

SPECIAL FEATURES IN APPLICATION AND MECHANISM OF REMEDIAL ACTIVITIES OF KINESITHERAPY IN CHILDHOOD

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Abstract: Kinesitherapy in childhood is aimed not only at restoring the organ or system affected by the disease but also in normalizing or maintaining the natural course of the child's physical and nervous and psychological development. What should be taken into account is the considerable dynamics in the morphological and functional development, greater plasticity and regenerative capacity of the child's organism, which favor the faster occurrence of positive changes and the higher effectiveness of the healing and rehabilitation events, especially made possible by kinesitherapy. The overall effect of exercise and increased motor activity is reflected in the proper development of muscles, in the increase of muscle mass, and in the improvement in child's muscle functions. The mechanisms of remedial activities constitute a variety of physiological and biochemical processes induced by dosaged muscle contractions aimed at restoring the constant composition of homeostasis in conditions of pathology. One of the most important features of the kinesitherapeutic methods in childhood is the correct dosage of physical exercise and the optimal load of the patient to restore health and normalize the child's functional abilities.

Key words: kinesitherapy, mechanisms of remedial activities, childhood.

Introduction

In the last few decades, kinesitherapy has become an integral part of the complex treatment, secondary prevention and rehabilitation for almost all diseases in childhood [1].

The accumulated knowledge and practical experience in this area have given reason to assume that its application holds no adverse effects in children, and if it exists, it is of a temporary nature and relates to a particular stage of a disease or trauma [2]. Kinesitherapy in children solves additional tasks and this should be taken into account when applying it. In childhood, it is aimed not only at restoring the body or the system affected by the disease, but also in normalizing or maintaining the natural course of the child's physical and nervous and psychologi-

cal development. In this sense, kinesitherapy plays an essential role in the overall development of the child's organism and is an all-purpose healing-pedagogical process [3].

Influence of kinesitherapy on the child body

A huge role in the development of children plays the external environment, which supports his motor activity. The influence of movements and physical exercises is manifested all the time.

The overall effect of exercise and increased motor activity is expressed in proper muscular development, in the increase of muscle mass and improved muscular function [4]. The influence of physical exercises on the child's respiratory system is reflected in the increase

of respiratory breathing capabilities, in the consistency of respiratory function and gas exchange. Systematic kinesitherapy exercises increase vital lung capacity and maximum ventilation. In the process of systemic muscular activity, the regulation of breathing improves and the coordination of the work of the respiratory muscles is assured in the performance of the exercises [5].

Significant changes also occur in the child's cardiovascular system. The number of functioning capillaries increases repeatedly in the muscles and blood redistribution occurs throughout the body. The activity of the nervous system is also improved. This is expressed by uplifting the the child's mood and the emergence of the feeling of "muscular joy". Under the influence of physical exercises the complex coordination relations in the central nervous system and the mental activity of the child are improved [6].

The beneficial changes occurring in the whole organism of the child under the influence of kinesitherapy strengthen the child's health, increase its protective powers, improve its physical development and the functional capabilities of all systems. The use of kinesitherapy in pediatric diseases should be in line with the general principles of complex therapy, the exact aim and tasks of the treatment, and the overall view of the effects of the agents applied on the course of the pathological process [7].

Mechanism of healing action of kinesitherapy devices

The physiological and biochemical processes induced by dosaged muscle contractions aimed at restoring the internal composition (homeostasis) in the conditions of pathology [8] have been found to be the basis of the remedial activities. They are divided into four mechanisms of healing:

1. *Mechanism of stimulating action.* The application of kinesitherapeutic means is associated with this mechanism, which is manifested in the improvement of the physiological functions of the diseased organism under the influence of the dosaged load during the exercises. Clinical

observations in sick children, especially at an early age, indicate that their weight decreases in a given disease, while their growth and psychomotor development are maintained [9]. One of the main reasons for this lag is the insufficient motor activity of the children. Physical exercises, designed to be performed depending on the disease period, the motor regimen, and the general condition lead to an increase in the metabolic processes in the muscles. They stimulate the nervous system, strengthen the activity of the cardiovascular and respiratory system. A very important aspect of the stimulating action of kinesitherapy is the increase in the emotional tone of the child. The emotional impact of the healing gymnastics should be done under appropriate conditions - specially furnished rooms with colorful appliances and toys [10, 11].

2. *Mechanism of trophic action.* In pediatric illnesses, the trophic effect of kinesitherapy is manifested overall in metabolism. The metabolic processes in hypotrophy, rickets and avitaminosis are improved with the use of dosaged physical exercise. The trophic effect of kinesitherapy is widely used in paralysis and paresis to accelerate regeneration processes after surgery, tissue transplantation, and injuries [12].

3. *Compensation Mechanism for Impaired Functions.* In almost every child's disease one of the most important tasks is to restore the compensation of the impaired function of the organs and systems from the pathological process. Compensatory responses develop in diseases or operations to replace temporarily or permanently a lost or altered function at the expense of adaptive rearrangement of functions of other organs and systems. Compensatory responses are actually protecting the body and preserving its ability to act [13]. In the case of a child's illness and impairment of some functions, physical exercises can ensure the inclusion of previously approved adaptation mechanisms and help to compensate for impaired functions. In respiratory deficiency, the kinesitherapeutic means help to regulate breathing, lead to a significant reduction in oxygen loss and increased pulmonary ventilation.

The compensatory effect of physical exercises in circulatory insufficiency, which is related to the improvement of its extra-cardiac factors, is strongly expressed [14].

