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CHANGING THE MAIN INDICATORS TO ASSESS MOTOR FUNCTION IN CHILDREN WITH CEREBRAL PALSY SPASTIC FORM BY HYDROKINESITHERAPY

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Annotation. The aim of the study is to identify the efficiency of the developed technique hydrokinetic system of physical rehabilitation for children 3-5 years old with cerebral palsy spastic form. Examined the impact of comparing the effectiveness of exercise in the water by two techniques: the author and accepted. In experiment involved 24 people aged 3-5 years old with cerebral palsy spastic form. The experiment lasted one year, classes were held hydrokinesitherapy 2 times a week. In the study recorded the performance evaluation of basic motor functions to the experiment, six months later, and after the experiment. It is shown that an important component of physical rehabilitation of patients is hydrokinesotherapy. Shows the direction of the development of motor skills of children 3-5 years old. Study of the development of indicators basic motor functions.

Keywords: hydrokinesotherapy, cerebral palsy, skill, rule, indicator, development.

Introduction

The problem of children nervous system's organic lesions, in particular cerebral palsy (CCP), is one of the most urgent in children neurology. The urgency of this problem is connected with growth of children disability in Ukraine. In Ukraine, as on 2000, in average, indicators of children disability was 155.8 per 1- thousand of children population, as on 2005 -177.6, as on 2010 – 204.3 and as on 2011 this average indicator was 207.6 [2, 5]. Children with cerebral palsy take leading place and make 2.6% from general quantity of disabled children with problems of nervous system [3,10].

Organization of motion activity of children with abnormalities of supporting-motor system caused by central nervous system's lesions meets certain difficulties. A lot of scientists [1.4.7 et al.] worked on problem of children cerebral palsy, which is accompanied by numerous many-sided clinical symptoms, patho-physiological mechanisms of their progressing, difficulty of treatment and rehabilitation and by the data of these scientists prevailing quantity of CCP patients have spastic form of disease.

There are different views on CCP treatment, but physical rehabilitation remains its important component. One of physical rehabilitation means is hydro-kinesitherapy – one of therapeutic physical culture's forms, which envisages combination of dosed movements with influence of water on patient's organism and includes fulfillment of gymnastic exercises, stretching in water, underwater massage, swimming, bathing and mobile games [6,9].

In connection with this there was developed a methodic of hydro-kinesitherapy as a mean of stage-by-stage formation of motion skills foe 3-5years old children with cerebral palsy of spastic form.

The purpose of methodic of hydro-kinesitherapy is to improve development of 3-5 years old children's, who have cerebral palsy of spastic form, motion skills.

The work has been fulfilled in compliance with combined plan of scientific & research works in the field of physical culture and sports for 2011-2015 by subject 4.2 "Physical rehabilitation of disabled with abnormalities of supporting motor system", specialty of BAK of Ukraine, 24.00.03.

Purpose, tasks of the work, material and methods

The purpose of the work is to prove efficiency of the developed hydro-kinesitherapy methodic in the system of physical rehabilitation for 3-5 years old children with cerebral palsy of spastic form. This purposed was achieved with solution of the following tasks:

1. Determine indicators of main motion functions' evaluation (EMMF) before experiment with main and control groups.
2. Study influence of hydro-kinesitherapy on dynamics of indicators of main and control groups' motion functions.
3. Analyze efficiency of the author's hydro-kinesitherapy's application in comparison with commonly used methodic.

The research was carried out on the base of Kherson regional center of social rehabilitation of disabled children. Experiment involved 24 children with cerebral palsy of spastic form, which were divided into main group – 12 children, in which author's program was implemented, and control group – 12 persons, who were rehabilitated as per commonly used methodic. Experiment took one year; hydro-kinesitherapy was conducted twice a week.

During experiment indicators of main motion functions' evaluation [8] were registered before experiment, after half of a year and after finishing of experiment.

For static verification of hypothesis about confidence of difference we used t-criterion of Student for linked and not linked samples; with checking up of confidence 5% level of significance was taken as the base. For evaluation of data link closeness we used correlation analysis with the help of Pirson's coefficient of linear correlation.

