THE FUNCTIONAL RECOVERY OF THE UPPER LIMB IN CHILDREN WITH CEREBRAL PARALYSIS

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SUMMARY

The precocity of proper diagnostics, establishment of a supported therapy program, 2-3 times per day, for 25 to 30 minutes , lot of patience, understanding, and professionalism will lead to the reduction of spasticity, learning to actively relax in correct and comfortable positions, formation of correct motion engrams, increase joint mobility parameters, stretching slowly, learning and training manual gestures and gripping. Equally important is individualization of therapy, choosing the most appropriate relaxing methods for each child, removing as much as possible the emotional stress, focusing on maintaining the state of relaxation during application using the right speed, depending on the particular response of the child.

Introduction

The cerebral paralysis or the cerebral motor infirmity includes a group of posture and movement disorders as a consequence of an unprogressive injury at the development point of the nervous system in pre-, peri- and postnatal faze.

The PCI's clinic forms are classified by the neuro-motor deficit and the affected morpho-functional stuctures in three categories: spastic, ataxic and dyskinetic.

The spastic form found in 70-80% of cases is determined by a pyramidal system injury, which affects the nervous system`s ability to recieve gamma amino-butyric acid in damaged areas and characterized by a high tone, assigned to the level of muscle groups and present permanently, even at rest. [1],[3]

Material and method

Five children were observed for 6 months, from October 2015 until April 2016, at the Recovery Center „Fara".

Objectives:

- Reducing spasticity;
- Improving fine motor skills;

- Reducing upper limb joints`s limit extention

Table No. 1 Patients

NAME	AGE	SEX	DIAGNOSTIC
L A	2 YEARS 3 MONTHS	M	Spastic tetraparesis, predominantly paraparesis, motor retardation
D G	2 YEARS 3 MONTHS	M	Spastic tetraparesis, predominant parapareză, strabism convergent, retard psihic mediu
A I	2 YEARS 2 MONTHS	F	Right hemiparesis, 3 step mental deficiency
T A	3 YEARS 1 MONTH	F	Spastic paraparesis, achondroplasia
S A	2 YEARS 1 MONTH	F	Spastic paraparesis, 2nd grade prematurity

L.A. 2 years and 3 months old, D.G. 2 years and 3 months old, Spastic tetraparesis, predominantly paraparesis, motor retardation;

Relax in inhibitory reflex positions. This is accomplished by symmetrical and strong flexed forward head, folded arms so that the arms grasp opposite shoulders, legs flexed in hips and knees. So the spastic contracture is much diminished and the movement is executed with ease. In this position the child will be swinging several times slowly.

It was worked for spastic muscles decontracture.

Passive moves:

- pronation and hand cubital flexion to automatic relax the fingers flexors;
- progressive passive extension of fingers for fist`s flexors decontraction, then the placement of the hand at the level of the shoulder (hand with tray), which cause the relaxation of the entire upper limb. Then it executes an extension and a supinasion of the entire upper limb, maintains the children's fingers extended, holding with the other hand the elbow, for a member's full extension;

- radial styloid processus percussion relaxes;
- quickly bending of a member result in inhibiton of flexors;
- rhythmic rotations combine with flex-extensions.

Slow stretching – from 10 seconds to 1 minute , with repetition in 2-5 sets, with 30 seconds rest after each stretch. It begins with distal joints, originally a join stretching, than goes to 2-3 joints. Thrust is slow, easy, in ax, without causing pain. It is realized on kineto table, on Bobath ball , on roll.

Active moves: from sitting: bimanual coordination exercises with milestones, sticks, milestones-circles asociations, quadruped walking in cushions;

- oculo-manual coordination: built – geometric shapes of different colors;

A.I. 2 years and 2 months old, Right hemiparesis,

Passive mobilisations: Le Metayer- Exercise for upper limbs, insists on the right upper limb.

- exercises to facilitate the right upper limb extension, to open the fist, fanning fingers, dorsal extension of the hand;
- At the upper limb which is contracted in flexion, we are working with the healthy member on Kabat variants, in flexion, relax, in extension, the ill upper limb.
- rhythmic rotations combined with flexions- extensions;
- the child in ventral decubitus on the Bobath ball, with upper limbs supported on the ball, therapist standing or kneeling down, behind the child, secure with a hand the child's torso, and with the other hand realize carries out the extension and the adduction of an upper limb, at the same time with elbow flexion. By pressure on the metacarpals facilitates automatic extension of the fingers.

