

AEROCRYOTHERAPY



CRYOSAUNA "SPACE CABIN"®

Methodical and practical guidelines for using
cryosauna "Space Cabin"®
in the context of extreme aircryotherapy

PHYSIOLOGICAL VALIDATION OF APPLYING AIRCRYOTHERAPY IN CLINICAL PRACTICE

ACT (aircryotherapy) is a method consisting in single-step cooling of the whole surface of human body in gas medium with super-low temperature (down to -180°C).

This is a technique meant for prophylaxis of premature death and for nonspecific status correction, being a part of integrative medicine.

From the point of view of integrative medicine, any disease is violation of biological integrity of the body, impeding satisfaction of the biological need in dynamic self-healing. This phenomenon generates various clinical manifestations of disbolism and energy supply disturbances.

The morphostructural balance of biological integrity of the body is represented by 4 groups of cells:

- 1st – the cells, which have entered into apoptosis or subject to necrobiosis;
- 2nd – hibernating or stunned cells;
- 3rd – differentiating cells, which, in fact, ensure physiological status of the body due to their physiological regeneration;
- 4th – the group, proliferating in the course of reparative regeneration.

If every minute a million of cells die in the body, in order to preserve the morphostructural balance of the body the same quantity of cells must be regenerated. Due to this fact the actions of a general practitioner should be aimed at preserving morphostructural balance of the body biological integrity by adopting a certain line of professional behavior and correspondent medical techniques.

The system of recuperating biological integrity of the body is brought about by general adaptive syndrome, which is triggered by the central nervous system through polyglandular somatotropic intensification. The nociceptive mechanism plays an important role in triggering the general adaptive syndrome. The biological purport of adaptation is to preserve the biological integrity of the body.

THERMOREGULATION OF THE BODY EXPOSED TO COLD

The influence of cold on the human body from quantitative point of view is determined by the degree of cooling. The degree of cooling reflects the rate of cooling for the human body with average temperature of 36.5°C or body heat amount, which is needed to maintain the temperature on fixed level.

As soon as the human body is a «self-tuned» system it is able to switch «depending on situation», by activating a number of data mechanisms. Thus, being subject to cold therapy, the patient's body may respond vigorously to the situation and a number of distant irritants (color, odor of water or gases etc.). This mechanism triggers sanogenetic (health-recuperative) reactions even with small doses of cold irritant.

The temperature distribution within the body is heterogeneous.

In 1955 Barton and Edholm suggested to distinguish between the heat «coat» and heat «nucleus» of the body.

The tissues of the «coat» are heated rather unevenly. So, the normal temperature of upper extremities is usually between 30°C and 32°C . Peripheral sections of lower extremities on feet have the temperature about 26°C - 28°C .

The temperature of internal organs is more constant (a bit higher than 37°C). The «nucleus» is less resistant to temperature descent. Drop in the temperature of the human body by 1°C causes the decrease in basal metabolism by 6-7%. When the «nucleus» temperature drops to 20°C it may result in death. However, supercooling leads first to rather prolonged skin temperature drop, and only then, some time later, the temperature descent of the internal organs occurs.

Generally, as soon as the body thermoregulatory mechanism regulates heat irradiation more than heat buildup, the body temperature does not depend directly on the ambient temperature.

In the skin there are 10-15 times more cold receptors than heat ones. It is believed that for 1 square centimeter of skin there are 200 nociceptors, 25 tactile receptors, 2 heat receptors and 12-15 cold receptors. The majority of the latter (used to be called bulbs of Krause) are triggered when the temperature descends to $+12^{\circ}\text{C}$. Each square centimeter of skin contains up to 14 nerve endings, which respond to cold and only 1-2 of those responding to heat. Skin heat receptors send electric signals informing about alteration in thermal equilibrium to a special area of the brain (hypothalamus) with the thermoregulatory centers.

SOME PHYSIOLOGICAL PROPERTIES OF HEAT BUILDUP AND HEAT TRANSMISSION

Under exposure to severe cold the skin turns pale due to contraction even of large blood vessels. Thus the heat emission into the environment is even more decreased. At the same time the inflow of blood to the internal organs is increased and the body «nucleus» temperature goes up.

As heat deficiency progresses, the internal organs temperature begins to descend, and as far as this goes it is accompanied by subjective feelings of being cool, cold or frozen.

The body respondent to the exposure to cold is subject to the law of quantitative relationship between the intensity of stimulus and reaction of the body. It is established that with intensification of the exposure to cold combined with the air bath the amount of consumed oxygen increases. For instance, under the influence of air bath of 25 kcal/sq.m the amount of consumed oxygen increases by 27-30%, and with the air bath of 45 kcal/sq.m it goes up by 48-53%.

The advance of adaptation to the cold irritant is an important mechanism. It is true for different physiological systems of the body. There's also an irritant cumulative effect, that is the increase in physiological activity of cold therapy as its effects are expanded. Still, very severe exposures may lead to protective inhibition according to I.P. Pavlov.

