CRYOGENIC PHYSICAL THERAPY

Cryogenic physiotherapy – medical and generally therapeutic procedure based on the short-term contact of the skin surface with the gas cooled to the temperature of -180ºC to -120º C. The duration of the contact is considerably important. Since the skin surface has to be cooled to the temperature low than 0º C (32º F) for at least 90 sec., the time of the therapeutic treatment should last from 2 to 3 minutes.

The procedure consists of a person immersing up to the neck into the gas (atmosphere) cooled to –130º -180º C. The temperature and the length of the procedure are selected depending on the characteristics of the skin. The procedure affects only the thin layer of skin where thermal receptors are located, while the rest of the body does not experience a substantial overcooling.

Cryogenic physical therapy provides an intensive stimulation of the immune and endocrine systems, increases the endorphins level in the blood, and blocks painful sensations of any origin for hours. Therefore, the whole body experiences a positive therapeutic impact. It also promotes the improvement of peripheral and micro-blood circulation, and consequently, a release of hormones from adrenal glands and hypophysis. The cooling process affects no more then 5% of the body, i.e. the parts that safely endure the variations of temperature. Thus, cryotherapy works as a certain stimulation of the body without exhaustion of its resources.

The most commonly shown effects of the cryotherapy are analgesic, anti-swelling, anti-inflammatory, relaxing, and overall rejuvenating, which as a combination, have a profound health improving impact that cannot be overestimated. The stimulation of skin receptors and the cooling of the skin surface are so rapid and extreme that the body response is not directed as much towards thermal regulation, as to activating the adaptation mechanisms, including hypothalamus, hypophysis, nervous, adrenal, immune, and other systems. Without interfering with the main functional mechanisms of the body, a short-term exposure to cryogenic temperatures triggers a chain of physiological reactions responding to all phases of (thermal) stress, which in its turn, activates all physical reserves of the body.

The universal qualities of cryotherapy make it favorable for use as a pathogenic defense treatment within many medical fields, i.e. general therapy, surgery, rheumatology, arthrology, dermatology and cosmetology, gynecology, andrology, stomatology, and possibly, in oncology and psychiatry. General cryotherapy is considered an instrument for medical rehabilitation after almost any illness. According to experts, this physiotherapeutic technology can serve as a universal homeostasis-modulating health treatment and can be used as follows:

- during treatment of chronic metabolism, endocrine, autoimmune diseases, and immune deficit;
- during treatment of arthritis and radiculitis;
- during various allergic conditions, including asthma, variations of pollen fever, contact dermatitis, etc.;
- during treatment of nervous system disorders, such as neuroses, insomnia, migraine, etc.;
- after serious somatic diseases, traumas, depression, chronic fatigue syndrome, etc.;
- in sports training camps, to help sportsmen achieve the best physical condition; also as an effective rehabilitation procedure after significant physical exercising, and as a method of increasing tolerance to emotional and physical stresses; as medical or preventive treatment, to help the body mobilize all of its important systems to function at the highest level;
- for enhancement of physical health condition in general.

Contraindications to the general cryotherapy

- critical condition of the patient;
- acute decompensation with chronic cardiovascular diseases;
- a hart attack and rehabilitation after a heart attack;
- brain strokes;
- hypertension – stage II (blood pressure of 180/100 mm Hg or higher);
- a heart failure;
- heart rhythm disorders;
- fever;
- Tuberculosis;
- malignant tumors;
- Hemorrhagic diathesis;
- Hysterical Neurosis (Anxiety Disorder);
- Individual intolerance to cold.

In order to maximize the effect of cryogenic physical therapy a number of rules and principals should be followed.

The first principle concerns a gradual approach to intensifying the procedure.

The second principle recommends a systematic approach and consistency. The method principles should be closely followed, including the length and number of sessions, temperature, etc. A course of cryotherapy treatments is more effective and beneficial than occasional sessions. At the same time, too long or shot sessions would not have the same therapeutic effect and sometimes can be harmful.