Active exercises:

- manual physiotherapy exercises, at the manual re-education board;
- driving pieces on coaster, especially with the right hand;
- bimanual coordination exercises with pins, milestones;
- matches discs on milestones with right upper limb;
- from standing, driving the ball on the trellis at the raised arm level, above the shoulders, especially with the right hand;
- extension of the right upper limb, leaning of the Bobath ball, taking a toy from below;
- manipulates objects, but during the movement doesn't complete extension of the right upper limb, running movements with the elbow slightly flexed ;

T.A., 3 years 1 month old, feminine gender, spastic paraparesis
Relaxation in supine on the therapy table, the therapist is sat next to the child, grab the ankle joints with one hand, and with the other one secure the head and the neck at the occipital level, KT realizes simultaneously with knee and hips flexion of neck and head, a positin in which the child will be slowly swung several times.
Le Metayer proposes an upper limb relaxation technique, thus:
- the shoulder in adductin and an internal rotation with the extended elbow will lead to the extent of posterior deltoid`s fibers and the subspinal, biceps and coracobrachial muscle relaxation. Now, he makes the pronation and the fist flexion, the fingers extension being relatively easy to perform. Then follows fist extensions, with fingers and thumb extension, supination: arm is in abduction, keeping hand extension. In this position, rotation motions and arm snatches, are being made. If the muscles are not completely relaxed, he continues with the completely arm extension.[7]

Passive moves of segments, executed by standing, seated, supine, focusing on relaxation.
- the child seated, in the flexed position, maintained from behind, by shoulders. Pull back by a shoulder (sternocleidomastoid muscle and scalene muscles expanding) and strongly massage with the thumbs of the same hand at the internal tip of scapula to cervical spine with the thumbs. After these massages the shoulder is pulled back, child stretch his upper limb and open his palm.
- exercises that determine the distance of muscle insertion for upper limb segments;
- upper limb`s **active moves** in focusing on the on relaxation positions, based on balances, swinging of the concerned segments.
- crawling exercises;
- quadruped walking exercises in the palm support;
- exercises at the trellis;
- exercises with portables;
- global relaxation exercises on Bobath ball.

S. A. 2 years 1 month old, feminine gender, spastic paraparesis, 2nd grade prematurity, motor retard, convergent strabismus.

One method of relaxation with good results is grabbing the child`s ankles and slightly swinging a few times upside down, position that favorizes the brain irigation. Relaxation is used before the therapy program execution, during the therapy, whenever necessary. The purpose

is the muscle decontracturation as much as possible, in order to perform the program exercises with economic energy use.

Passive movements of the segments performed in the supine, sitting, standing focusing on relaxation;

It was worked to improve joint mobility to the upper limbs, in supine;

Exercises in sitting with stick at the edge of the table to strengthen balance;

- lifting, with help, from sitting to standing;
- motric games, walking on inclined pan, progression with resistance;

The children patients evaluation has been achieved by using standardized scales, both at baseline, at 3 months, and completion, carried on further study.

1. The spasticity`s evaluation using Ashworth modified scale :

The Ashworth modified scale:

0: without changes in muscle tone.

1: discreet growth of tone manifested either by a barrier in the passive movement of flexion or extension, followed by relaxation, or by minimal resistance until the end of the movement.

1+: discreet growth of tone manifested by a barrier followed by minimal resistance perceived at least a half of the articular amplitude.

2: more marked tone growth over most articular amplitude, so the joint can be mobilized easily.

3: significant increase in muscular tone causing difficulties in passive mobilization.

4: that joint is fixed in flexion or extension, abduction or adduction, with an impossible passive mobilization.[2]

Table No. 2 Spasticity Evaluation

The tone evaluation of the upper limb`s affected muscles		L A			D G			A I			T A			S A		
		I	IN	F	I	IN	F	I	IN	F	I	IN	F	I	IN	F
The shoulder`s evaluation during the passive movements with its elbow extended	Flexors	2	2	1	3	2	2	3	2	2	2	2	1	2	1+	1
	Extensors	1	1	0	1	1	0	2	2	1	2	1	1	1+	1+	1
	Adductors	2	2	1	2	2	1	2	2	1	2	2	1	2	1+	1
	Abductors	2	2	1	2	2	1	2	1+	1	2	1+	1	2	1	1
Evaluation made with the elbow flexed	Shoulder`s internal rotators	2	1	1	2	2	1	2	2	1	2	2	1	2	1	1
	Shoulder's external rotators	1	1	0	1	1	1	1	1	0	1	1	0	1	0	0
	Elbow's flexors	2	2	1	3	2	2	2	2	1	2	2	1	2	1	1
	Elbow's extensors	1	1	0	1	1	0	1	0	0	1	1	0	1	0	0
	Pronators	2	2	1	3	2	2	2	2	1	2	2	1	2	1	1
	Supinators	1	1	1	1	1	0	1	1	0	1	1	0	1	0	0
	Fist's flexors	2	2	1	2	2	1	2	2	1	2	1	1	2	1	1
	Fist's extensors	1	1	0	1	1	0	1	1	0	1	1	0	1	0	0
	Fingers`s flexors	2	2	1	2	2	1	3	2	2	2	2	1	2	2	1

