

METHOD OF MOTOR FUNCTION RECOVERY IN PATIENTS WITH MUSCLE SPASTICITY AFTER STROKE

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Annotation. *Purpose:* to prove the effectiveness of an innovative method of recovery of motor function of persons with spasticity after stroke. *Material:* in the experiment involved 26 patients aged 45-68 years who have had an ischemic stroke, a period of illness from 6 months to 5 years. *Results:* the analysis of specialized literature on the problem of reduced mobility due to spasticity confirms that spastic muscle condition after stroke significantly reduces the possibility of movement after stroke. The results of applying the method of recovery of motor function of persons with post-stroke spasticity of the muscles, which is based on the use of the second phase of post isometric relaxation - passive stretching muscles after heat-treatment procedures. This study confirms the high efficiency of this method for reducing pain in the shoulder and restore motor function of persons with spasticity after stroke. *Conclusions:* the implementation of the proposed method of recovery of motor function of persons with spasticity of muscles can increase the amplitude of the active movements of the shoulder and elbow joints, and, consequently, improve motor function in patients after stroke.

Keywords: *ischemic stroke, spasticity, motor function.*

Introduction

The problem of cerebral brain attack is rather urgent in connection with its great prevalence, high mortality and resulting in disablement. Brain attack is third by frequency reason of death and one of main reasons of disablement in most of developed countries of Europe and USA as well as in Ukraine [3; 8]. The third part of people, who suffered from brain attack, is persons of workable age; only every fifth patient recovers workability. Full professional rehabilitation is achieved only in 8% of cases [2; 4; 11; 15].

After brain attack nearly 85% have motion disorders [9; 13; 14].

$\frac{3}{4}$ of patients have disorders of motion function in acute period. 1 month after brain attack only 55% can freely move, after 2 month – nearly 80%. After half of year steady motion effect is preserved at 53% of patients, who suffered from brain attack [4; 8]. For some patients significant contribution in limitation of life activity is made by high muscular tonus (spasticity), treatment of which shall be regarded in context of obvious disorders and aims of rehabilitation [11].

During first three months after brain attack muscular tonus is increasing in limbs and, though at first stage light or moderate spasticity takes place in extensors of lower limbs would even facilitate rehabilitation of walking function, then in most cases this progressing increasing of tonus would result in appearance of muscular contractions, combined with periodic pain attacks of muscular spasms. Then trophic changes take place in limbs' joints and joint contractions happen. Spasticity of muscles is rather significant obstacle in rehabilitation of motion functions and results in loosing of workability, skills of self-servicing and sharply decreases quality of life of patients, who suffered from brain attack [5; 10; 12]. Battle with spasticity of muscles, recreation of normal muscular tonus is important and necessary component of motion rehabilitation of patients, who suffered from brain attack [11].

The following method of muscular spasticity's treatment with the help of post-isometric relaxation is well known; it consists of two phases, which alternates 5-6 times: first isometric contraction of muscles shall be fulfilled on inhale during 8-10 seconds with the help of light resistance in direction, opposite to muscle's contraction; then – passive stretching of muscle at exhale during 10-20 seconds [1].

However, this method can not be used with expressed muscular spasticity, because it shall be fulfilled in phase of muscle's contracting that is possible only with very light spasm; contraction of muscle and retention of this phase during 8-10 seconds results in steady pain syndrome and facilitates further progressing of spasticity.

One of effective directions of rehabilitation of patients with spasticity is application of physical therapy methods. Treatment with warm for reducing of muscular hyper-tonus is applied practically for all patients with post-brain attack spastic paresis. Positive influence on spastic hyper tonus was registered with using of mud treatment, wax – treatment. In this methodic favorable effect on muscular tonus is connected with deep heating of tissues. Disadvantage of this method is in limited duration of clinical effect: from several hours to several days [6; 7].

In spite of using modern, in our time, complexes of rehabilitation treatment in different periods of brain attack, often they result only in adaptation of patient to present defects but not in their elimination [9].

Effectiveness of traditional methods of motion function's rehabilitation with pathology of central motor-neuron is especially low in late recreational and residual periods of disease [7]. Creation of new rehabilitation methods, oriented on liquidation of muscular spasticity and recreation of motion function, especially in late periods after brain attack, is highly urgent [10].

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Purpose, tasks of the work, material and methods

The purpose of the research is determination of effectiveness of worked out by us method of motion function's rehabilitation of patients with muscular spasticity after brain attack.

The methods and organization of the research: 26 patients of 45-68 years old age participated in the research. These persons were on rehabilitation treatment in Center of social protection of Vinogradov's population during three weeks. All patients suffered from ischemic brain attack with period of disease from 6 months to 5 years. All patients had increased tonus in limbs' muscles.

The patients were divided in two groups: main (13 persons) and comparative (13 persons).

The methods of control. Pain and constraint in shoulder is rather frequent with brain attack complication. Pain in shoulder is an obstacle in patients' rehabilitation and prolongs rehabilitation process. Pain and restricted amplitude of shoulder motion is an obstacle for self-servicing, worsens balance, and make moving more difficult. That is why for determination of our method's effectiveness for persons with muscular spasticity after brain attack we carried out testing, which included: determination of amplitude of active movement in shoulder and elbow joints and determination of pain degree by seven-points' scale.