The hardening by cold causes after-effect, displayed after a treatment course. It is manifested by favorable changes of biochemical indices long time after exposure to hardening treatment, in some cases, within several months or even after one year.

The cold may have specific and selective action on physiological reactions of the body. As shown by P.K. Anokhin, during climatic therapeutic intervention all changes in the body are aimed at achieving favorable physiological result, which guarantees the most sparing functioning of the body under given conditions with lowest energy cost for the key functions.

INFLUENCE OF THERAPEUTIC COOLING REGIMES UPON CELLS AND TISSUE STRUCTURES

It is established that the efficiency of thermoregulatory mechanisms of the body is considerably high: the extreme cooling of patients (1 to 3 minute exposure to the air with the temperature down to -120°C or forced air cooling of separate areas of the body with the temperatures down to -180°C for several minutes) provokes a chain of defense reactions, but at the same time no overstrain of thermoregulatory mechanisms is registered. It is stated that the defense physiological reaction to dosed general cooling is very favorable for the patients with rheumatic disorders, because it relieves pain and reduces muscle spasms. Besides, the response is manifested through vegetative-vascular changes due to activation of the adrenal system. At the same time other authors, who used exposure to extreme temperatures (down to -120°C in cryo-cabins) for treatment of the patients suffering from chronic rheumatic arthritis did not register the difference in the adrenal function stimulation between the patients and the control group of healthy people, because release of cortisol and oxycorticosteroids (17OCS) by this gland during the process of cryotherapy (17OCS) did not display considerable alteration. According to Dr. R. Fricke (1989), the favorable effect of general ACT for treatment of motor apparatus disorders (the patients stayed in cryo-cabins with the temperature of -160°C for 1 and 3 minutes) is called forth by stimulating the functioning of anterior lobe of hypophysis. He found out, that under the influence

of ACT procedure the level of cortisol in blood serum of the patients was decreased, the level of prolactin and somatotrophic hormone remained unchanged, the content of noradrenalin increased and that of adrenalin was within normal limits. Recently some investigators tend to explain the ACT influences by contribution of the neuropeptide system and formation of endogenous morphinoid substances - opiodes, through which the cooling effect is realized. This phenomenon is confirmed by data obtained based on monitoring the patients with pain syndromes of the vertebral column, receiving cryoapplications with the temperature -140°C , and the patients with bronchial cryospasm, treated by cooled air (for desensibilization).

REACTION OF CARDIOVASCULAR SYSTEM

While studying the cardiovascular system reaction for cooling, it was established that general aircryotherapy does not cause excessive blood circulation strain; that is why it can be used for patients with ischemic heart disease in the initial stage. When monitoring such patients in cryo-cabins (with the temperature about -110°C) and after the procedure (staying in the cabin up to 3 minutes) no provocation of myocardial ischemia and no cardiac rate disturbances were registered. The patients with normal arterial pressure (AP) under the influence of general ACT showed the increase by no more than 10 mm of mercury, though in case of hypertension the increase may also be higher.

Presently it is believed that the vessels constriction under the influence of cold is the first defense reaction of the body for cooling, the second defense reaction is luminal expansion of the blood vessels observed in different time (from 1 to 3 hours) depending on cooling dosage. The intensity of cold impact definitely has effect on the degree of consequent skin reddening (reactive hyperemia), however no linear dependence has been registered. It is believed that the first defense reaction is aimed at heat preservation, the second one provides intense heat buildup. At the same time dividing the vessels response into first and second category is rather relative. The real situation is characterized by rhythmical oscillations of contraction and expansion of vessels in the skin, which thus prevents ischemic damage of tissues. It must be stressed, that the optimum effect of ACT may be achieved with skin cooling to the temperature of $8-15^{\circ}\text{C}$.

INFLUENCE OF ACT UPON NEUROMUSCULAR SYSTEM

The initial body response to cryotherapy is related, first of all, to stimulation of skin receptors. Long cooling causes their inhibition and partial paralysis, which is related to the patient's subjective feelings: first he feels cold, then burning and pricking, then pain, which gives place to anesthesia and analgesia.

The aptitude to regulate the muscle tone is one of the most valuable properties of ACT. Majority of authors use cold in order to reduce muscle spasm, others, vice versa, to enhance muscle tone. The latter achieve their goal through brief exposure to moderately low temperature (about 0°C). This results in increasing muscle strength and endurance.

Reducing muscle spasm is of great practical importance. The muscle relaxation is registered after a long (more than 10 min) cooling within the temperature range around 0°C or after a short-time but intensive exposure to cold (up to -180°C).

The researchers proved, that cold therapy with ice pack, as well as 2-3-minute exposure to cold air (down to -180°C) or staying in a cryo-cabin (about -110°C) do not change muscles temperature and the temperature of nerve trunks. The ACT spasmolytic effects are brought about through the exteroceptive system of the skin and gammamotoneuronic system.

