

## PHYSIOTHERAPY IN THE TREATMENT OF SICK CHILDREN WITH BRONCHIAL ASTHMA.

Mavlyanova Zilola Farkhadovna,

Khaidarova Sarvinoz Khaydarzhonovna.

Samarkand State Medical University.

**Abstract:** Physiotherapy for children with asthma can involve: Breathing pattern training, which involves techniques to control the breath and its rhythm. How to loosen and clear secretions (mucus, phlegm) from the lungs to improve lung airflow. How to clear the nasal passages to improve breathing through the nose.

**Keywords:** physiotherapists, breathlessness, harmful production factors, respiratory diseases.

Physical training should be prescribed by physiotherapists for asthmatics to increase fitness and cardiorespiratory performance, reduce symptoms such as breathlessness and improve quality of life. Breathlessness, chest tightness and wheezing can occur when exercising, deterring patients from physical exertion.

Currently, occupational bronchial asthma (OBA) occupies a leading position among respiratory diseases caused by exposure to harmful production factors. At least 15% of cases of newly diagnosed bronchial asthma are occupational. In the treatment of occupational bronchial asthma, it is necessary to exclude contact with an allergen, toxic substances and irritating substances, choose medication to achieve control, as well as spa treatment and methods of physical rehabilitation. In recent years, both in outpatient and inpatient settings, there has been a tendency to reduce the volume of rehabilitation treatment. Priority is drug therapy, while the development and implementation of medical rehabilitation using non-drug methods, the effectiveness and safety of which is obvious, is given insufficient attention.

One of the effective methods of treating patients with chronic respiratory diseases is pulmonary rehabilitation. Pulmonary rehabilitation is a comprehensive program of measures based on patient-oriented therapy, which includes, in addition to physical training, educational programs designed to improve the physical and emotional state of patients and ensure long-term adherence of the patient to behavior aimed at

preserving health. Most of the works are devoted to pulmonary rehabilitation in chronic obstructive pulmonary disease, in particular of professional origin. In Russia, Europe and North America, papers have been published on the study of the effectiveness of pulmonary rehabilitation in patients with bronchial asthma. The development and implementation of a pulmonary rehabilitation program for patients with occupational bronchial asthma is currently relevant due to the increase in the incidence of PBA in industrially developed countries, the increasing impact of industrial allergens and irritating substances on workers. This leads to the need to improve research on pulmonary rehabilitation of patients with PBA and the use of these programs in practice.

The objectives of the pulmonary rehabilitation program are: achieving stable remission with an increase in functional indicators, achieving control over the disease, increasing the indicators of general and professional ability to work and restoring the social status of the patient, improving the quality of life of the patient. In case of professional bronchial asthma, the rehabilitation program must necessarily include physiotherapy methods.

The use of physical factors in the complex therapy of patients with occupational bronchial asthma is more preferable than drug monotherapy. Physiotherapy potentiates the effect of drugs, and therefore it is possible to reduce their dose, remission of the disease is achieved faster, which can be prolonged due to the fact that physical factors have a pronounced aftereffect effect. Physiotherapeutic methods of treating occupational bronchial asthma, having a complex effect, affect many links in the pathogenesis of the disease. The use of air ionization has become widespread in the treatment of patients with occupational bronchial asthma. Light negative ions have a positive effect on conciliary clearance, reduce the reactivity of the bronchi by reducing the sensitivity of receptors, reduce the intensity of lipid peroxidation, normalize ventilation-perfusion ratios and improve bronchial patency, cause an improvement in general well-being. In stationery and sanatorium-resort conditions, aero ionizers of various kinds are used by remote methods. The duration of the procedure is 5-15 minutes, the number of aero ions per procedure is 50-150x10<sup>9</sup>, carried out daily, for a course of treatment 10-15 procedures.

The combination of high aeroionization of air with aerosols of high dispersion is widely used in the treatment of patients with PBA at balneotherapy resorts with radon waters. The therapeutic effect of the procedure consists in the reflex action of radon received by inhalation and due to the accumulation of radon products in the skin. The use of dry-air radon baths significantly reduces the degree of inflammation in the bronchi in patients with occupational bronchial asthma, improves disease control and indicators of respiratory function (FEV1), which is confirmed by the study of bronchial hyperreactivity in the methacholine test and measurement of the level of nitric oxide in exhaled air. Radon therapy is most effective in patients with controlled bronchial asthma, which can be used in the formation of individual rehabilitation programs in order to achieve optimal disease control. Dry-air radon baths are recommended for 10-15 minutes, radon concentration is 20 nCi / l, temperature is 40 ° C, the course of treatment is 10-12 procedures with an interval of 2-3 days without combination with radon inhalations.

