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Research Article

MODELING MODES FOR IMPROVING THE PROCESSING FUNCTION OF THE BRAIN DURING INTENSIVE VESTIBULO-PROPRIOCEPTIVE AFFERENTATION UNDER CONDITIONS OF PHYSICAL ACTIVITY

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Allamuratov Mirtaza
Associate professor at Department of Human and Animal Physiology at National University of Uzbekistan named after Mirzo Ulugbek, Uzbekistan

ABSTRACT

The article presents a generalized experimentally tested model of the structure of special motor modes and procedures for their practical implementation to improve the processing function of the brain during intensive vestibulo-proprioceptive afferentation during physical activity.

KEYWORDS

Physical activity, vestibulo-proprioceptive afferentation, model.

INTRODUCTION

A generalized experimentally tested model of the structure of special motor modes and procedures for their practical implementation is presented in order to improve the processing function of the brain during intense vestibulo-proprioceptive afferentation under conditions of physical activity.

Numerous studies have established the deep physiological significance of the acceleration factor in the formation of the background activity of the central nervous system, which opens up wide opportunities for the practical use of this phenomenon in the system of physical improvement in sports, choreography, as

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well as special types of professional work and experimental work [1].

The main methodological principle for the practical solution of the problem of improving the processing function of the brain under conditions of intense exposure to acceleration is the regular use of the most effective special physical exercises that cause intense vestibular afferentation. Based on theoretical

experimental data, the search for this kind of exercise is associated with movements of the head, or movements of the whole body, during which a directed movement of the head occurs in space. It should be emphasized that the most accessible and methodologically convenient is the use of rapid head movements in the form of a special complex, as well as the selective use of individual head movements [2].

The experience of using fast head movements in the system of general physical improvement and during sports has shown the advisability of using fast head movements in such forms of physical exercise as morning physical exercises, warm-up, the final part of the training load, as well as the use of special vestibular loads in the form of individual tasks performed in modes of work, life and rest. According to our data, the main methodological rule for the use of fast head movements both in sports and in choreography is the intermittent principle, characterized by a certain rhythm of alternation of vestibular loads and the main program of motor actions during physical exercise. What is essential here is the short duration of the rhythmic phases of performing rapid head movements. The frequency of use of quick head movements depends on the duration of the physical improvement session. The interval between phases of vestibular load is 3-5 minutes. The frequency of vestibular loads outside of organized classes when performing individual tasks is determined by the possibilities of independent regulation of the rhythms of repeated vestibular loads. In this case, the intervals between phases of vestibular loads can vary within several hours. Along with rapid head movements, the processing function of the brain in regulating late reactions can be enhanced through special sets of physical stretching exercises in the form of a variety of unusual positions of body segments and exercises in balancing on a reduced support (a gymnastic beam, the edge of a Swedish bench, a tightly stretched metal cable). It is rational to carry out these exercises according to the principle of intermittent loads in the main part of the motor load in the form of switching pauses lasting up to 5-7 minutes.

It is logically advisable to use the above-mentioned special vestibular loads and exercises that promote voluntary control of late reactions according to the following scheme: 1) diagnostic classification of the trained contingents according to the level of background stability of vestibular and late reactions; 2)

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determination of the structure and content of vestibular loads, differentiated by classified diagnostic groups of training populations; 3) determination of the structure and content of special physical exercises associated with the regulation of late reactions and body balance functions; 4) periodic determination of the training effect of the means used to improve the processing function of the brain under conditions of intense vestibular and proprioceptive afferentation. The diagnostic classification of the trained contingents according to the level of background stability of vestibular and late reactions provides for the establishment of the level of stability of somatic vestibular reactions and the body balance function at rest.

Determination of the stability of somatic vestibular reactions in trained individuals at rest is carried out by taking into account the duration of maintaining body balance in a vertical stance with closed feet, without visual control, in the process of spinning the head counterclockwise at a rate of two movements per second. Persons with a test duration of less than 50 s belong to the group with low stability of somatic vestibular reactions; subjects whose test duration is 50 seconds or more belong to the group with a high level of background stability of vestibular reactions.