INFLUENCE OF SINGLE EXPOSURE TO COLD UPON CERTAIN PARTS OF CIRCULATORY SYSTEM

The recuperative (sanogenetic) mechanisms of cryotherapy are based on anesthetic, antiphlogistic and spasmolytic effects.

Therapeutic efficiency of general ACT (staying in a cryo-cabin with the temperature about -110°C for 0.5-3 minutes) for the patients with rheumatic disorders of articulations is shown not only

in reducing pain but also in reliable improvement of articulation functioning, general improvement of the state of health. Besides, it was determined, that the same effects apply to the covered parts of body as well, for example, articulations of hands and feet protected with gloves and shoes. Considerable improvement of patient's functional state is registered within several hours after the procedure.

The cooling of tissues, affected by burns, with liquid nitrogen vapors having the temperature -100°C prevents secondary processes of deepening for the thermal injury.

Cryotherapy is efficiently used in a neurogeriatric clinic (for treatment of nervous system diseases of the aged people). Practically, there are no age limits for ACT with super-low temperatures established; the exposure to the cold air with the temperature down to -180°C was used for the patients up to 81 years old. It has been observed that ACT increases physical endurance of the patients by 6.8%, according to the data of bicycle exercise.

It should be stressed, that anesthetic effect, decreasing the need for analgesics, muscle relaxation, anti-inflammatory activity of therapeutic cold, absence of side effects and age limitations for most methods make cryotherapy an important means of "home" rehabilitation for chronic pain syndromes, in particular, those of neurological and rheumatic character.

CRYOTHERAPY IN A COMPLEX OF REMEDIAL MEASURES

The attention paid to this problem is determined by a clinic's requirement for complex rehabilitation methods, which give excellent results, as shown by recent investigations.

Exposure to cold simultaneously with or after some other physical agents (ultrasound, therapy with oxygen under high pressure - hyperbaric oxygenation, microwave irradiation and laser emission, ultraviolet blood irradiation) under experimental and clinical conditions demonstrated the possibility to enhance or reduce the action of a chosen factor by way of cooling. In order to enhance treatment efficiency the electric therapy is used together with ACT, in sequence. Recently the devices and methods for simultaneous cold influence with direct or pulse (diadynamic, interference) currents are developed. Besides, there are separate cases of using ACT with alternating magnetic field. It is often recommended to combine the ACT procedures with physical exercises. Many researchers mention positive and considerable effect of the ACT procedures applied before physical exercises for the patients with rheumatic disorders.

For this category of patients discontinued treatment method is suggested. It consists in the exposure to cold for 3 min. with a 5-minute complex of therapeutic exercises, which are alternated consequently several times. The efficiency of combining the ACT with isometric exercises was shown as well, causing so called postisometric muscle relaxation. It is recommended to combine local exposure to cold air, for example, for an articulation, with bending and unbending, in this case, during all the procedure. The patients with autonomic neuropathy underwent intensive movement therapy each time after cold immersions. This was aimed at achieving compensation of heat emission. After medical arthroscopy of the knee joint an ice pack for 15-20 min is used to decrease edema.

The basic medical efficiency of cryotherapy is related to stress stimulating influence upon hypothalamic-hypophysial-adrenal system, and with stimulation of the peripheral blood circulation as well. The total cryotherapy shows maximal medical efficiency. The treatment efficiency is determined not only by maximum air temperature level in the area of cryomodality, but also by the rate of temperature descent. The duration of general cryotherapeutic modality makes 30-180 sec. During the cryotherapeutic procedure the patient's skin temperature goes down instantly to 0°C, but then due to the intensification of peripheral blood circulation, goes up to 35°C (the normal skin temperature is 32.5°C). The compensatory temperature rise lasts within one hour and a half. Together with compensatory temperature rise, during the cryotherapeutical modality the pain sense and constraint in articulation affected by rheumatic polyarthritis are suppressed.

The possibility of pain suppression in joints combined with overcoming of constraint makes easier the performance of curative gymnastics, which together with diet provides good results in

rheumatic polyarthritis treatment. The analgesic influence of cryotherapy is considered to be a result of decreased activity of inflammatory mediators. That is why cryotherapy is prescribed for all types of polyarthritis: acute and chronic, infectious and non-infectious.

Other ways of general cryotherapy application are possible as well, for example, for the treatment of immunodeficiency and in order to increase nonspecific resistance of the body, or when treating burn wounds. Taking into consideration the comfort and velocity, the hardening effect of cryotherapeutical procedures allows using this technique in mass as a powerful preventive method, which is very easily arranged to be used both on an outpatient and on an inpatient basis (for instance, in preventoriums of large enterprises).