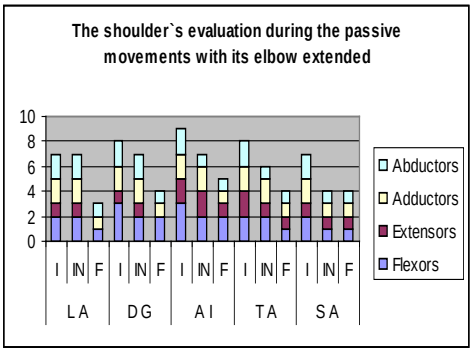
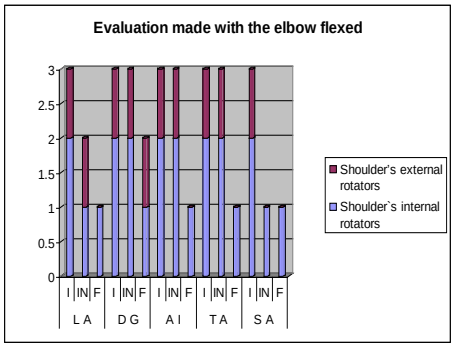


Figure No.1



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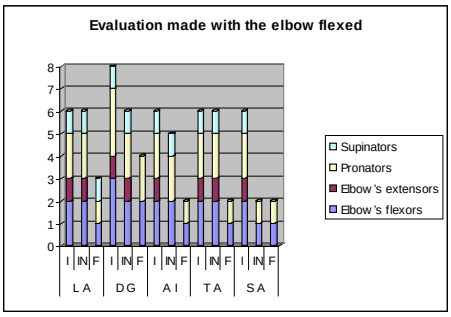

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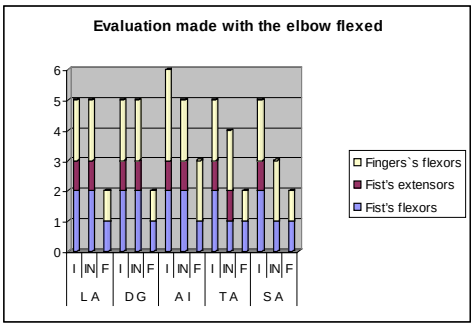

Figure No.4

2. The upper limb`s functional motor level it was carried out using *The sheet for upper limb motor function level*, using the 1-19 items, giving scores: 1 point for the first 10 items and 2 points for the following 9 who performed . It calculate the total number of points.[2]

Table No.3 The sheet for upper limb motor function level

L. A.			D. G.			A. I.			T. A.			S. A.		
I	IN	F	I	IN	F	I	IN	F	I	IN	F	I	IN	F
10	14	14	8	10	12	12	16	18	20	22	24	20	22	24

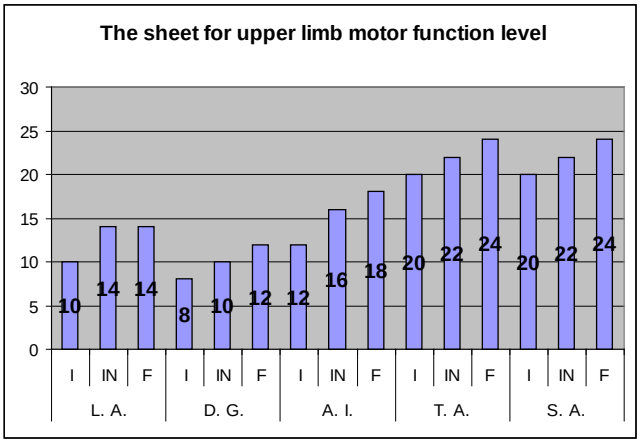

Figure No.5

***2*. Hand`s global motor bilance** it was performed by using the *Global motor balance* table (Manole, V. şi Manole, L.), using the items (1-8) and giving scores of 0-5, as follows:

Table No..4- Hand`s global motor balance

L. A.			D. G.			A. I.			T. A.			S. A.		
I	IN	F	I	IN	F	I	IN	F	I	IN	F	I	IN	F
22	24	25	20	22	24	23	24	26	26	28	30	28	30	31

0- absent motion
1- poor movement that interests only the intention
2- movement is partly achieved
3- movement is performed throughout amplitude difficultly
4- movement is achieved easily but with low power
5- normal motion.[2]