The third principle suggests a careful consideration of an individual's body needs and conditions.

Description of the general cryogenic physical therapy method

The procedure should take place in a specially equipped area divided into a changing room and the sauna cabin.

During the procedure, an individual is located inside of a thermo-insolated cabin enclosed around the perimeter and open above. The cabin is equipped with an airtight door used for entrance/exit. It is also equipped with a forced flow ventilation system for the removal of the cryogenic gas.

While the procedure takes place, the air temperature inside the cabin should be kept between -130º C and -180ºC. It takes 30 sec. for the system to achieve the proper operating conditions. The length of the daily sessions starts with 30 sec. per session, with the subsequent addition of another 30 sec. for every other session until reaching the length of 3 minutes at a time. The course consists of 8 to 10 sessions.

Usually there are no any adverse effects caused by the procedure. The sudden redness of skin surface experienced by some individuals at different time after the procedure should not be

considered as a complication but is an indication of hyperemia (or increase of blood flow). Occasionally a cold-induced urticaria (a mild allergic reaction) may appear.

Steps of the procedure

1. Before the procedure, a short resting period of 10-20 min. is recommended to the individual in order to help the body to adapt to the conditions inside of the room, and to allow the sweat glands function to be stabilized.

2. A member of medical stuff should examine the patient, check the blood pressure, the pulse, and conduct the orientation informing the individual about the procedure and the behavior rules inside of the cabin.

3. The patient enters the cabin undressed, leaving underwear on.

4. Socks and mittens should be worn in order to avoid a cold-related injury.

5. During the session a medical technician should maintain a constant contact with the patient to monitor his/her condition and prevent an episode of asphyxia that may take place, due to a high level of nitrogen present in the inhaled air.

6. The procedure is carried out with the cabin door tightly closed. After the individual takes the correct position inside the cabin (with the head above the top rim of the cabin), the cryogenic gas is released.

7. After the procedure is finished, the individual can dress up slowly and rest for about 10 minutes.

The practical use of cryophysiotherapy allowed to accumulate a substantial experience that helped to select positive results applicable to certain conditions.

Our research was conducted utilizing Cryosauna “Space cabin”. A wide operating range of this model allows to customize the treatment parameters and makes individual adjustments, depending on the diagnosis, physical condition, and age of a patient.

During the research, the course of cryotherapy was taken by 138 people. All patients experienced a health improving, invigorating effect. One patient had to stop the course, due to the cold allergy reactions.

The most accurate data recorded pertains to the following health conditions:

- post-surgical rehabilitation (23 patients)
- obesity (32 patients)
- neurosis, migraine, insomnia (17 patients)
- sexual disorders, decrease of libido (15 patients)
- rheumatoid arthritis (5 patients)
- sports traumas (45 patients)

Case study as applicable to each condition

Post-surgical rehabilitation – A woman, age 37, after cholecystectomy.

Medical condition – stable, complains of the pain around the surgical sutures, general weakness, and digestive problems (constipation).
The course of cryophysiotherapy started on the 7th day after the surgery. It consisted of 10 nitrogen exposure sessions, starting with 2 sessions for 1 min. each at the temperature of -130º C, and subsequent sessions for 2 min. each at the temperature of -150º C.

After the 3rd session, the patient noticed improvement of general physical condition, sleep, and appetite. The soreness around the sutures area substantially decreased after the initial sessions. The process of tissue regeneration was normal, without complications. The digestive functions were stabilized (without medication). By the end of the course, the pain in the scar area was gone; the general physical condition became normal.

Obesity – A woman, age 30, obesity, stage 2. Weight – 92 kg. Blood pressure – 150/90 mm Hg, pulse – 90/min. Total body fat percentage – 32%.

The course of cryophysiotherapy consisted of 20 hydrogen exposure sessions, starting with 2 sessions of 1 min. each with the temperature of -130º C, and subsequent sessions of 2 min. at the temperature of 160º C.

After the course was complete, the general physical condition of the patient improved. Weight – 82 kg. Blood pressure – 135/80 mm Hg, pulse – 72/min. Body fat percentage – 21%.

