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1. Hydrothermotherapy: history, definition, mechanism of action on the body's organs and functions.

Hydrotherapy includes a series of procedures that use plain water (hot, cold, steam, or ice) or with additions (chemicals, gases) in external treatment, to improve various physiological conditions or to treat disease.. Simple water can be used in three states of aggregation: liquid, solid or gas. Common forms of hydrotherapy include: Whirlpools, Jacuzzis, and hot tubs are commonly used by a physiotherapist to improve the condition of a patient affected by muscle and joint pain.

The external cure is the basic treatment for diseases of the locomotor system, the nervous system, the genital system and the skin. The treatment is applied in valves or basins fed with plain or mineral water. The use of mineral water in external treatment is called balneotherapy.

The thermality of the bath water is corrected either by heating or cooling. Baths with mineral water or plain water act on a large surface of the skin. The skin, an organ endowed with nerve endings and a very rich vascular network, is the place for triggering numerous reflex actions, the result of which is the modification of the function of several organs and systems, primarily the function of the cardiovascular system. So the action of the baths is a general action on the body as a whole, this general effect being mediated by a series of reflexes triggered by the bath through the thermal, mechanical and chemical factor. The last factor acts when the water is mineral or when different substances have been added for therapeutic purposes.

A detailed written description of the baths was compiled by the Greek historian Herodotus of Halicarnassus in the 5th century BC. e. He assumed that the first baths appeared among different peoples almost simultaneously, some of the first to introduce the bath cult were the Egyptians. These baths acted as medical institutions, since ancient Egypt many diseases were treated with water. Egyptian papyri contain many recipes that helped women and men get rid of the signs of aging. Baths were the main means of rejuvenation and healing. The Greeks, in turn, adopted many models for arranging bathrooms.

By hydrotherapy is meant the application for prophylactic and therapeutic purposes of a very varied number of procedures, which are based on water at different temperatures and under different states of aggregation (solid, liquid, gaseous), as well as other procedures, technically closely related to it .

Thus, apart from procedures that use plain water, as happened at the beginning of hydrotherapy, today procedures that use some ingredients such as: carbon dioxide, sulfur dioxide, hydrogen sulphide, various seed extracts, plants are included in this field medicines and chemicals.

Some thermal procedures such as: hot air, light, mud, paraffin, whose application technique is closely related to water procedures, are also part of hydrotherapy, which in this way widens its scope even more, getting the name correct hydrothermotherapy.

The most active factor that comes into consideration in hydrotherapy is the thermal factor, to which is added, in some procedures, the mechanical factor and, to a lesser degree, the chemical factor.

These factors influence the numerous nerve endings in the skin, and the reflex impulses that arise reach the centripetal pathways to the central nervous system, from where the various responses spread throughout the body via the centrifugal pathways.

Hydrotherapy is a tool of medical rehabilitation. The history of hydrotherapy as a treatment method dates back thousands of years. The first time hydrotherapy was used is unknown, but it was

reported to be in use as early as 2400 BC. by proto-Indian culture as sanitary facilities, and also Egyptians and Assyrians used mineral waters for curative purposes.

Homer reported the use of warm water to promote wound healing, reduce fatigue, and combat depression and low spirits.

The use of baths in hydrotherapy has been known in the Mediterranean since ancient times. In particular, the Greeks used thermal waters, a fact demonstrated by numerous archaeological discoveries. The Greeks were the first to appreciate the relationship between mental and physical well-being. Bathing in hot waters was valued by the Greeks primarily because they believed in their divine nature. It is not by chance that temples were built in the areas of thermal springs, such as the Temple of Apollo in Delphi or the Temple of Olympus. Despite the fact that ancient peoples were wrong about the origin of thermal springs, they were right about one thing: the water from them really has a positive effect on the human body. The benefits of thermal springs and mineral waters in his treatise "The Use of Fluids" brought praise to Hippocrates.

Greek baths from the beginning of their origin were called "laconicums", from the city of Laconic, from where the bathing procedures spread throughout Greece.