The use of speleotherapy in patients with PBA is based on a combination of high aeroionization with relatively constant humidity and air temperature. It has been established that the peculiarities of the microclimate of salt mines have a positive effect on the reactivity of the bronchi due to a decrease in the effect of irritating factors. For therapy, halite, rock-salt, and silvinite workings are used, where patients with mild and moderate PBA can stay for 7-8 hours daily for 5-6 weeks. Literature data indicate the presence of hyposensitizing, mucolytic, immunomodulating, draining and anti-inflammatory effects formed in the speleoclimatic chamber of the air environment on the body.

Among the methods of anihypoxic and vegetocorrective therapy in PBA, normobaric hypoxytherapy and hyperbarotherapy should be distinguished. Normobaric hypoxytherapy (interval hypoxic training) is recommended for 10-12 daily procedures consisting of 4-5 cycles of alternating inhalation of hypoxic air mixture from the hypoxicator apparatus (3-5 min) and atmospheric air (5 min). A hypoxic mixture containing 10-12% oxygen and 88-90% nitrogen is used for treatment. Intermittent normobaric hypnotherapy improves pulmonary ventilation and stimulates cellular and humoral immunity. When inhaling a hypoxic mixture, the respiratory center is excited, bronchial obstruction decreases, mucociliary clearance is activated, and tissue resistance to hypoxia increases.

With hyperbarotherapy, the air pressure in the pressure chamber during the first two procedures increases from 0.2 atmosphere, then 2 more procedures to 0.3 atm., and then to 0.4 atm. until the end of the course, consisting of 22-25 sessions. When using this method, the respiratory center is activated in patients with PBA, the processes of oxidative phosphorylation and metabolic processes in tissues are stimulated [16]. Due to the effect on beta-adrenergic receptors, hyperbarotherapy is accompanied by a broncholytic effect and increased mucociliary clearance.

According to the literature, in recent years, the use of laser therapy (red and infrared radiation) has become very popular in the treatment of PBA. This method acts differentially and purposefully on various links in the pathogenesis of the disease. The use of laser radiation increases the adaptive capabilities of the body with minimal risk of side effects and allergic reactions. An important advantage of laser therapy is the possibility of precise regulation of exposure parameters. The simplicity and safety of the method allows it to be used in the treatment of patients of all age groups. Among the numerous techniques, the most prevalent are those related to skin irradiation in the area of corporeal (45-60 s irradiation) and auricular (15-30 s) acupuncture points. The achieved effects of laser acupuncture are mainly due to reflex mechanisms.

A positive clinical effect was also obtained when using infrared laser radiation on the projection area of the adrenal glands in patients with PBA. There is an improvement in the clinical picture of the disease, a decrease in the frequency of attacks of suffocation, an improvement in the indicators of the function of external respiration, normalization of the level of hydrocortisone. It was found that when using the helium-neon laser laser for the treatment of patients with bronchial asthma, improvement of laboratory data, indicators of external respiration function (FVD), reduction of bronchial reactivity, restoration of bronchial sensitivity to sympathomimetics and xanthine derivatives was achieved.

Intravenous laser irradiation of blood is more promising when the skin barrier is no longer a determining factor. The combination of intravascular laser irradiation of blood with a wavelength of 0.635 microns and plasmapheresis leads to the achievement of a controlled course of bronchial asthma in 83% of patients, as well

as a reduction in the maintenance dose of inhaled corticosteroids by 50%. With an exacerbation of the disease, the use of intravenous irradiation with a helium-neon laser in patients with PBA leads to a rapid improvement in the condition, there is a normalization or significant improvement in FVD indicators, a decrease in bronchial obstruction. Under the action of a helium-neon laser, cell membranes are stabilized, which provides the necessary conditions for the normal functioning of membrane-receptor complexes and cells in general, which helps to reduce bronchial hyperreactivity and eliminate bronchial obstructive syndrome. EHF-therapy has been widely used for the treatment of patients with PBA. EHF radiation is well absorbed by water molecules and hydrated proteins, has a low penetrating power into biological tissues (0.2-0.6 mm). Millimeter waves induce a conformational reorganization of the structural elements of the skin and modulate the spontaneous impulse activity of the nerve conductors of the skin, its immune reactions, which leads to the activation of skin-visceral reflexes. Against the background of EHF-therapy in patients with PBA, indicators of the function of external respiration improve by 25%. The neurohumoral activation of the body's antioxidant system, which occurs during millimeter irradiation, blocks the processes of lipid peroxidation, which play a significant role in the pathogenesis of bronchial asthma. EHF radiation can activate the body's immune system. Conducting methods of EHF-therapy is based on the methods of reflexology. The impact is carried out on reflexogenic zones and biologically active points.