Results of the research

Before rehabilitation course (see table 1) main group children with cerebral palsy lagged behind in their motor development from norm by 136.4 points (48,3%), while children of control group – by 129 points (51,2%). It witnessed that 3-5 years old children with cerebral palsy of spastic form have significantly disordered level of life activity, i.e. nearly all examined require help in their domestic and social life, they are not able to move for long distances without auxiliary means and support.

Table 1

Indicators of mean values of main motion functions' estimation of children with cerebral palsy of spastic form (main and control groups)

Items	Main group			Control group			Indicator (points)
Dynamic of indicators (points)	Before	After 6 months	After	Before	After 6 months	After	
«А» -lying and turning	40.1±2.1	41.2±2.1*	43.8±2.1*	40.8±2.1	41.7±2.1*	43.8±2.1*	51
«Б» - sitting	37.4±2.5	38.3±2.5*	40.8±2.4*	39.4±2.5	39.8±2.5	41.5±2.4*	60
«В» - creeping	23.55±2.1	25.15±2.1*	26.8±2.1*	26.0±2.1	26.3±2.1	28.0±2.0*	42
«Г» - standing	11.25±2.3	13.25±2.2*	15.1±2.1*	11.75±2.3	12.25±2.3	14.1±2.2*	39
«Д» - walking, running, jumping	15.35±3.0	15.95±3.0*	17.3±3.0*	17.2±3.0	17.4±3.0	18.15±3.0*	72
Total points	127.6	133.8	143.8	135.1	137.4	145.5	264

Notes: * - p<0.01 according to initial state

After annual course of rehabilitation we can observe positive changes in motion functions.

With fulfillment of skill "A" – lying and turning (see fig. 1), after rehabilitation course indicator reached norm value by 7,2%, and in relation to initial state it improved by 9,2%. In control group, the same indicator reached normal value by 5,8%, and in relation to initial state it improved by 7,3%. It witnesses that indicator of lying and turning skill in main group reached normal indicator by 1.4% more than indicator of con6trol group; concerning relation to initial state – by 1.9% more than indicator of control group.
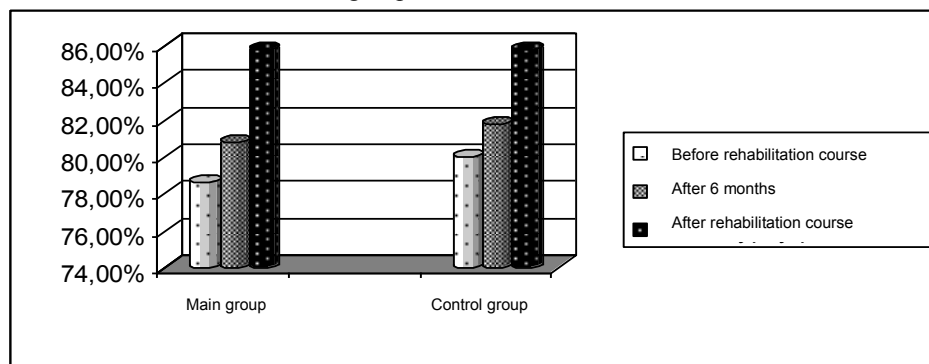

Fig.1. Dynamic of EMMF indicators for lying and turning during rehabilitation course in main and control groups, in %

With fulfillment of skill «Б» - sitting (see fig. 2) indicator of main group reached normal indicator by 5.7% after rehabilitation course and in relation to initial state, it improved by 9,1%. With fulfillment of the same skill indicator of control group reached normal indicator by 3.5% after rehabilitation course and in relation to initial state, it improved by 5.3%. It says that indicator of sitting skill of main group reached normal indicator by 2.2 % more than indicator of con6trol group; concerning relation to initial state – by 3.8% more than indicator of control group.