It is impossible not to mention the baths of Herod - the king of Judah. His most famous building was the North Palace built in Masada. The baths at Masada were decorated with mosaics and marble and were strikingly luxurious. They consisted of a dressing room, a pool room (also called a cool room), a warm room and a hot steam room (caldarium) with a double floor. The layout of the Kaldariya room itself is somewhat similar to a modern Finnish sauna. The king also had a special room to anoint the body with healing oils and incense.

In ancient Rome, baths appeared after the Greek model of baths, they were called thermae (an old bath in Greece, in large houses). The first baths in Rome were built by the emperor Agrippa (25-19 BC) and handed over to the Roman population for use.

The Romans created an order of baths ranging from caldarium, tepidarium to frigidarium. Baths were used for intellectual, recreational, health and hygiene purposes. The Roman Emperor Andrian expanded the culture of visiting thermal baths. He was the founder not only of the mass construction of public baths, but also the founder of the standard construction of public buildings. The heating methods and systems of his thermal baths are still admired by modern specialists. Water supply systems at different temperatures for swimming pools are striking in their complexity.

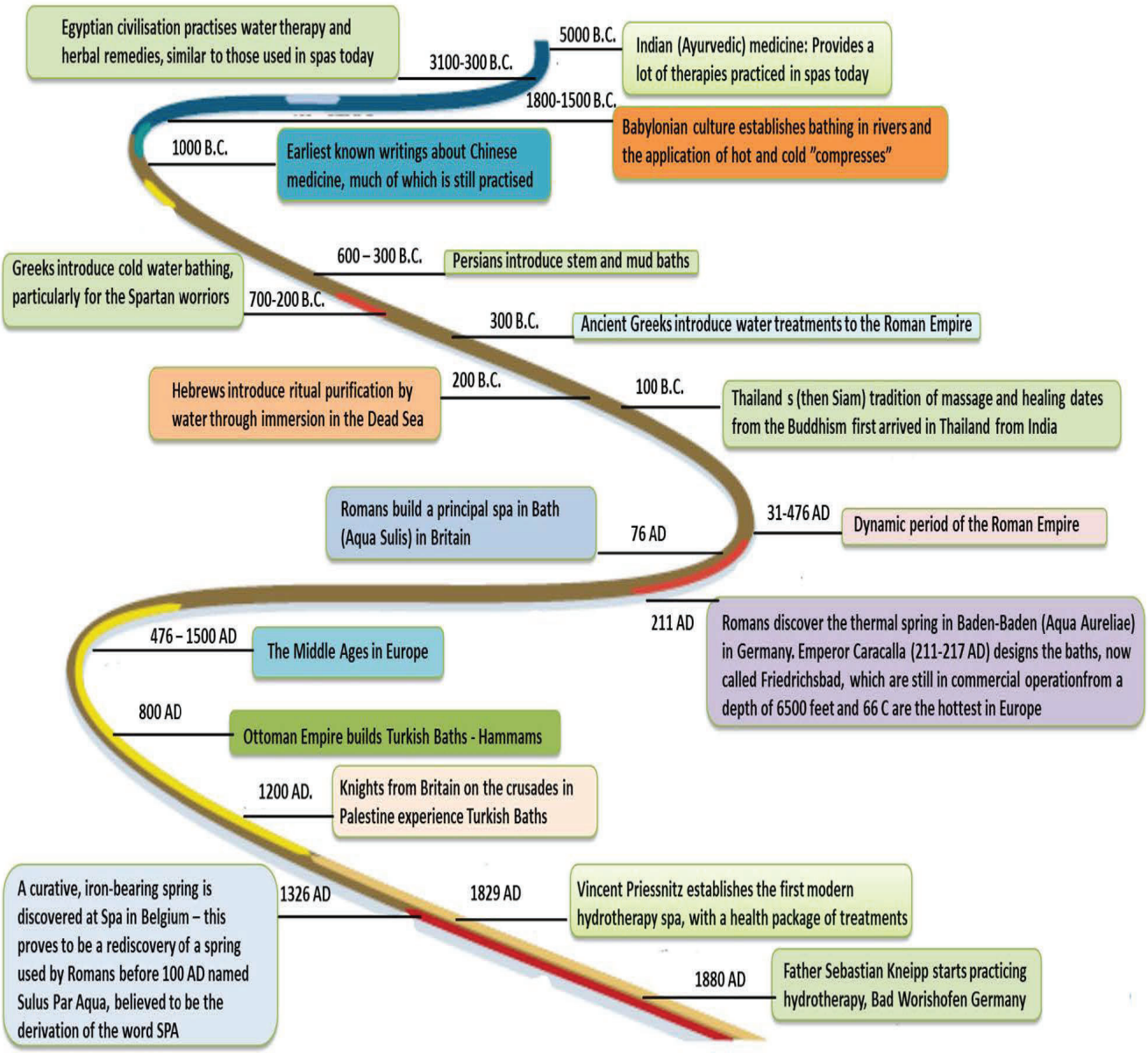
The most famous thermal buildings that have survived to this day are the Baths of Caracalla and the Baths of Diocletian. Looking at these buildings, it is easy to imagine how many famous personalities rested in the baths: Pliny the Elder, Catulus, Vitruvius, Tibulus, Titus Livius, Horace, Martial and other prominent figures. The latter, by the way, dedicates a number of his epigrams to the terms. It is worth noting that, despite the big names mentioned above, the cost of visiting the baths was not very high. So, they were available to all the inhabitants of the Roman Empire.