The methods of rehabilitation. Patients of both groups were on complex rehabilitation treatment, which included treatment position, physical exercises in form of complex of therapeutic gymnastics, warm therapy of big joints of affected limbs and massage. Patients of main groups, after procedure of warm therapy also stretched muscles with spasms by the offered method: after locating of a limb in comfortable position, facilitating relaxation of muscles with spasms, patients fulfilled passive exercises, because patient can not fulfill active movements with maximal amplitude independently. Considering the fact that the length of muscle with spasm is shortened there shall be fulfilled exercise for stretching, which increase the length of the muscle and ensures by reflex its relaxation; turns of waist or foot during exercise create direction of physiological motion of muscle with spasm by bio-mechanic of movement, facilitating its even stretching and recreation of physiological tonus. Fulfillment of exercise on exhale creates conditions of reflexive muscle's relaxation and muscle's adaptation to "healthy" state, preventing from progressing of spasm. Exercises shall be fulfilled up to feeling of stretching and disappearance of steady pain syndrome and limb's trauma. 20-30 minutes of a session permit repeat exercise several times, increasing unbending angle in joint of limb with spasm at the account of gradual increasing of muscle's length and its relaxation.

Results of the research

In table 1 we presented tested indicators of pain degree in shoulder and amplitude of active movements in shoulder and elbow joints with primary examination.

Table 1

Comparing of tested indicators of main and control groups before and after research

Parameter	Main group (n=13)	Comparative group (n=13)	Stjudent's criterion
value	M±m	M±m	t
parameter	Pain in shoulder, points		
value	4.31±0.34	3.77±0.38	1.06
parameter	Amplitude of active bending of shoulder, degrees		
value	44.08±2.24	41.23±2.59	0.83
parameter	Amplitude of active moving shoulder aside, degrees		
value	43.38±2.59	46.15±0.90	1.01
parameter	Amplitude of active bending of forearm, degrees		
value	67.08±5.17	73.17±2.10	1.09
parameter	Amplitude of active unbending of forearm, degrees		
value	79.69±2.89	83.62±2.38	1.05

From data, presented in 6table 1 we can make conclusion that the tested from main and control groups had no statistical difference at primary examination (p>0.05).

Changes in the tested indicators of main and control groups' indicators are given in table 2.

Table 2

Dynamic of tested indicators of main and control groups

parameter	Main group (n=13)			Comparative group (n=13)		
	Primary examination	After rehabilitation	Stjudent's criterion	Primary examination	After rehabilitation	Stjudent's criterion
value	M±m	M±m	t	M±m	M±m	t
parameter	Pain in shoulder, points					
value	4.31±0.34	5.46±0.25	2.72	3.77±0.38	4.69±0.27	1.99
parameter	Amplitude of active bending of shoulder, degrees					
value	44.08±2.24	55.00±2.64	3.15	41.23±2.59	48.15±2.08	2.08

parameter	Amplitude of active moving shoulder aside, degrees					
value	43.38±2.59	53.38±1.93	3.10	46.15±0.90	49.00±1.02	2.09
parameter	Amplitude of active bending of forearm, degrees					
value	67.08±5.17	90.50±5.18	3.20	73.17±2.10	79.00±2.01	2.01
parameter	Amplitude of active unbending of forearm, degrees					
value	79.69±2.89	83.62±2.38	2.85	69.69±1.99	76.46±2.55	2.05

The research showed that in main and control groups the following dynamics of indicators' change had been by the end of training course:

- indicator of pain degree in shoulder (be seven-points' scale) in main and control groups confidently increases, but in main group this indicator increases by greater value and, so, pain in shoulder reduces more substantially;
- indicators of goniometry in shoulder and elbow in main and comparative groups confidently improve, but in main group improvements were more substantial. It means that patients of main groups can fulfill active movements in tested joints with greater amplitude than in control group.

In table 3 we presented differences in change of tested indicators between main and comparative groups.

Table 3

Differences between indicators of main and comparative groups after research

Parameter	Main group (n=12)	Comparative group (n=12)	Stjudent's criterion
value	M±m	M±m	t
Parameter	Pain in shoulder, points		
value	5.46±0.25	4.69±0.27	2.06
Parameter	Amplitude of active bending of shoulder, degrees		
value	55.00±2.64	48.15±2.08	2.04
Parameter	Amplitude of active moving shoulder aside, degrees		
value	53.38±1.93	49.00±1.02	2.01
Parameter	Amplitude of active bending of forearm, degrees		
value	90.50±5.18	79.00±2.01	2.07
Parameter	Amplitude of active unbending of forearm, degrees		
value	83.62±2.38	76.46±2.55	2.09

Analysis of table 3 showed that:

- indicator of pain degree in shoulder (be seven points' scale) in main group is confidently higher in respect to comparative group's patients;
- indicators of goniometry in shoulder and elbow joints are confidently greater in respect to comparative group's patients.

The research showed that at the end of the research there was confident positive dynamic of the tested indicators between main and comparative groups.

Conclusions:

Application of existing in our time complexes of rehabilitation treatment after brain attack often are little effective in late rehabilitation and residual periods after brain attack and often result only in adaptation of a patient to defects but not to liquidation of them. The research showed that application of offered method of stretching of muscles with spasms after heat treatment significantly reduces pain in shoulder of patients after ischemic brain attack. Application of the offered method of motion functions' rehabilitation of persons with spastic muscles permits to increase amplitude of movements in shoulder and elbow joints and that is why improve motion function of patients after brain attack.

Further researches will be oriented on determination of influence of the offered methodic on rehabilitation of motion functions of sportsmen with traumas.

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