So, the green color represents the evolution of the tested parameters and the yellow color represents the values of the stationary parameters Their stationing represents on the one hand the incapacity and limitation of the realized program but also a maintenance of them at the value they had at the beginning of the program. Positive values were achieved mainly in the area of motor skills and proprioception, where kinetic programs manage to determine positive responses from the subject. Of the indicators subject to evaluation, namely 14, a number of 7 which represents 50% of the total were evaluated as positive, and the others were evaluated as stationary.

Table no.1 Evaluation, sensory capacity; proprioceptive; balance; stability.

No.	Functional capacity tested	Level 0	Up to 25%	Over 25%	Level 0	Up to 25%	Over 25%
		Initial assessment			Final evaluation		
1	Recognizes the voice of parents			X			X
2	Communicate verbally: understanding / expression	X			X		
3	Recognizes colors	X			X		
4	Reacts to auditory stimuli		X			X	
5	Reacts to light stimuli		X			X	
6	Reacts to thermal stimuli		X			X	
7	The ability to turn from side to side		X				X

8	The ability to keep the head raised in a supine position		X				X
9	The ability to maintain the position of the doll high (on the elbows)	X					X
10	Ability to maintain a knee pose	X					X
11	Ability to maintain a four legged position	X				X	
12	Ability to hold a sitting position	X					X
13	Ability to maintain position in orthostatism	X			X		
14	The ability to grasp	X				X	

Conclusions

- it is confirmed that the investigation methods followed by a program established as early as possible, can create the premise of limiting and slowing down the deconditioning mechanisms installed in the child with BMI;

- among the techniques and methods used in physiotherapy for neuromotor deficits, those that use postures and mobilizations such as: PNF; KABAT; BOBATH, they had a positive response from the subject;

- the effectiveness of the program is conditioned by the area and complexity of the neuro-motor deficit, by the somatic-functional residue established at the start of the physiotherapy program, but also by the limitations determined by the clinical-medical intervention / stabilization;

- the program realized through the presented results confirms the beneficial role of kinesitherapy on the morphological-functional parameters, but also of those in the area of psychomotor skills.

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