Neurosis, migraine, sleep disorders – A woman, age 43, complained of insomnia, irritability, and frequent headaches. Blood pressure varied from 125/75 mm HG to 155/90 mm Hg, pulse – 110/min.

The course of cryophysiotherapy consisted of 12 hydrogen exposure sessions taking place 5 hours before bedtime. The initial 2 sessions lasted for 1 min. at the temperature of -130ºC, and subsequent sessions of 2 min. with the same temperature.

After the course was complete, the patient noted the improvement of sleep, mood, and general physical condition, as well as decrease of irritability. Blood pressure stabilized at 130/70 mm Hg, pulse – 78/min.

Sexual disorders, libido decrease – A man, age 40, complained of lack of erection, irritability.

The course of cryotherapy consisted of 15 hydrogen exposure sessions, with 2 initial sessions of 1 min. at the temperature of -130ºC, and subsequent sessions of 2 min. at -140ºC.

At the end of the course, the patient noted the improvement of the sexual function, mood, and irritability decline.

Rheumatoid arthritis – a man, age 62, complained of joint pain in hands and knees.

The course of cryophysiotherapy consisted of 20 hydrogen exposure sessions. Two initial sessions of 1 min. each at the temperature of -110ºC, and subsequent sessions extended to 2 min. at -130º C.

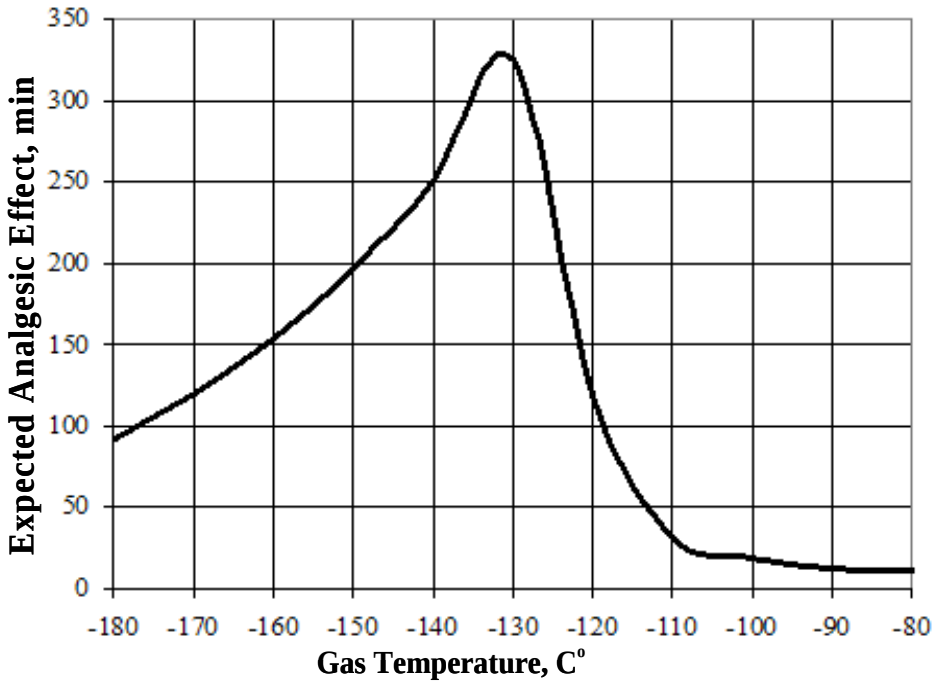
During the initial sessions, the patient noticed a decrease of joint pain. A positive dynamics regarding the joint movements was observed.

Sports traumas – A man, age 25. A partial tear of the anterior talafibular ligament of the right ankle-joint, swelling of the subcutaneous fat tissues, sharp pain, and restriction of movement; pronation and supination are impossible.

The course of the cryophysiotherapy consisted of 10 hydrogen exposure sessions. Two initial sessions of 1 min. with the treatment temperature of -130º C, and subsequent sessions of 2 min. each with the temperature lowered to -160º C.

