Hippotherapy with cerebral palsy children – our experience in Bulgaria - a pilot study

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Cerebral Palsy /CP/ is a disease requiring management, including knowledge of different therapeutic methods, in compliance with the needs of the child at certain stage of his psycho-motor development. Hippo-therapy offers to the children with CP medical care, sport and pedagogy at the same time and is used for their treatment (1,3).

For a first time in Bulgaria research was performed on the influence of hippo-therapy on psycho-motor status of children with CP.

The PURPOSE of this study was to measure range of the motor abilities, level of spasticity, body position in space and some psychological functions after participation in a hippo-therapy program.

METHOD

Participants
15 children with spastic /quadriparesis – 6; diparesis – 4; hemiparesis 5/ CP were involved in this study. The age of tested children varied between 2-13 years, 8 of them were boys and 7 - girls.

Measures and Assessments
We used the Holt Test for Child Motor Ability Assessment (2), Gross Motor Function Classification System (GMFCS)(5), Ashworth Scale for Spasticity. The Posture Assessment Scale /Bertoti –1988/ (4) allowed the rating therapist to visually assess and score alignment and symmetry of five body areas: 1.Head and neck; 2.Shoulder and scapula; 3.Trunk; 4.Spine; 5.Pelvis. We test also some psychological functions as emotional-behavioural activities

including: emotional stability, troublous level, motivation activity and the components of attention.

Hippo-Therapy Programme

The child participated in a 10-12 week Hippo-therapy program consisting of 12-14 procedures as total, carried out once weekly, with duration of 20-30 min. each procedure.

Each child rode twice weekly. The horses were led only at a walking pace. The exercises on the horseback were in a prone, side –lying or siting position. In the siting position the child, stretched to touch his own toes, or rotated to reach for the horse tail, tried to raise his own arms into different positions to increased trunk extension, rotation, stretched to reach for the horse ears. The balance activity of the child was trained with the child sitting with the face, either the front or the back of the horse.

During the first sessions the horse was led in a straight forward direction, later the horse was led in circles or in a serpentine.

DATA ANALISIS

Results and discussion

The **Holt`s test** demonstrated increased score in both age groups, more manifested in the group encompassing children from 2 to 7 years of age. The average score change according to Holt in the smaller age group /from 2 to 6 years of age/ increased from 109 in the beginning to 116,6 at the end of the test, and in the upper age group/from7to 13 years / from 137,5 to 139,6. The score increase on the Holt test is due to the stabilization of gate, assuming standing position with other's assistance and climbing up and down stairs, which is done with support and stabilizing pace in children able to walk and improvement of the head control, erection of the torso and stable support at four points in children unable to walk. One may note that in small children the improvement is much more marked. The greater improvement in small children may be explained by the insufficient time to fix the pathological motor stereotypes and lack of secondary complications. In bigger children the deterioration in motor functions is linked to a great extent to the fixed motor contractures, strong spasm of a number of muscle groups, deformities being formed, as well as to the constant pathological regulation by the Central Nervous System /table. 1, fig.1/.

We obtained a similar change in **Bertotti test**. The score increases in both age groups is due to the improved position of the head, the posture and erection of the torso during horseback riding and smaller improvement upon stabilization of the pelvis. The most considerable improvement was observed in children suffering from hemiparesis, followed by the ones with diparesis and most insignificant in children with quadriparesis. /table. 2,fig.2/.

The number of children for each **GMFCS** level was – Level I /n=7/; Level II/n=5/; Level III/n=2/; Level IV/n=1/.Mean GMFCS score for I gr. –1,55; for II gr.- 1,66 /table. 3/. At the end of the survey there is no change and transfer to an upper level.

The same applies for the surveying of the spasticity degree according to **Ashworth Scale** - 4 of the children achieved a score of 3; 5 achieved a score of 2; 2 achieved a score of 1+ and 4 achieved a score of 1 /tabl. 3/.

The assessed of some aspects of **psychological functions** by CP children showed different changes either.