The modality of this cold therapy method was first based on practice of known and studied cold application procedures used for rheumatic disorders of articulations. However, quite soon this method became core one in comprehensive treatment of a variety of most severe diseases, which were very difficult or almost impossible to cure before. In the eyes of foreign experts, application fields of extreme cryotherapy where it can be used as a valuable component of multimodal therapy, include the following: treatment of inflammatory articulation diseases, degenerative articulation diseases with secondary inflammation component, vertebral column disorders, inflammatory and degenerate, inflammations of soft tissues, collagen disorder, fibroma syndrome, autoimmune diseases etc. Japanese program of children hardening in extreme cryo-cabins proved to be quite efficient, as there was registered considerable decrease of catarrhal incidence for children subject to 10 sessions of general cryo procedure compared to the control group. Besides, the results of general extreme cryotherapy method for the treatment of bronchial asthma, chronic lung diseases, pollinosis proved to be quite satisfactory. The most valuable experience in general cryotherapy application is accumulated for treatment of depressive state, elimination of stress syndrome, drug addiction therapy, usage as a stimulator which amplifies functional abilities of the body. It is impossible to enumerate all the nosologic forms, therapeutic efficiency of which makes more than 85%. They include psoriasis, atonic syndrome, disseminated sclerosis, rheumatic polyarthritis etc. Based on the above facts this technique may be called one of most remarkable achievements of the 20th century.

GENERAL INDICATIONS AND CONTRAINDICATIONS OF COLD TREATMENT

The medical efficiency is determined not only by minimum air temperature level in the affected area, but also by the speed of temperature descent.

A session is held with the cabin's door tightly closed. The cryogenic gas is supplied into the cabin, the temperature goes down from -20°C to -140°C within 30 sec. After that the attained temperature level remains constant. The duration of general ACT session is 60-180 sec., to be increased during the course. The course dosage makes 10-20 or even more sessions. Therapeutic (preventive) procedures are recommended to be held every day, every second day or every third day. When treating rheumatic or other diseases it is allowed to increase the frequency of sessions up to 2-3 per day.

According to the data of domestic and foreign scientists the main application fields for general cryotherapy are as follows:

Rheumatology and vertebrology

- soft-tissue rheumatic and rheumatoid disorders;
- osteochondrosis and other pathological alterations in the vertebral column;
- collagenoses, spondylitis.

Hepatology

- chronic autoimmune hepatitis;
- chronic virus hepatitis;
- cirrhosis in the compensatory stage.

Neurology

- neuroses, migraine, sleep disorders;
- radiculitis

Cosmetology

- skin-firming and tightening, cellulite reduction;
- general rejuvenation of the body and prevention of aging;
- increasing metabolic processes in the skin, anti-wrinkle effect;
- strengthening and treatment of the hair and nails;
- treatment of skin defects

Sexology and urology

- impotence treatment, potency and libido boosting;
- restoration and improving of erectile function;
- treatment of psychoemotional disorders and functional state recovery.

Gynecology

- premenstrual syndrome;
- climacteric syndrome.

Endocrinology

- obesity;
- endocrine and immunologic disorders.

Pulmonology

- chronic bronchitis, including those obstructive;
- tracheitis.

Cardiology

- prevention of cardiovascular diseases;
- vegetovascular disorders.

Dermatology

- dermatitis, atopic neurodermatitis, eczema, psoriasis.

Orthopedy and traumatology

- postoperative period.

Sports medicine

- cure and rehabilitation for acute and chronic athletic injuries
- modulation and maintenance of top athletic shape

Powerful health improvement

- prevention of flue and catarrhal diseases;
- prevention of stresses and their consequences (insomnia, depression, appetite disorders);
- immunity enhancement;
- metabolism recovery;

Please note that one course of cryotherapy has the same effect as 4 years of intensive hardening.

Contraindications for general aircryotherapy:

- general grave condition of the patient;
- decompensation of chronic cardiovascular diseases;
- acute myocardial infarction and rehabilitation period after the infarction;
- cerebral strokes;

- stage II essential hypertension (AP > 180/100 mm of mercury)
- stage II cardiac insufficiency
- prognostically unfavorable heart rate and conduction disorders;
- fever;
- pulmonary tuberculosis in active form;
- malignant growths;
- hemorrhagic diathesis;
- hysteric neurosis;
- individual cold intolerance;
- pregnancy;
- age under 10 years.

CONSTITUENT QUESTIONS OF CLINICAL ACT

It is very important for general practitioners to realize that extreme air cryotherapy is the most powerful method in physiotherapy, and it cannot be interpreted as cold therapy in the traditional sense.

First, in phylogenesis a man has never faced such superlow temperatures, and apparently, the mechanisms to monitor such temperatures are absent. Second, the speed of heat abduction from the body surface is so stressfully incredible, that it makes the body respond totally and not only through the thermoregulatory system, but with all the adaptive mechanisms, including hypothalamic-hypophysial-adrenal, immune, endocrine and other systems.