Diocletian's Baths are a structure that architecturally repeats the forms of the entire city. It was built in ancient Rome and served as a bath. The Baths of Diocletian, whose construction was completed in 303 AD, occupied an area of 13 hectares and could accommodate 3 thousand people at a time. In addition to pools of hot and cold water, there were rooms for philosophical debates, a library, an amphitheater, and gardens with fountains and pavilions around them. The Baths of Diocletian have survived to this day in a fairly intact form, undergoing, however, reconstruction in 1566. One of the circular rooms was rebuilt in the Church of San Bernardo alle Terme.

Diocletian, as one of the ancient Roman emperors, dreamed of delighting his guests with luxurious festivities. At the end of the 3rd century AD fun events, lavish celebrations and absolutely any entertainment one could think of were concentrated. And for the curious, it was possible to

communicate in the libraries that were located right there. Diocletian's baths were built in such a way that the water was heated by the warm rays of the sun and, where needed, remained cold.

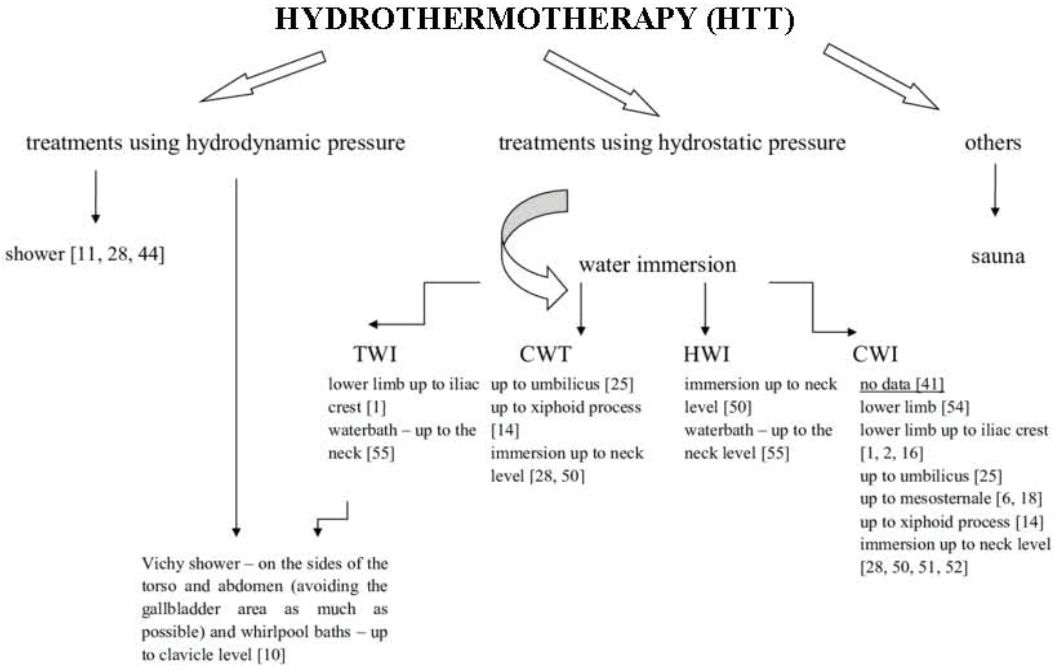
During the empire, the baths were open to men as well as women and children, and even a very modest payment in a quadrant was sometimes covered by the generosity of the emperor or a wealthy man who could bear the entire cost of visiting the baths for a period from one day to one year. Romanians went to thermal baths to meet others, take walks and chat, some to play ball and other games, others to experience more intense physical activity such as wrestling or to watch others they also do it, of course, to get something cool in the summer and warm in the winter. The cold baths were in the frigidaria - the cool room of the bath house; there was also a warm room, or tepidarium, as well as a heated room, a caldarium, which had warm baths and hot steam to induce perspiration, as in our modern Turkish baths... The room was even hotter, laconic, used mostly by patients. Heat was provided by a raging fire under the floor, lit by the slaves, using a lot of wood. Today hydrotherapy is used in recovery from neurological, rheumatic, obstetrical, sports, pediatric and musculoskeletal problems.



Definition of HYDROTHERMOTHERAPY (HTT)