4. *Mechanism of normalization of functions.* One of the most important tasks of modern healing in childhood illnesses is the all-round recovery of the sick child's health. It is not enough just to take into account the results of the restoration of the integrity of the diseased organ, but also the extent to which the various functions disturbed by the disease have been restored. Physical exercises and muscle contractions appear to be powerful biological stimulants for all physiological functions of the child's organism. This allows the use of dosed physical exercises to increase the volume of one or another function accordingly. When considering kinesitherapy as a particular case of training, it can be argued that with the gradual increase of the adaptability of the child's organism to muscular work during the exercises, an improvement of the functions is achieved [15].

The normalization of functions as one of the main mechanisms of the healing impact of physical exercise manifests itself not only in increasing the functional capabilities of the injured system to the norm, but also in eradicating the various pathologically altered functions caused by the disease.

General guidelines in kinesitherapy methodology in childhood

The effect of kinesitherapy in childhood is determined by the proper selection of its resources according to the forthcoming tasks and the methodology of their application. One of the most important features of childhood kinesitherapy is the well-regulated dosing of physical exercise and the optimal load on the body to restore health and normalize functional abilities [17]. On the one hand, the physical load depends on the amount of work done and on its intensity. On the other hand, the physiological changes depend on the nervous-psycho reactions and on the degree of mental tension in the exercise. During the various periods and stages of treat-

ment and recovery of the motoring habits of the sick child, the level of physical load is significantly different [18].

The most applicable methods for regulating physical exercise are the following: time duration, exercise selection, quality of repetition, choice of the most appropriate starting position to perform an exercise, degree of effort to perform, pace and rhythm of the exercise.

The total duration of the workout usually increases with the improvement of the child's condition or age. A precise idea of the physical load can be obtained by considering the intensity of the workout, ie. the sheer time spent doing physical exercise. The intensity of the workout is reduced by the time spent explaining and showing the exercise, post-implementation remarks, and giving away equipment, as well as by the time spent specially for rest after a series of exercises [19, 20].

Physical exercise is the most important factor in the dosing of workout. Physiological changes that occur after a series or even a single exercise are dependent on the participation of the different muscles for the movement. It is necessary to consider the classification of exercises by anatomical signs: for small, medium and large muscle groups or for small, medium and large joints. The adjustment of the physical load depends on the choice of the output position [21]. It affects the degree of static muscle tension while preserving the position and the intensity of work performed by the muscles at different starting positions. The degree of physical exercise during the workout or when performing an exercise depends on the pace and rhythm with which it is performed. A faster pace allows for more movements per unit of time, and this will unconditionally lead to a greater physical load [22].

Increasing or decreasing muscle effort is achieved by varying the extent of one or other segment of the limb involved in the movement. During exercise, this factor is counted as the amplitude of movement in the joint in combination with its trajectory. For example, when removing an upper limb with a folded elbow, the physical load will be less than when it is

taken off with the elbow extended. In cases where the physical load has to be increased, but the anatomical capacity of the child is insufficient, the kinesiologist can apply the exercise with resistance (manually) by adjusting the tension of his own muscles and increasing the resistance. For muscle strain stretching and physical exercise adjustment, gymnastic sticks, dumbbells, balls, rubber ropes, and spring expanders can be used to augment the stretch [23]. During some of the treatment periods, it is necessary to reduce the physical load while maintaining the achieved volume of movement. In such cases, it is recommended that exercises in relieved baseline or with help be performed. The most common way to reduce the load is with the kinesiologist holding limb during the exercise. To reduce muscle strength, gravity should be eliminated, sliding platforms (roller skating) or folding or unfolding a sliding surface (24) should be used.

The total physical load in performing exercises or mobile games in a single workout can be distinguished by its intensity. It has 3 degrees: small, medium and large. Low-intensity loading usually takes place in the active phase of the disease-when initiating kinesiologist, in cases of trauma or chronic illness. On the basis of low intensity, the tasks of compensatory function can be solved, for the restoration of the trophic of damaged tissues and organs. Methodologically, it can be done by choosing an appropriate baseline, usually a quadrilateral or seated position, from relieved positions, simpler co-ordination and technical exercises involving small and medium muscle groups. [25]

Medium intensity physical load is needed to solve tasks during the recovery phase and the residual phenomena of the disease. Adequate physical load corresponding to the potential of a healing child should provide a more active muscular activity. The kinesiologist should increase the intensity of the workout by diversifying the baseline exercises for all muscle groups, especially for the middle and the large ones in the exercises with resistance and stretching with a gradually increasing physical load. It

is also advisable to include exercises with applied character: walking, running, jumping, climbing and creeping [26].

The physical load with high and submaximal intensity can be applied in a sanatorium or in a specialized rehabilitation center where it aims to achieve maximum adaptation to any kind of everyday activities.

The classes should include exercises for large muscle groups with a maximum volume of movement, more repetitions, faster tempo; stretching exercises; mobile games and applied exercises [27].

Conclusion

In the treatment and rehabilitation of sick children in implementing a differentiated approach in the determination of the physical and nervous-psychic burden within the daily regime are regulated individual motor regimes. They contain the permissible physical and psychological activity according to the clinical and functional condition of the children [28].

The wide variety of kinesiologist means makes it possible to perform the most appropriate differentiated selection according to the tasks of treatment, prophylaxis and recovery, age and disease.

The rate of total physical exercise should always be individual, in particular, according to the child's health, his/her ability to adapt to a greater physical load, and the age-specific features of his or her body [29]. To measure the tolerance of the child's organism, its response to the quality of the exercises performed, the coordination of movements, and also the effects of the cardiovascular and respiratory system must be traced. In order to properly perform physical exercise in accordance with the medical tasks it is necessary to observe all the requirements of the medical-pedagogical supervision [30].

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