Determination of the stability of the body's balance function is carried out under conditions of reduced support, a displaced center of gravity, without visual afferentation in a series of successive tests: a) high standing on the toes of closed feet, hands below (physiological standard FS - 60 s); b) standing high on the toes of closed feet, arms at the top (FS - 50 s); c) horizontal balance, standing on the entire foot of one leg, the other straight behind (FS -15 s); d) standing high on the toes of one leg, the other leg bent in front at the hip and knee joints by 90 degrees, arms at the top (FS -7 s); e) additional test for persons engaged in choreographic training - standing high on the toes of one leg, the other leg abducted at 45°, arms to the sides (FS-7 c). Persons who have indicators below the physiological standard according to three tests belong to the group with dissociated insufficiency of the body balance function, according to the data of four tests - to the group with unidirectional insufficiency of the body balance function. Persons who exceed the standards or have indicators equal to them on one, two or three tests belong to the group with dissociated increased stability of postural reactions. Persons who exceed physiological standards in four tests belong to the group of unidirectional increased stability of the body's balance function [3,4]. Determination of the structure and content of vestibular loads, differentiated by classified diagnostic groups of training contingents, is carried out taking into account a number of provisions:

1) for persons classified as a group with insufficient stability of vestibular reactions, it is recommended to

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use in all of the above methodological options a complex of rapid head movements in the form of: a) turns, b) bends to the sides, c) bends forward and backward, e) circles along the way clockwise, e) counterclockwise circles at a pace of one movement per second with a duration of each type of movement equal to 30 seconds;

2) for persons classified as a group with high stability of vestibular reactions, it is rational to use in all considered forms of physical improvement a session of rapid head movements at a rate of two movements per second. with the duration of each type of head movement equal to 60 s;

3) as a selective use of rapid head movements during physical improvement, alternating head circling clockwise and counterclockwise is recommended in the amount of individual gradation of loads depending on the appearance of a feeling of dizziness (for persons with reduced stability of vestibular reactions, it is advisable to reduce the frequency and duration of vestibular load phases);

4) in the conditions of production work, it is advisable to include individual elements of a complex of rapid head movements in the program of pauses of industrial gymnastics, which will help summarize the results of improving the processing function of the brain in the working phase of the daily period;

5) in the mode of free time and relaxation at home, provide a backup option for using vestibular afferentation to form high levels of background activity of the processing activity of the nervous system by performing an integral complex of rapid head movements, taking into account that repeated vestibular loads during the daily period contribute to the rapid formation of highly stable levels of somato-vegetative vestibular neuro-regulatory functional structures[3].

Determining the structure and content of special physical exercises associated with the regulation of late reactions and body balance functions is based on taking into account the potential capabilities of the trained contingents:

1) for persons who have low indicators of the body balance function both in individual and in all differential diagnostic tests, it is rational to organize special classes in the form of functional training, including sets of exercises for stretching the main working muscle groups, balancing exercises on a reduced support and performing applied complexly coordinated motor acts without visual control;

2) for persons with a high level of development of the balance function, it is advisable to increase the volume and complexity of sets of stretching and balancing exercises;

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3) in systems of physical improvement of athletes and in choreography, it is rational to use stretching exercises in the form of various and unusual poses as a means of restoring and stimulating muscle activity both during training loads and in everyday life, especially at the end of the active period of the daily period. This, along with the development of proprioception mechanisms, will help eliminate congestion in the systems of the motor apparatus and internal organs.

Periodic determination of the training effect of the means used to improve the processing function of the brain in conditions of intensive vestibular and proprioceptive afferentation is carried out according to the plan:

1) during training cycles and culminating periods of physical improvement, re-determine the stability of somatic vestibular reactions and body balance functions in trained individuals using the above-mentioned diagnostic functional tests in the aspect of the first paragraph of the above-mentioned methodological scheme for using means of improving the coordination systems of vestibular and late reactions;

2) determine the quantitative characteristics of background shifts in the stability of vestibular and late reactions over the past cycle of motor improvement, which will allow us to establish the direction of the achieved training result;

3) compare the results of repeated diagnostic determinations of the functional status of the system of vestibular and proprioceptive receptions with the sports performance of the trained contingents and show the sufficiency or insufficiency of the achieved result of the processing activity of the studied neuro-functional structures;

4) use the information obtained about the direction of the process of improving the mechanisms of spatio-temporal orientation of the human body to correct the volume, intensity, character, rhythm, frequency, sequence of switching, the means used to improve the processing function of the brain in conditions of intense vestibulo-proprioceptive afferentation during dynamic and static muscle efforts.

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