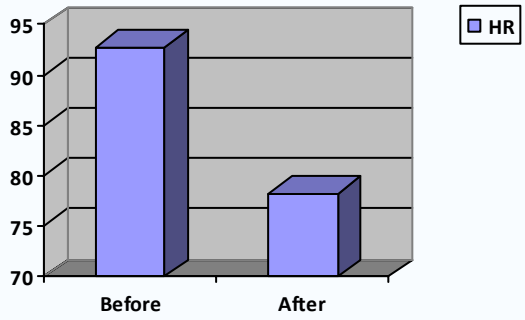
After 4 sessions, a positive healing dynamics was noted, including decrease of pain and reduced swelling. By the end of the course, there was no movement restriction in the ankle-joint.

The most apparent result of the cryogenic physical therapy is its prolonged analgesic effect.

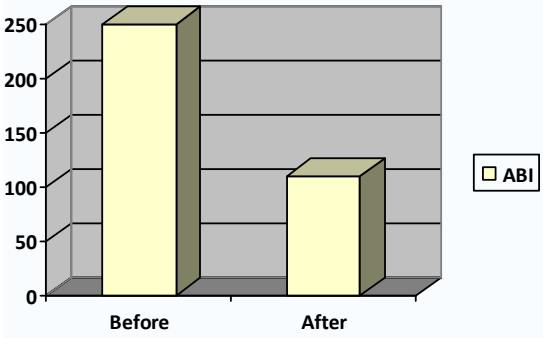


The correspondence of the analgesic effect (min.) to the change of temperature (degrees C).

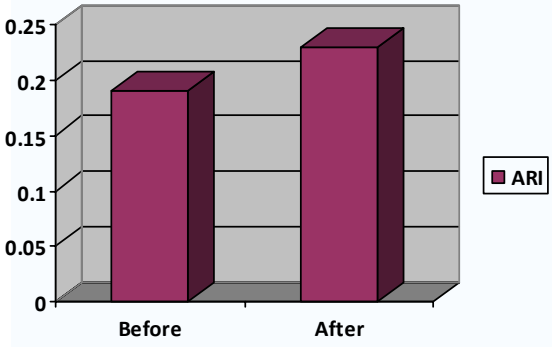
The cardiac rhythm variability parameters (rhythmograms) in all patients were recorded and analyzed utilizing the digital analyzer of biorhythms “Omega-M”.



HR – Heart Rate .

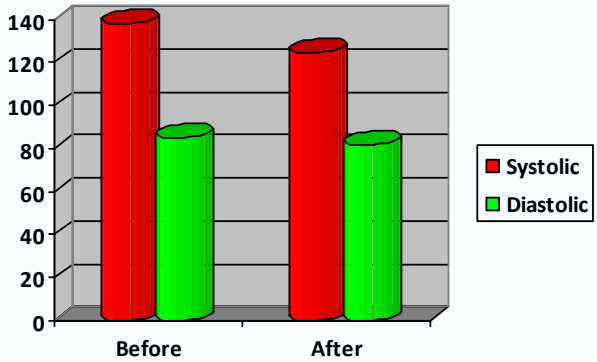


ABI – Autonomic nervous system Balance Index



ARI – Autonomic nervous system Rate Index

BP– Blood Pressure



Cryophysiotherapy was conducted in combination with medical treatments prescribed by the doctors. Based on our observation and research, we concluded that it made a positive impact on the physical health condition of the patients in general and accelerated the healing processes. The effect of medical treatment combined with cryophysiotherapy always exceeded expectations.

Analysis of each example shows that its application increases humoral and cellular immune responses and elevates the interferon level. After some time positive changes in the blood take place: the red and white blood cell counts increase, coagulation decreases, and arterial oxygen saturation becomes better. This stimulates the functions of cardio-vascular and other regulatory body systems.

Taking into consideration all of the positive effects listed above, it becomes clear why the “cryo” treatments have lately become so popular and widely used.