The short-time exposure to extremely low temperatures without disrupting the energy and functional mechanisms of the body is a kind of training for all the sections of physiological stage of stress and alerts all physiological resources of the body.

The attending medical doctor should be aware that assigning highest objectives to the ACT, he also confronts the patient with psycho-emotional problems. Though short-time, the procedure is found extremely uncomfortable by many patients because of incredibly high speed of heat abduction from the body, especially from the whole body surface.

Thus, the choice of ACT routine is an absolute prerogative of the attending medical doctor and is a criterion of his medical and practical qualification

The objective tendency to intensive expansion of nosological range of ACT application is proved by reliable, universal therapeutic efficiency, placing the ACT to one of the foremost positions in the most of directions of applied medicine.

ACT in combustiology (burns treatment)

ACT is the most efficient way for rendering first aid to victims, because it allows discontinuing quickly the temperature agent effect and thus considerably decreases tissues heating, which results in minimizing tissue necrosis. The cooling of burn wounds promotes improvement of microcirculation, reducing of pain sense, plasma loss and tissue edema. The cooling is also adopted for treatment of later stages after getting burnt. ACT may be necessary at later terms, in the first place, for the wounds with weak granulations being prepared for plastic closing. This ensures decreased granulations edema, their flattening and drying. All this accounts for good engraftment of skin flaps.

The ACT is used for burns of all degrees.

ACT in pulmonology

Used for treatment of bronchial asthma, chronic bronchitis, chronic pneumonia:

- General ACT session 180 sec. long, 25-30 sessions, once per day. In case of bronchial asthma the patient should undergo up to 3-5 courses, with 1 to 3-month interval between the courses.

ACT in gynecology

For treatment of sterility, miscarriages, climactic syndrome, endometriosis, in pregnancy planning /to prevent toxicosis/.

- General ACT session 120-180 sec. long, 25 sessions, once per day or every second day. Number of courses - 3 to 5, with 2 to 3-month interval between the courses.

ACT in hepatology

The basic factors of life sustaining activity are metabolism and energy exchange. All the proteins, fats and carbohydrates in the body are converted in the process of assimilation and dissimilation. Their biological importance lies in the fact that while the substances are broken down the energy contained in them is released thus ensuring all the body functions.

The alteration of liver texture and loss of normal liver cells results in the liver inability to synthesize proteins and other substances necessary for the body as well as neutralize toxins. The grown scar tissue is compressing blood vessels, which results in the blood circulation disturbance.

The cold influence is a method of physical thermoregulation, during which at first the vessels are contracted and, if the influence continues, warm blood is supplied to the superficial vessels from internal organs, and then the blood flow of internal organs increases. Based on the results of Doppler sonography it is observed that the hepatic blood flow is increased, ferment activity is accelerated, metabolic reactions are enhanced.

So, even with temperature irritation of the feet and shins the cerebral cortex blood flow is changed, too, the cold influence of peripheral sectors manifests itself on the heart vessels blood flow and the portal system.

Short-time general cold procedures are able to stimulate physicochemical or biochemical processes. Their favorable influence is shown in the cell structure, where the mediators of metabolic reactions are formed, the activity of oxidation and recuperation processes are enhanced.

Increase of blood flow to internal organs and change from cold to warmth are the mechanisms necessary for blood circulation system training. The blood which carries mediators of activation and oxygen considerably enhances antioxidant properties of parenchymatous organs, in particular, those of the liver, improving metabolic processes.

Under the influence of general cold procedures the tissue (cell) respiration of adipose tissues is activated, which is a very important factor in treatment of adipose infiltration and fatty degeneration of liver.

The liver diseases are characterized mainly by the following pathologic processes:

- inflammation;
- peripheral blood circulation disorders;
- metabolic disorders;
- diffuse accrementation of connective tissue together with dystrophy, necrosis, tumors.

Based on the above, the mechanisms of cryotherapy influence the causative factors provoking the development of hepatic diseases and prevent many of those.

Due to the immune system failures the body generates substances which damage the liver.

Multimodal therapy comprising treatment with hepatoprotectors, extracorporeal detoxification methods and cryoinfluence favors normalization of detoxification indices of the liver, reduction of cytolic, mesenchymal inflammatory and cholestatic syndrome.

The patients with chronic liver diseases characterized by hypersplenic phenomena show the increase in platelet number and in capillary blood flow, as well as decrease of regional vascular resistance, according to the data provided by rheohepatography and Doppler sonography.

Summing up we can draw a conclusion that the aircryotherapy considerably increases microcirculation and improves trophic processes in the organs and tissues, influences the rheological blood properties, has pronounced immunomodulatory effect, favors drastic activation of the body detoxification protective system with the liver as a key agent.

The variety of therapeutic action mechanisms provided by cryotherapy determines the specter of its clinical use:

- for treatment of chronic autoimmune hepatitis; chronic virus hepatitis; liver cirrhosis at the compensatory stages.