Hydrothermotherapy represents the methodical and scientific application of procedures that use water at different temperatures, pressures, different states of aggregation (solid, liquid, gaseous), applied directly or through materials (compresses, packs, brushings) for prophylactic, curative or of recovery. There are techniques that use together with water various ingredients - medicinal plant extracts, therapeutic gases, chemical substances

Hydrotherapy, like the other branches of balneophysiotherapy, is a non-specific therapy, with the help of which we can obtain either the same response to different procedures, or different sometimes opposite reactions, to one and the same procedure, depending on the dosage of the stimulant and the reactivity of the patient.



Note: TWI – thermoneutral water immersion; CWT – contrast water therapy; HWI – hot water immersion; CWI – cold water immersion

Classification according to the values of the thermal stimulus:

1. HYDROTHERMOTHERAPY of INDIFFERENCE: thermal values of 34-35°C, being close to skin temperature, do not constitute an excitant that triggers thermoregulatory reactions;

- the sensation of hot or cold is not signaled;
- the general effect is to put to rest, sedation;
- indicated in neuro-vegetative disorders

2. WARM HYDROTHERMOTHERAPY: thermal values above 35°C, the thermoreaction is directly proportional to the difference of 1°C between the water and the skin;

- Thermoregulation mechanisms are triggered in the sense of thermolysis, training the body's important functions (circulatory, respiratory); physiological process by which the body gives up surplus heat to the environment: evaporation of sweat on the body surface
- Temperatures of 37 - 38°C are used in general treatments - baths for curative and recuperative purposes
- Temperatures above 38°C to 40 - 44°C for water and 70 – 80 - 100°C warm air, light bath, are overload procedures.

3. **COLD HYDROTHERMOTHERAPY:** thermal values below 34°C - use the cold (applied on unheated integuments) and contrasting (warm - cold) thermal exciter, to which the mechanical exciters are associated. Examples: fusions, frictions, walking through water, etc.

- It is applied on limited skin surfaces.
- It is indicated for prophylactic purposes, ultimately improving the adaptive processes of the body to the thermal variations of the external environment and the predisposition to venous circulation disorders, it is indicated for the purpose of hardening the body and correcting functional, circulatory, constitutional disorders, of venous circulation disorders.

The action of hydrotherapy on the body is due to the thermal, chemical and mechanical factor. Among them, the thermal factor has the most important role.