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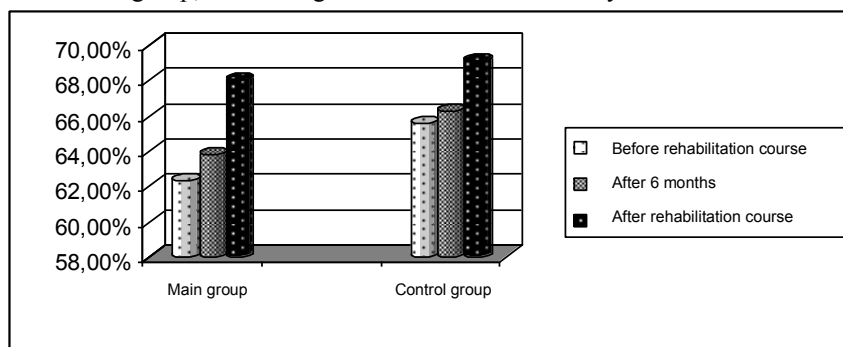problems of physical
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Fig2. Dynamic of EMMF indicators of sitting skill during rehabilitation course in main and control groups, in %

With fulfillment of skill «В» - creeping (see fig. 3) indicators of main group reached normal indicator by 7.9 % after rehabilitation course and in relation to initial state, it improved by 13.8%. With fulfillment of the same skill indicator of control group reached normal indicator by 4.7 % after rehabilitation course and in relation to initial state, it improved by 7.6 %. It says that indicator of sitting skill of main group reached normal indicator by 3.2 % more than indicator of con6trol group; concerning relation to initial state – by 6.2% more than indicator of control group.
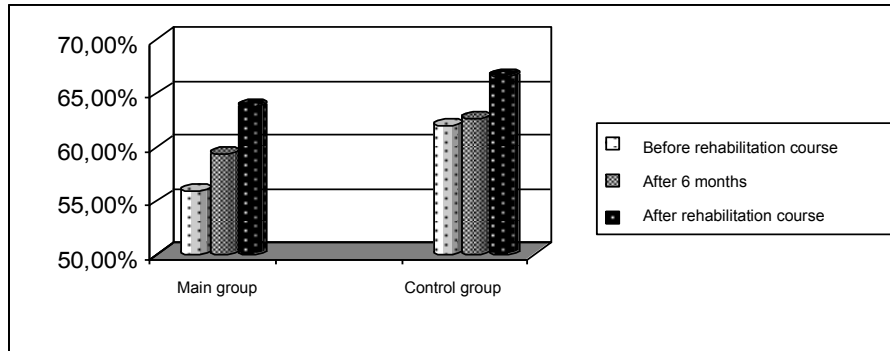

Fig3. Dynamic of EMMF indicators of creeping skill during rehabilitation course in main and control groups, in %

With fulfillment of skill «Г» - standing (see fig. 4) indicator of main group reached normal indicator by 9.9% after rehabilitation course and in relation to initial state, it improved by 34.2%. With fulfillment of the same skill indicator of control group reached normal indicator by 6.1% after rehabilitation course and in relation to initial state, it improved by 20 %. It says that indicator of sitting skill of main group reached normal indicator by 3.8 % more than indicator of con6trol group; concerning relation to initial state – by 14.2 % more than indicator of control group.
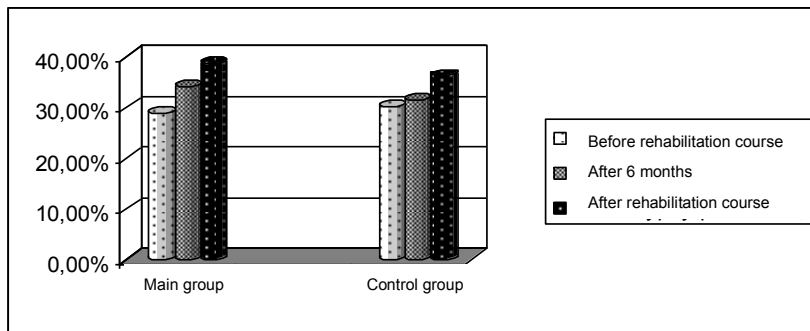

Fig4. Dynamic of EMMF indicators of standing skill during rehabilitation course in main and control groups, in %