- The general ACT session 120-180 sec. long., 15-20 sessions, once per day or every second day.

ACT in general surgery (proctology and traumatology)

- In traumatology the general ACT is recommended for any kind of trauma, injury, dislocation, tendovaginitis, fractures etc. The exposure is based on the condition with the number of sessions up to 3-5 per day until edema disappears and pain reduces, and also with the aim to prevent the pain shock (see the chapter on *sports medicine*).

ACT in rehabilitation of chronic fatigue syndrome and other abstinent states, for prevention of catarrhal diseases and maintaining homeostasis

It is believed that general ACT is very effective for rehabilitation of any abstinent states and homeostatic disorders:

- syndrome of chronic fatigue;

- after grave somatic, infectious and surgical diseases.

- The most valuable experience of general extreme cryoprocures was amassed for treatment of depressive states, elimination of any kind of stress syndrome. While undergoing cryotherapy the sleep is improved, the irritability disappears, the mood becomes elated, propensity to take alcohol and sedatives anesthetic medicines decreases. Objectively, the tremor decreases and vegetative reactions (panhidrosis, dystonia and so on) subside. Practically all the patients experience gain in health, increase of efficiency and improvement of sexual life.

- The rehabilitation regime of procedures and number of general ACT courses should be chosen individually. It is recommended to introduce the ACT technology on accrual basis with 20-25 procedures per course. Supporting courses are on the contrary prescribed on descending basis. Number of general ACT courses and intervals between them should be determined individually, according to the condition.

- The ACT as a homeostasis protective and preventive method has no alternative in contemporary medicine. This fact was proved by the results of many investigations of orderly groups of children 5-7 years of age. The incidence of virus respiratory infections in the groups of children submitted to 15 sessions of general ACT decreased by 7 times compared with the control groups. The intense homeostasis protective trace is kept within 6-12 months.

ACT in dermatology

It is obvious that the maximum sanogenetic amplitude generated by cryotherapy is manifested directly in the skin and is most firmly fixed at tissular level. That's why the ACT in dermatology has a wide nosologic usage: from the treatment of acute and chronic inflammatory processes to the rehabilitation of secondary degenerate manifestations of skin diseases. In all cases the efficient combination of classic therapy with ACT provides possibility to get a considerable improvement or clinical recovery or prolongation of remission period for chronic skin diseases. The methods of ACT use in dermatology are mainly standard depending upon localization or visceralisation of the process. The attending medical doctor may vary the frequency and number of procedures in the first place, but the temperature is less variable. The exposure temperature, especially in general ACT its relatively permanent. It refers equally to autoimmune and granulomatous processes during skin diseases, such as psoriasis, neurodermatitis, seborrheic symptom complex, eczema, erythematosis, scleroderma, lichen ruber planus etc.

ACT in multimodal therapy of psoriasis

Cryomedical methods are very valuable and most often basic elements in the multimodal psoriasis therapy. Without coming into conflict with classical therapeutic methods, they considerably improve the prognosis of the treatment and modify the clinical course of psoriasis in any of its manifestations. Besides, when the most frequently used methods (such as PUVA-therapy, PUVA-therapy combined with retinoid therapy, selective phototherapy, retinoid therapy, immunosuppressant drugs and cytostatic agents (sandimmun, methotrexat etc.), hormone therapy) prove to be ineffective, or contraindicated, the cryomedical techniques remain almost unique methods giving possibility for the clinical recovery of psoriasis and long-time pronounced remission.

The ACT is mainly aimed at homeostasis modulation. That is the objective of general ACT is to modify the clinical course. At the first stage it means decreasing the amount of skin rash appeared during relapse, protracting the period of primary remission. The final goal of general ACT is to achieve stable remission or at least stable clinical and cosmetic comfort.

- For general ACT /cryo-cabin/ the "golden standard" of psoriasis treatment on smooth skin is 3 courses, of 25-20-15 procedures each, received within 6-8 months.

However, even one course of general ACT consisting of 25 procedures considerably improves the prognosis of psoriasis remission.

- In case of common psoriasis the regime of general ACT session is 120-180 sec.
- For arthropatic psoriasis at the initial stage of treatment, especially during the aggravation stage the ACT use should be more intense, that is the in-patient treatment should be adopted.
- In the first 10-15 days of treatment the general ACT may be prescribed up to 3-4 times per day, depending on the character of the clinical course.
- The procedure regime of general ACT for psoriatic arthropathy is 180 sec.
- The first intense treatment course of arthropatic psoriasis may take up to 2-3 months. As a rule, after 10-15 days the acute manifestations subside. It is possible to increase the frequency of ACT procedures up to 1 time per day. After the first month of intense course the local ACT can be canceled, in accordance with the condition.
- General ACT should be taken every second day, at best, until a stable positive clinical effect is achieved, totally up to 3 months.

