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A DEVICE FOR GROUP EXERCISES TO RESTORE HAND MOVEMENTS AND INTELLECTUAL ACTIVITY IN CHILDREN WITH NEUROLOGICAL CLINIC PATIENTS

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Abstract. The article contains information about the device, which belongs to the section of speech therapy, defectology and can be used in the departments of neurorehabilitation of neurological and neuropsychological clinics during individual and group classes on restoring hand movements in patients of the neurological clinic with organic brain lesions of various etiologies, and can also be used in preschool institutions in the practice of a speech therapist, a defectologist, a psychologist. The device differs in its various characteristics from the currently available equipment and helps in the restoration and development of fine motor skills and coordination of movements.

Keywords: DEVICE, hand movement, group, base, rod, nut, spring, switch, electrical circuit, warning lights, holder.

Introduction. Fine motor movements, which form the basis for the development of mental activity, provide children with an understanding of the world around them: the formation of such important characteristics as speech skills, the thinking process, and memory.Systematic exercises for training finger movements have a stimulating effect on speech development and are a powerful means of increasing the performance of the cerebral cortex. The ability to understand surrounding objects in children is largely associated with the development of hand actions. The ability to perform small movements with objects develops in older preschool age. It is by the age of 6-7 that the maturation of the corresponding zones of the cerebral cortex and the development of small muscles of the hand are generally completed. It is important that by this age the child is prepared to learn new motor skills.

The forms of its organization used during classes with patients with disorders of various mental functions play an important role in the effectiveness of rehabilitation training. Methods and forms of organizing rehabilitation education should take into account the social nature of a person and create conditions for maximum use of all the capabilities and abilities of a person, using the influence of the social environment and other social factors on a sick person [1]. One of the forms of organizing rehabilitation training, which is based on the use of the social environment and other social factors, is a group form of classes, which helps to increase the effectiveness of the restoration of impaired mental functions, expanding and complementing individual classes with a specialist and independent training of patients during their stay in a neurological clinic . Group classes allow you to implement, first of all, the activity of communication and influence on the patient's personality through the mechanisms of a small social group: interpersonal interaction, cooperation, cooperation, competition, etc. [1].

According to group dynamics specialist Marvin Shaw, a small social group is a community consisting of two or more individuals interacting and influencing each

other [2]. The use of a group form of classes helps to increase the effectiveness of rehabilitation training when working on the restoration of various mental functions in neurological patients, including intellectual activity, as well as motor functions, including movements of the hand.

To restore impaired movements of the hand in patients at the neurological clinic, various simulators are used to ensure the inclusion of the hand in various movements, one of which is the rotation of an object with the hand.

The "Helical Rotation Trainer" is known, designed for developing twisting movements of the hands ([3], Renax, Rehabilitation and medical equipment, Helical Rotation Trainer, found 09.20.2017 on the Internet athttp://renaks.com/shop/group_641/item_361/). Structurally, this simulator consists of a base with two stands on which a screw rod with a nut is fixed, which the patient must rotate with his hand, moving from one edge of the screw rod to the other. The overall dimensions of the simulator are 400×200×200 mm.

The disadvantages of this simulator when used during group classes to restore hand movements in neurological patients are: limited capabilities of this simulator when used in group classes, since it is intended for individual training; uniformity and monotony of the movements performed by patients to move the nut along the screw rod, which can lead to a decrease in interest in exercises and rapid fatigue of patients; The screw-nut threaded pair made of metal has a fairly high coefficient of friction and therefore requires effort, which may be excessive for some patients with impaired movements of the hand.

Also, from the existing level of technology the "Symulator for developing the hand" is known ([4], KIDDIS.RU, Production and sale of sports and gaming equipment, Simulator for developing the hand 5668, found 09.20.2017 on the Internet athttp://kiddis.ru/2016/04/trenazher-dlya-razraboki-kisti-ruk-5668/).Structurally, this simulator consists of a base, at one end of which there is a forearm stand, and at the other - a rotational handle with an adjustable rotation resistance force. During the exercises, the patient makes rotational movements with his hand in one direction and the other, which contribute to the development of movements of the hand.

The disadvantages of this simulator when used during group classes to restore hand movements in neurological patients are: limited capabilities of this simulator when used in group classes, since it is intended for individual training; uniformity and monotony of the movements performed by patients to rotate the handle in one direction or the other, which can lead to a decrease in interest in exercises and rapid fatigue of patients;

Also known from the prior art is the "Multifunctional developmental wall-mounted simulator", which is based on screwing and unscrewing caps on the necks of plastic bottles ([5], Polozova E.V. Developmental simulators made from waste material. A practical guide for educators and methodologists of preschool educational institutions. - Voronezh: PE Lakocein S.S., 2009, pp. 26-30).

Structurally, this simulator is a wooden frame, in which 121 holes are made (11 horizontally and 11 vertically), in which screw necks of plastic bottles are fixed, onto which standard plastic caps are screwed. The dimensions of the simulator are 650x700 mm. Exercises with this simulator, which consists of screwing and

unscrewing plastic caps, promotes the development of motor skills of the fingers, as well as the formation of a number of other mental processes in children: visual-spatial perception, attention, counting operations, etc.