The physical basis of hydrotherapy

Water is the indispensable physical medium in hydrotherapy, the properties of which depend on the character of the thermal stimulus and the degree of influence it has on the body, and the most important are:

- *high thermal capacity* – the amount of heat required to heat one kilogram of water by one degree (1 large calorie) is sufficient to heat by one degree 33 kg of mercury, 8 kg of iron, which proves the superiority of the calorific capacity of water over the two media, which means that large amounts of caloric energy can be transported with small amounts of water;
- *high thermal conductivity* – by this is meant the ability that water has to transmit caloric energy (in a unit of time water gives up or receives a large amount of heat), compared to air, water has a thermal conductivity 25 times higher, which explains why at a temperature of 50° C, water applied to the skin causes burns, while dry air is supported even at over 100° C;
- *indifference temperature* – is conditioned by the first two and is the temperature of an external physical environment which, on the body, does not give the sensation of cold or warm, depends on the properties of the physical environment and the temperature of the skin, is 34° - 35° C and is conditioned by the state of nutrition of the body and the irrigation of the skin.

To establish the temperature of indifference, we must take into account the consecutiveness of the thermal action, in the sense that after a hot bath, the bath at the temperature of indifference gives the sensation of cold and vice versa, after the cold bath, the bath at the temperature of indifference gives the sensation of warm.

Table 1. Specific gravity, heat capacity and heat retention capacity of physical media used for therapeutic purposes

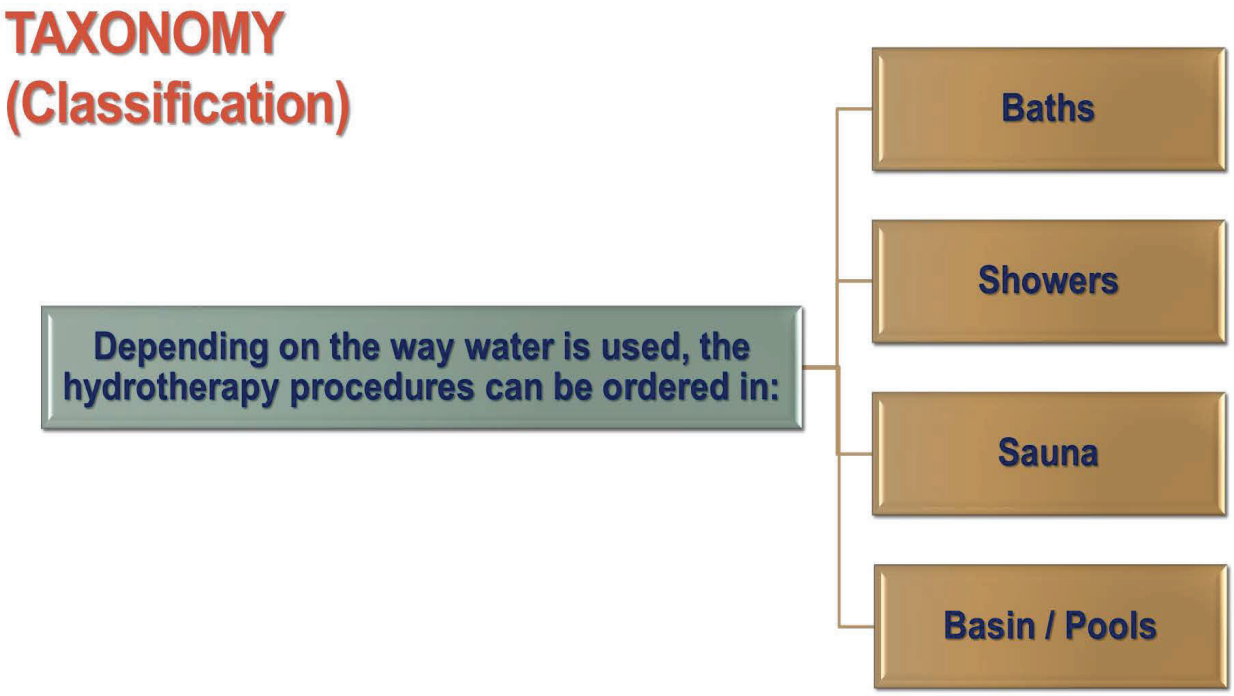
The physical environment	Specific gravity	Caloric capacity (calories)	Thermal conductivity	Heat Retention (seconds)
Water	1	1	0,00148	-
Sapropelic mud	1,20 – 1,60	0,800	0,00179	450
Peat	1,05 – 1,15	0,790	0,00108	800
Clay	1,40 – 1,70	0,420 – 0,740	0,00183	380
Paraffin	0,9	0,775	0,00059	1120
Ozokerite	0,9	0,797	0,00038	1875