Together with general treatment, which aims at immunomodulation, immunosuppression, detoxification, antioxidant therapy and so on, there's also an absolute chance of complete correction and treatment of psoriasis concomitant diseases. First of all, it refers to the treatment of focal infection and inflammation areas, especially those of lymphoid tissues (tonsillitis, laryngitis, gastroenterocolitis, hepatitis, nephritis etc.). The attending medical doctor should fulfill these recommendations of ACT usage in psoriasis treatment.

ACT in multimodal therapy of atopic dermatitis (diffuse neurodermitis)

Athopy is characterized by the readiness of the human body for abrupt and unpredictable fluctuations of tissues and organs allergic reactivity under the influence of environmental factors, both biospheric and man-caused. The ecological and social conditions play determinative role in the evolution of athopy.

Athopic dermatitis (diffuse neurodermitis, hereinafter DN) as one of possible outcomes of athopy belongs to the most resistant skin diseases.

At present general and local ACT being included into multimodal therapy is utterly beneficial for the patient. The possibility of using cryomedical techniques (local and general ACT, discrete layer-by-layer cryosurgery) allows the attending medical doctor to achieve the patient's clinical recovery with practically 100%-assurance and long DN remission.

- The general ACT is to be prescribed for DN treatment since the first day, as a rule, once per day. In exceptional cases during the first intense course of general ACT in can be taken every second day. Both the first course and the subsequent courses of general ACT consist of 30 procedures. The procedures for the repeated courses of general ACT are taken every second day. The intervals between courses of general ACT in case of DN make 1-2 months. The duration of general ACT session for DN is 180 sec.

Developing individual algorithms of multimodal DN therapy requires from the attending medical doctor the availability of utterly complete information about the state of the patients' body. This information will allow except prescribing standard basic DN therapy (antihistaminic medicines, immunomodulators, gastrointestinal protectors, detoxics, PUVA-therapy, retinoid therapy, diet etc.) to correct and treat concomitant pathologies purposefully and efficiently, including sanation of any centers of focal infection and invasion.

ACT in multimodal therapy of seborrhea, acne and rosacea

The general ACT for seborrheic symptom complex and rosacea is to be prescribed in regime of 120-180 sec. during 15-20 procedures. The purpose of general ACT is potentiation of multimodal therapy of seborrheic symptom complex with correction of all the parts of pathogenesis, based on its actual manifestations and concomitant diseases.

ACT in neurology and vertebrology

Nervous system diseases, both essential (infantile cerebral paralysis, disseminated sclerosis, myasthenia, migraine, parkinsonism etc.) and manifestations of systemic diseases or traumas (painful, spastic, paretic, reflex and neurodegenerative syndromes) take one of the first places and affect almost each person during his life. Sanogenetic points of ACT attack are directed basically at the neuroreflectory system of the body. That's why the ACT use in the field of neuropathology is logically sound and highly efficient

The general ACT may be prescribed for any nervous system disease, with sessions 120-180 sec. long, every day or every second day. The number of procedures and courses of general ACT are to be determined by an attending medical doctor according to the condition. In any case, the positive dynamics of patient's health is manifested towards the 10th procedure.

It is believed that the main mutually potentiating factors in the pathogenesis of osteochondrosis are muscles and vessels spasm, venous and lymphatic outflow disorders, arthrosis of articulations, changes in local metabolism, development of aseptic inflammation and pain syndrome aggravating all above mentioned pathological processes. The sanogenetic mechanisms and tissular effects of ACT are amazingly well-adapted for the control of the pathological processes characteristic of osteochondrosis. As a matter of fact that explains the highest efficiency of ACT for conservative treatment of degenerative pathology of the vertebral column.

The usage of ACT for the patients with diskogenic radiculopathy including those with herniation of intervertebral disks is as expedient.

- General ACT for any vertebral pathology is to be prescribed in accordance with the principles of treatment of musculoskeletal apparatus diseases in the maximum sanogenetic amplitude.

ACT in rheumatology

While treating the musculoskeletal system diseases (rheumatoid arthritis etc.) the tasks for multimodal therapy with ACT use may be divided into minimum and maximum. This approach has rational basis in the clinical practice.

Minimal task for an attending medical doctor includes the following objectives: to arrest inflammatory manifestations of arthritis, diminish drug load of basic and supporting therapy and achieve pronounced remission. The ACT parameters used are the same as for treating psoriatic arthropathy.

Apart from the above stated, the maximum task aims at restoring the function of the affected articulation to the maximum possible extent. For this the attending medical doctor should strive for the maximum sanogenetic amplitude of ACT, and therefore for the maximum regime of general ACT 180 sec long. The number and time of procedures depend on clinical expediency and curative gymnastics rate.

Of course, with already developed degenerative process in articulations (arthrosis) and concomitant osteoporosis, special machine-based curative gymnastics methods are needed, requiring special training in the clinics, which have material resources and

experience in teaching conservative treatment of ankylosing forms of arthritis with ACT use. Unpractical curative gymnastics for arthrodial joints may result in fracture of articular heads, condyle separation, ruptures of joint capsule etc.