Unlike simulators based on monotonous, purely mechanical rotation of a nut or handle with the hand, the process of screwing and unscrewing plastic plugs is more effective for restoring the movements of the fingers and part of the hand in patients at a neurological clinic, due to the fact that: there is experience in performing this action to one degree or another in all patients, therefore this action is more strengthened and accessible for implementation by patients; the process of screwing and unscrewing the plugs is included in the gaming activity, which helps maintain the patients' interest in activities.

The disadvantages of this simulator when used during group classes to restore hand movements in neurological patients are: this simulator is aimed primarily at restoring fine motor skills of the fingers, but does little to restore hand movements; this simulator is aimed primarily at working with children, which consists of performing simple actions that contribute to the formation of spatial concepts in children, learning counting operations and is not intended for training with adult patients, this simulator is aimed primarily at working with children, which consists of performing simple actions that contribute to the formation of spatial concepts in children, learning counting operations and is not intended for classes with adult patients.

In another known device for the development of motor skills of the fingers, including a spring mechanism located in the housing, the spring mechanism consists of a set of leaf springs, made with the possibility of their replacement and movement along grooves made in the housing, and the leaf springs have parts protruding from the housing , and the free ends of the leaf springs are connected to the control elements of a device for developing motor skills of the fingers (Patent RU 2290909) [6,7].

The disadvantage of this device is its complexity and the impossibility of using it for a group of sick children and also the lack of competition.

It should be noted that the main existing simulators do not allow conducting classes using the fingers of both hands, for 24 participants in a group, providing motivation and competition between them.÷

The design according to (Trainer for developing the hand 5668, found on September 20, 2017 on the Internet athttp://kiddis.ru/2016/04/trenazher-dlya-razraboki-kisti-ruk-5668/) [4].

The objective of the invention is to ensure and restore hand movement and intellectual activity in children suffering from neurological clinics, taking into account competition. The task is being implemented by improving the screw simulator, taking into account the signaling devices and the load on the hands of patients.

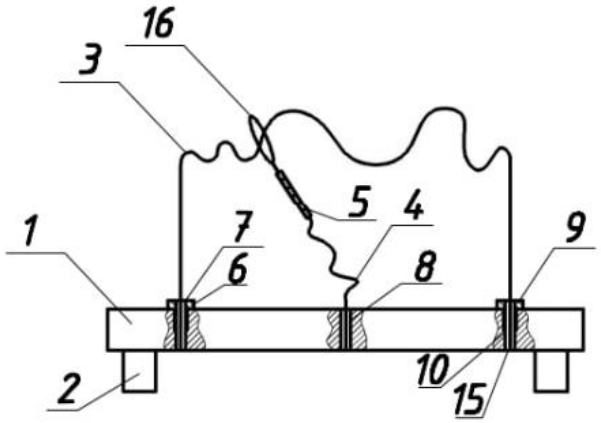
Effective design of the simulator

A simulator for group classes to restore hand movements and intellectual activity in children suffering from a neurological clinic, containing a base made of a wooden rectangular (square) shaped board with stands, on which there is a stand for the forearm, a rotary handle, characterized in that instead of a stand for the forearm and a

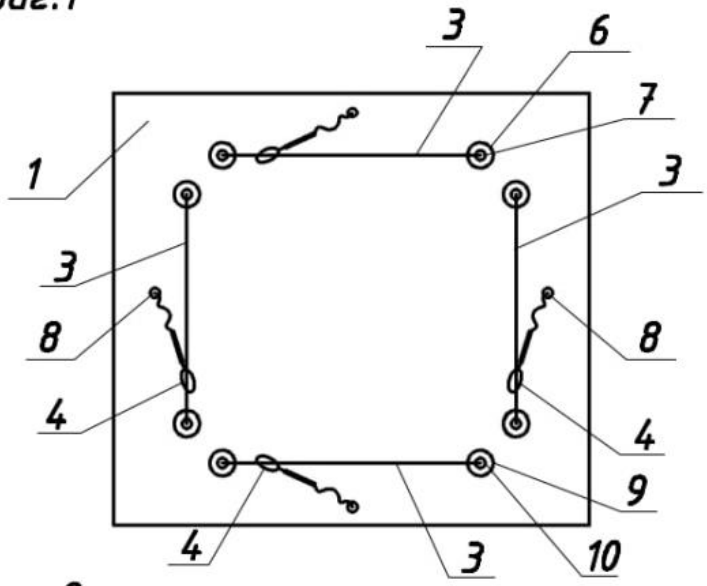
handle Electrodes with a curved shape and a certain rigidity are installed on the base on four sides by means of insulating bushings and support bushings, while the first of them is made of conductive material, a round-shaped conductor with a handle is put on the electrode with a curved shape with a certain gap, and the other end of the conductor is fixed to the base by means of an insulating sleeve and a support sleeve, while the conductor passing through the hole of the base is connected to an electrical circuit including an energy source (battery), a red light bulb and connected to a curved electrode, in parallel there is an electrical circuit including an energy source (battery), a conductor, a light bulb green alarm and support sleeve.