The emotional and behavioral sphere is characterized by rather dynamic processes, since it is influenced by various factors, which make its assessment difficult. The inclusion of hippo-therapy in the rehabilitation of children with CP showed the following changes at the end of the therapeutic program:

a/ the greatest improvement is noted for the emotional stability index - 40% of the children after the therapeutic course have been transferred to a borderline and stable state, and only 20% remain unstable (Table 4);

b/ the anxiety index showed a trend towards decrease from high to moderate and low, as 33,33% of children remained with high anxiety (Table 5);

c/ behavioral motivation showed the same results as anxiety. The relation with the horse as a friend proved to be a real stimulus for the active involvement in the therapeutic program (Table 6);

Due to the small difference in the attention and the emotional and behavioral sphere indexes in smaller and bigger children we do not separate them by age.

The analysis of attention span components in both age groups showed the following changes (Table 7) - 20% of children distributed initially in the groups with considerable and moderate attention disturbance have been transferred to the groups of slight attention disturbance and normal as only one child remained unchanged, and the percentage of children having achieved normal parameters of attention at the end of the study reached 46,66%. It is important to mention that all components of attention have improved in both age groups.

CONCLUSION

The results of this study constitute a first trial for objective analysis of the hippo-therapy effects for the children with CP in Bulgaria.

The results show that:

1. Children with spastic CP demonstrated an improvement in the postural control and motor abilities after applied Hippo-therapy program;

2. Bigger improvement in the posture and motor abilities are observed in the younger children.

3. There were not changes in GMFCS and Ashworth`s Scale after the application of Hippo-therapy program in the two groups.

4. There were positive effect over some emotion-behavioural activities - emotional stability, anxiety, behavioral motivation, and the components of attention.

References

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4.Bohannon R.W. Smith M.B. Interrater Reliability of a Modified Ashworth Scale of Muscle Spasticity , Physical Therapy, 67, 206-207, 1987

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Motor Tests

Tabl. 1   **Holt Test** /points/

Age/years/	BEFORE THERAPY		AFTER THERAPY		d	t	p
	x	s	x	s			
2-6	108,67	45,67	115,89	44,50	7,22	2,95	<0,01
7-13	138,5	37,03	140,67	37,09	2,17	2,23	<0,05

Tabl. 2   **Bertotti Test** /points/

Age/years/	Beginning of the study		End of the study		d	t	p
	x	s	x	s			
2-6	7,22	2,54	9,66	2,83	2,44	5,5	<0,001
7-13	7,83	1,94	9,50	2,09	21,67	3,59	<0,001

Tabl .3   Gross Motor Function Clas. System //   Ashworth Scale

Age/years/	GMFCS					Ashworth Scale				
	Level I	Level II	Level III	Level IV	Level V	Grade1	Grade 1+	Grade 2	Grade 3	Grade 4
2-6	4	2	0	1	0	2	1	2	2	0
7-13	3	3	2	0	0	2	0	3	2	0

Emotion - Behavioral Scales

Table 4.   I. Emotional stability

Unstable			Borderline state			Stable		
in the beginning	in the end	difference	in the beginning	in the end	difference	in the beginning	in the end	difference
9	3	- 6	3	6	+ 3	3	6	+ 3
60,0 %	20,0%	40,0%	20,0%	40,0%	20,0%	20,0%	40,0%	20,0%

Table 5   II. Anxiety

High			Average			Low		
in the beginning	in the end	difference	in the beginning	in the end	difference	in the beginning	in the end	difference
7	5	- 2	3	3	0	5	7	+2
46,7%	33,3%	13,3%	20,0%	20,0%	0	33,3%	46,7%	13,3%

Table 6.   III. Behavioral motivation

Low			Average			High		
in the beginning	in the end	difference	in the beginning	in the end	difference	in the beginning	in the end	difference
7	5	- 2	3	5	+ 2	5	5	0
46,7%	33,3%	13,3%	20,0%	33,3%	13,3%	33,3%	33,3%	0

Table 7.   IV. Attention surveillance

Considerably impaired			Moderately impaired			Slightly impaired			Normal		
in the beginning	in the end	difference	in the beginning	in the end	difference	in the beginning	in the end	difference	in the beginning	in the end	difference
5	1	+ 4	3	4	+ 1	3	3	0	4	7	+ 3
33,3%	6,6%	26,7%	20,0%	26,7%	6,6%	20,0%	20,0%	0	26,7%	46,7%	20,0%