ACT in sports medicine (installed in gyms, fitness centers, training centers)

The tendency towards increase of acute and chronic athletic injuries, both quantitative and qualitative, complicates the selection and training of top class sportsmen as well as intensification of training process. So nowadays the problem of arresting acute athletic injury, decreasing the risk of its long-term negative consequences, including that of specific chronic athletic injuries characteristic of certain sports remains quite pressing.

In sports medicine to stop the vicious circle of "pain - muscle spasm - pain" in case of acute athletic injury up to present the cold procedures were used including irrigation with chloroethane and other freons, ice applications, salt or gel cold accumulators (ice packs).

The ACT techniques open new wide horizons for sports medicine:

- arresting, treatment and rehabilitation of acute and chronic athletic injuries
- developing and maintaining of top athletic form.
- preparation and stimulation of physical and psycho-emotional conditions of sportsmen immediately before competitions, matches or starts.
- rehabilitation of sportsmen after competitions and in order to prolong sportsmen's athletic life.

The requirement and insistent need for including ACT techniques in the sports industry are based on its high efficiency, as soon as ACT can never harm a sportsman in any kind of sport, but, on the contrary, it exercises positive influence on his athletic results.

As per data provided by functional research, one course of general ACT consisting of 15-25 sessions considerably increases the endurance of sportsmen. Optimization of the functional indices and efficiency – psychofunctional state, PWC-170, end-systolic dimension, rehabilitation time and so on is comparable to the results of using biologically active stimulators and adaptogens and even is considerably higher in some respects. It should be stressed that the ACT unlike biochemical stimulation does not have long-time negative side after-effects. Besides, the ACT is able both to reinforce the influence of biostimulators considerably and eliminate their long-term side after-effects, which are peculiar to stress load in the modern sports.

First of all, general ACT equipment should be supplied to athletic training bases. Directly at the competitions the ACT-technique use should be thoroughly arranged by managers and medical doctors of athletic teams.

While elaborating individual programs of ACT-technique the sports medical doctors may use these practical and methodical guidelines paying special attention to safety rules.

○ *During the preparative period before competitions the general cryotherapy (cryosauna) is prescribed in regime 120-180 sec., with a course at least 15-20 procedures (the course is repeated once in 6-8 months), once per day or every second day 20-40 min. before training starts.*

○ *Immediately before competitions the cryosauna is prescribed in regime up to 180 sec., 20-60 min. before they start.*

○ *After the matches or competitions the cryosauna is prescribed in regime 150 sec. with the aim to rehabilitate an athlete.*

Cryosauna before or after business trip, negotiations, sleepless night, hard working day

- 1 session 120-150 sec. long.

Cryosauna in cosmetology (SPA centers, beauty salons)

Aircryotherapy is one of the most catching, efficient and prospective of physiotherapeutic methods to solve most pressing problems in the sphere of cosmetology.

- *general rejuvenation of the body, prevention of aging;*
- *skin metabolic process enhancement, anti-wrinkle effect;*
- *rejuvenation of skin on the face, neck, back, abdomen, hips, extremities;*

Due to its general sanative effect the cryosauna gives a great synergetic support to

all the cosmetology technologies, without exception. By means of microcirculation boosting, metabolic processes optimization, strengthening of skin turgor, general cryotherapy favors a considerable improvement of exterior esthetic look of the skin, bringing it to the state of "milk and roses".

- *The cryosauna is prescribed in the regime 150-180 sec., at least 20 sessions for a course (not less than once in 6-12 months), once per day.*

- For problem skin, seborrheic symptom complex and rosacea (comedos, acne, dandruff, oily skin and so on) the ACT is to be used in clinical variant

- *General ACT is prescribed in the regime 180 sec., with the course of at least 10-20 procedures, once per day or every other second day.*

Body correction, cellulite and excessive weight control

- The cryosauna makes the body lose a lot of energy. Depending on the body weight and the temperature in the cabin during one session a patient loses from 1,000 to 3,000 kcal. It has been observed that in certain cases the patients who undergo intensive general aircryotherapy lose 7 to 10 kg during the course made of 20-30 procedures.

- With the purpose to lose weight the general ACT may be prescribed only in combination with rational and calorie-balanced diet. The calories supplied with food shouldn't exceed 500-700 kcal.

- The attending medical doctor should take into consideration motives, will-power of the patient and apply his suggestive abilities for their strengthening, based on the axiom: "Achieving harmony between the weight and individual body constitution is the product of modern medical technologies but keeping it stable and staying in harmony is the result of the patient's life style".

- *The cryosauna for cellulite and excessive weight control is to be prescribed in the regime 180 sec. per session, 20-30 sessions for a course, once per day. Number of courses should be determined by the attending medical doctor (but at least 2-4). Intervals between courses shall be no more than 1 month.*