The essence of the design is that a simulator for group classes to restore hand movements and intellectual activity in children suffering from a neurological clinic, containing a wooden base of a rectangular (square) shape with stands, on which four sets are rigidly mounted on four sides, including an electrode with a curved shape and a certain rigidity by means of insulating bushings and support bushings, wherein the first of them is made of a conductive material, a round-shaped conductor with a handle is put on an electrode with a curved shape with a certain gap, and the other end of the conductor is fixed to the base by means of an insulating bushing and a support bushing. In this case, the conductor passing through the hole in the base is connected to an electrical circuit, including an energy source (battery), a red light bulb and connected to a curved electrode; in parallel, there is an electrical circuit including an energy source (battery), a conductor, a green alarm light and a support sleeve.

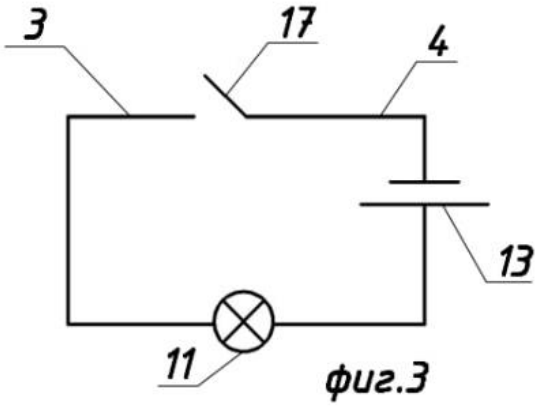
The design is illustrated by a drawing, where Fig. 1 is a general front view of the simulator; Fig 2 – top view of the simulator; Fig 3 – electrical diagram of the red alarm; Fig. 4 – electrical circuit of the green alarm.



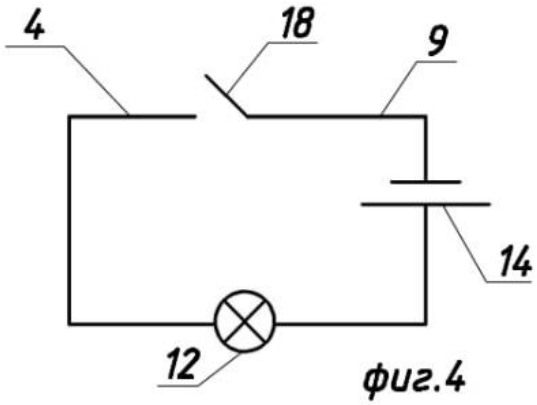
фиг.1



фиг.2



фиг.3



фиг.4

Fig-1. Scheme of the recommended design of the simulator.

A simulator for group classes to restore the movement of the hands and intellectual activity in children suffering from a neurological clinic consists of a base 1 made of wooden material in the form of a rectangular board, 2 stands, on four sides of the base there are electrodes 3 of a curvilinear shape, one end of which passes through a hole in base 1 subsequently insulating sleeves 7 and support sleeve 8, rigidly fixed to base 1. The other end of the electrode 3 is rigidly connected to support sleeve 9, made of conductive material. In this case, a conductive wire 15 is rigidly connected to the support sleeve 9, which passes through the hole on the base 1 by means of an insulating sleeve 10 and is connected to the electrical circuit (Fig 4). A ring 16 with a handle 5 and a wire 4 is put on an electrode 3 with a curved shape with a certain gap, which passes through the hole in the base 1 by means of bushings 8. The first electrical circuit includes electrode 3, contact 17 between the electrode and ring 16, then wire 4, an energy source 13 (battery), red light 11 (Fig. 3). The second electrical circuit includes an electrode 3, a contact 18 between the electrodes 3 and a support sleeve 9 with a wire 15, an energy source 14, and a green light bulb 12 (Fig. 4).

The principle of operation of the simulator.

The design works as follows: A group of performers (sick children), located on four sides of the base 1 of the simulator, at the command of the leader, begin to move ring 16 with handle 5 along the curved electrode 3, avoiding contact of ring 16 with electrode 3. If ring 16 touches electrode 3, switching on occurs electrical circuit (Fig. 3) and the red light 11 lights up. The number of such contacts is a penalty. If the ring 16, passing the electrode 3, reaches the end, then the ring 16 is in contact with the support sleeve 5 and an electrical circuit is activated through the wire 15 (Fig. 4). At the same time, green light 12 lights up. The presenter records the number of signals from the red and green lights for each participant, and the winner of the game will be determined. At the same time, each participant becomes motivated for each subsequent game in the simulator.

The recommended simulator provides and restores the movement of the hand and intellectual activity in a group of sick children at a neurological clinic, allowing competition and increasing motivation.

Conclusions. Based on an analysis of the circuits of existing simulators, a new effective circuit of the simulator has been developed that allows for the restoration of hand movements and intellectual activity in children suffering from a neurological clinic.

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