Magnetotherapy in the treatment of patients with PBA is a pathogenetically substantiated method. This is due to the fact that the magnetic field has a bronchodilator, anti-inflammatory, desensitizing effect, due to which mucociliary clearance is activated in patients, sputum discharge improves, and bronchial obstruction decreases. The range of magnetic therapy techniques used in patients with PBA is quite wide, in particular, it can be a traveling pulsed magnetic field, a combined effect of a pulsed and constant magnetic field on the chest area from behind on both sides, a low-intensity magnetic field of complex configuration, administered both locally and in the form of a general impact on the patient's body. The widespread use of this physical factor is due to a minimum of contraindications and side effects. The corrective effect of the magnetic field on the clinical condition of PBA patients in remission and their laboratory and instrumental parameters is

achieved immediately after the end of the course of procedures and persists for 6 months.

The method of assigning a traveling pulsed magnetic field using the ALIMP apparatus: 3 pairs of ring inductors are placed on the projection area of the roots of the lungs and the collar zone. The magnitude of the magnetic induction is 1.5 mT, the frequency is 100 Hz, the procedure time is 15 minutes, daily. The course of treatment consists of 10 procedures. Thus, the analyzed information available in the literature on the pulmonary rehabilitation of patients with occupational bronchial asthma and the impact of physiotherapeutic factors expands the understanding of the possibilities of using this type of therapy. The inclusion of physical methods in the therapy of patients with PBA is clinically and economically justified at all stages of pulmonary rehabilitation. An example of the purpose of the procedure is intravenous laser therapy using the Matrix-VLOK device with a wavelength of 635 nm using disposable sterile light guides inserted into the cubital vein. The radiation power at the end of the light guide is 1.5 MW, the duration of the procedure is 30 minutes, every other day, 5 procedures per course of treatment.

After laser therapy, there is an elongation of the periods of clinical remission of the disease up to 4-6 months, but later exacerbations resume, which indicates the expediency of repeating laser therapy courses after 1.5-2 months with severe PBA, and after 6 months - with mild and moderate PBA. Among the methods of electrotherapy for PBA, electrophoresis of drugs and dirt, amplipulstherapy, medicinal phonophoresis, electro son, percutaneous electrical stimulation of the diaphragm are currently used. Medicinal electrophoresis in PBA is used for slow administration of drugs in low doses, bypassing deactivating systems. In this physiotherapy procedure, electrodes with an area of 100-200 cm<sup>2</sup> are placed transthoracic ally according to the general method, the current density is 0.03-0.05 mA / cm<sup>2</sup>, the duration of the procedure is 20 minutes, daily, to achieve the effect, a course of 10 sessions is necessary. Depending on the goals of therapy, calcium and magnesium electrophoresis is used in patients with PBA.

Sinusoidal modulated currents in patients with occupational bronchial asthma contribute to the activation of microcirculation of the respiratory tract and lungs, reduction of venous congestion and pulmonary parenchyma edema, activation of gas

exchange. When using amplipulstherapy, hemodynamics and the function of external respiration change, in addition, it is possible to normalize the level of hydrocortisone when exposed to the adrenal region, vasomotor and respiratory centers are activated. The paravertebral arrangement of the electrodes is recommended in the presence of difficult-to-separate sputum in order to stimulate its evacuation. An example of the purpose of amplipulstherapy can be the effect on 2 fields: the interscapular region and the area of the projection of the adrenal glands. Electrodes with an area of 150 cm<sup>2</sup> are initially placed paravertebral in the interscapular region, variable mode, type of work III and IV, 5 min each, modulation depth 50-75-100%, pulse frequency 80-100 Hz, half-life duration 2:3 s. Then, according to the same method, the second field is affected: paravertebral at the level of the lower thoracic and upper lumbar vertebrae. Procedures are prescribed daily, for a course of 10 procedures.

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