With fulfillment of skill «Д» - walking, running, jumping (see fig. 5) indicator of main group reached normal indicator by 2.7 % after rehabilitation course and in relation to initial state, it improved by 12.7%. With fulfillment of the same skill indicator of control group reached normal indicator by 0.9% after rehabilitation course and in relation to initial state, it improved by 5.5 %. It says that indicator of sitting skill of main group reached normal indicator by 1.8 % more than indicator of con6trol group; concerning relation to initial state – by 7.2 % more than indicator of control group.
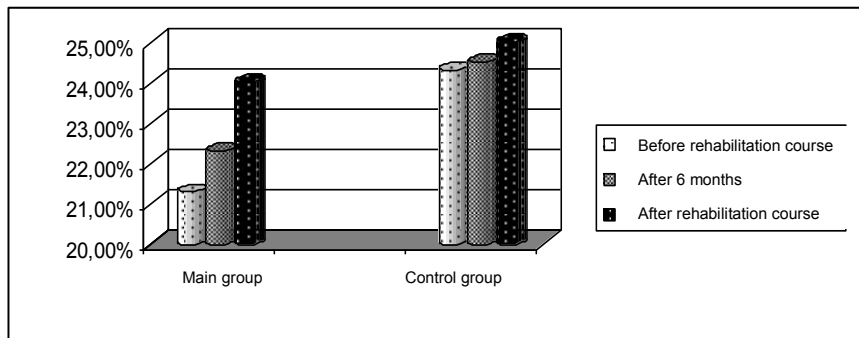
Fig5. Dynamic of EMMF indicators of walking, running, jumping skills during rehabilitation course in main and control groups, in %

As it can be seen in table1, initial total points in main group were lower than the same in control group by 7.5 points; after 6 months this difference was 3.6 points and after rehabilitation course − 1.7 points. If to speak about total points in relation to norm indicator (see fig. 6), then before rehabilitation course total points of control group were higher than the same of main group by 2,9%, after 6 months the difference was 1,4%, and after rehabilitation course indicator of control group was higher than the same of main group only by 0,6%. That means that total points of main group increased by 16,2 points (12,7%) in relation to initial state and end of rehabilitation course, i.e. it reached norm by 6,2%. Total points of control group increased by 10,4 points (7,7%) in relation to initial state and end of rehabilitation course, i.e. it reached norm by 3,9%.
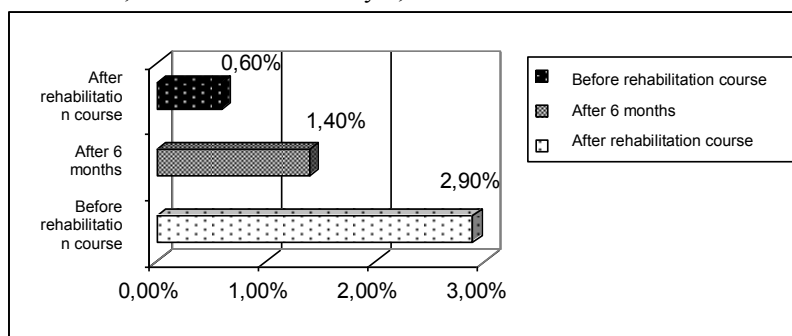

Fig6. Difference of total points of main and control groups during rehabilitation course in relation to indicator of norm in %

So, considering the above mentioned motion skills of main group children developed better that skills of control group children by 5% in relation to initial state, i.e., EMMF indicators reached norm by 2,3% better than indicators of control group.

With carrying out of correlation analysis, when evaluating link "before" and "after", correlation coefficient of main group approximated to 1, i.e it was equal 0.9985, correlation coefficient of control group also approximated 1 but it was equal 0.9988. It means that indicators of both groups have positive dynamics, but it developed better in main group, because its indicators were linked to less extent, i.e. have better trend to increasing.

Analyzing indicators of both groups we can come to conclusion that general motor skills of main group children developed better than the same of control group children.

Summary

Results of the fulfilled researches witness about effectiveness of application of the developed hydro-kinesitherapy methodic for 3-5 years old children with cerebral palsy of spastic form, and influence positively on formation of stage-by-stage development of motion skills, that, in its turn, facilitates inhibition of pathologic tonic reflex activity.

The prospects of further researches are to determine efficiency of other methods of physical rehabilitation of patients with nervous system's lesions.

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