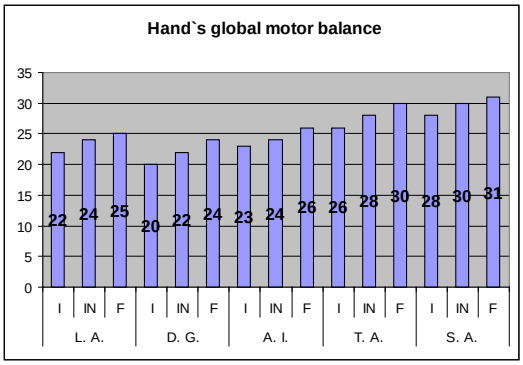

Figure No.6

Results and discussions

As a result of the and the analysis of the data obtained at former, intermediate and final tests, the effects of the methods and techniques used were found in order to reduce spasticity, to improve the range of motion in upper limb joints as well as the acquisitions driving acquired during the 6 months of therapy

L.A. 2 years and 3 months old, spastic tetraparesis: during therapy finds a slight shoulder contracture in adduction and internal rotation, slight spasticity on the elbow flexors, then the pronation is incomplete, and the limitation of the wrist and fingers extension is due to the flexor contracture of the fingers.

D.G. 2 years and 3 months old, spastic tetraparesis present pa moderate spasticity in initial testing flexors and shoulder adducts, pronatori foream flexors and finger flexors.

At the intermediate and final testing, spasticity diminishes slightly or remains constant, from one to another test on certain muscle groups.

Upper limb functionality increases percent from a test to another text describing an upward curve.

On the motor aspect it appears orthostatism, performing varions activities, in this position: driving the ball on the trellis which is located above the shoulder height, sticking flyers on the by bringing the arms forward and upward.

A.I. 2 years and 2 months old, Right hemiparesis – Initial testing reveals a moderate contracture of the right shoulder, in adduction and internal rotation, pronation is partially the right upper limb, a limited elbow extension, most of the activities they perform are with the elbow flexed. Fist flexion contracture determines finger flexors and fingers. If the intermediate testing on some muscle spasticity groups persists, others

are reduced, as the final reduction will be sensitive testing on all muscle groups examined. Upper limb functionality improve from one test to another regarding acquisitions and driving movement is found in standing position, with the right knee in extension, driving large base of support.

T.A. 3 years and 1 month old, feminine gender, cerebral paraparesis – stagnation or decrease spasticity is found in a test next all tested muscles groups, upper limb functionality improves from one test to another, and to found acquisitions driving moving from standing position with wide base perform activities for upper limb extension, hand exercises for skill development.

S.A. 2 years and 1 month old, feminine gender, cerebral papraparesis – At the initial testing it grows a slight spasticity of the upper limb on the flexor muscles that decrease or stagnate in subsequent tests. Upper limb functionality increases from a test to another. It performs certain activities of standing transport balls, small items, places the pads one over the other. By imitating adults claps, raises her hand high five. She verbalizes actions that she does, she asks to play with certain objects. Working on the manipulation of objects, incastrates little objects, two- piece puzzle, colors or shapes.

The global balance of power hand has a slight improvement frome one test to another for all patients.

Conclusions

The relaxation of the spastic child is made according to the response of the child to the method used it promotes the relaxation before, during and after the therapy application. Depending on the child`s tolerance using its hanging upside down by catching the ankles, followed by slow ribbed several times.

The production of inhibitory reflex positions by bringing the head symmetrically and strong flexed forward, with the arms crossed on his chest with his hand gasping the shoulders from the opposite sides, with legs bent in hips and knees. In this position the child will be rocked several times.

The passive motion and lent stretching are used to improve joint mobility, executed on every joint of the affected limb, so as not to provoke stretch reflex. If it feels a restriction when moving the limb is held in a certain position during movement amplitude, until the release is felt. Then the move continues slowly. It starts with the least affected joints, followed by those most affected. The physiotherapy and

occupational therapy fill the bill in promoting manual skills, in developing motility and the oculo-manual coordination.

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RECUPERAREA FUNCŢIONALĂ A TRENULUI SUPERIOR LA COPIII CU PARALIZIE CEREBRALĂ

Cuvinte cheie: paralizie cerebrală, recuperare, motricitate fină

REZUMAT

Precocitatea diagnosticării corecte, instituirea unui program de terapie susţinut, de 2-3 ori pe zi, timp de 25-30 minute, multă răbdare, înţelegere, dar şi profesionalism vor conduce la diminuarea spasticităţii, învăţarea de a se relaxa activ în poziţii comode şi corecte, formarea unor engrame corecte de mişcare, creşterea parametrilor mobilităţii articulare prin mobilizări pasive, stretching lent, învăţarea şi formarea gesticii manuale şi a prehensiunii. La fel de importantă este individualizarea terapiei, alegerea celor mai adecvate metode de decontracturare pentru fiecare copil în parte, înlăturarea pe cât posibil a stresului emoţional, focalizându-ne pe menţinerea stării de relaxare pe parcursul aplicaţiei folosind viteza potrivită, în funcţie de particularităţile de răspuns ale copilului.