âHydrothermotherapy procedures - classification

Hydrotherapy, like the other branches of balneophysiotherapy, is a non-specific therapy, with the help of which we can obtain either the same response to different procedures, or different sometimes opposite reactions, to one and the same procedure, depending on the dosage of the stimulant and the patient's reactivity.

Taking temperature as a criterion, we can divide hydrotherapy into 3 branches:

- cryotherapy or cold therapy, which uses temperatures below 0°;
- actual hydrotherapy, which uses temperatures between approximately 5 - 42°
- thermotherapy, which includes procedures located between 45 and 80°.



CLASSIFICATION OF THERMOTHERAPY PROCEDURES

From the point of view of the applied vector, thermotherapy procedures are divided into:

- wet procedures (hydrothermotherapy) that use water as a vector and which represent the largest part of thermotherapy: compresses, wraps, baths, showers, etc.
- dry procedures, which use vectors with lower conductivity than water: paraffin, mud, air, light, sand.

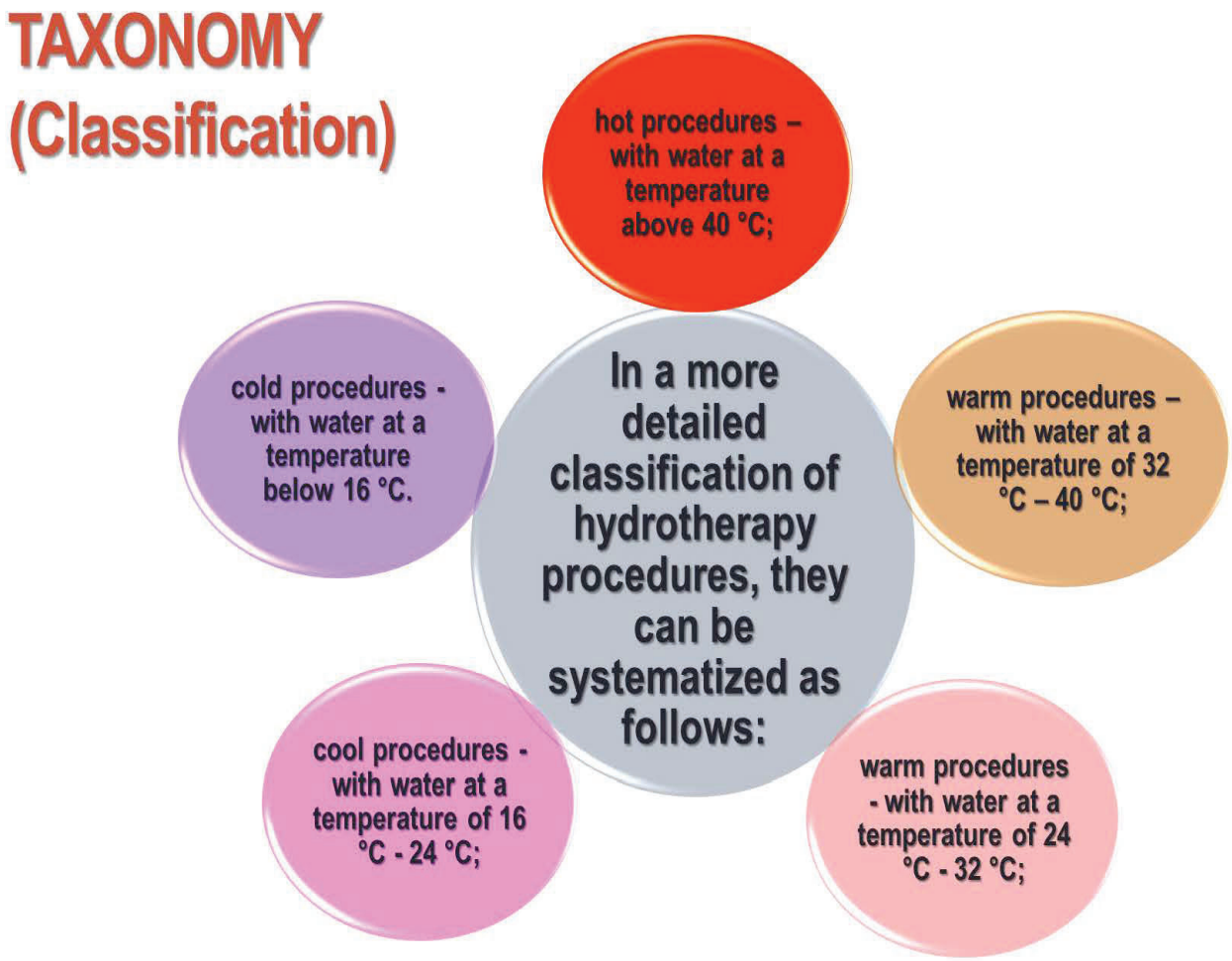
From the point of view of the surface on which the procedure is applied:

- local procedures; on limited body surfaces: compresses, poultices, local baths
- partial procedures, on larger areas of the body or on halves of the body: wraps, partial baths, partial paraffin applications, alternating baths
- general procedures, at the level of the whole body

From the point of view of the temperature used, thermotherapy procedures are divided into:

- cryotherapy procedures, which use temperatures below 0°C
- cold procedures which in turn are divided into proper cold procedures, with temperatures up to 20°C and cool procedures, with temperatures up to 32°C

- warm procedures, which cover the temperature range between 36 and 45°C. The most used forms of thermotherapy in this group are warm baths with temperatures of 36-37°C, hyperthermic baths of 38-39°C and intensely hyperthermic baths of over 40°C
- actual thermotherapy procedures - which use temperatures between 45-80-100 °C. This includes paraffin, mud or sand applications, light baths, sauna
- alternating procedures, which use the alternative application of hot and cold, mainly to stimulate microcirculation. These procedures can, in turn, be local, partial or, less often, general and use the different application temperatures of the thermal vectors
- ascending procedures, in which the temperature of the vector is gradually increased and which are used, in particular, for hardening the body.
- Contrast therapy procedures



A special place is represented by conversion thermotherapy, which uses the conversion of other forms of energy into heat, such as infrared light, high-frequency electric current or ultrasound.

Depending on the degree of penetration of caloric energy into the tissues, two types of thermotherapy are described: deep (diathermy - caloric effect at 3.5-7cm in depth) and superficial (paraffin applications, light lamps, hydrothermotherapy applications, etc.).

2. Mechanisms of action of hydrothermotherapy on the body's organs and functions.

Core and shell theory. Thermoregulation

The nucleus (core) represented by the thoracic, abdominal and brain internal organs, gives the body's central temperature of 36-37.5°C, which is constant (sublingual, tympanic, rectal, intravaginal) through the permanent control of the hypothalamic centers, so that we say that in this area the human body behaves homeothermically. In the periphery (mantle, shell), represented by the muscles, vessels and integuments of the upper and lower limbs, the temperature varies depending on that of the environment (poikilotherm behavior). The central area of the body (trunk, abdomen, head) has a constant determined temperature, while that determined by the skin in the peripheral area varies between 33-34°C (integument in the calf-knee area) and 36.5-37°C in axillary determination . These variations within the mentioned limits have no pathological significance, but show the good functioning of the feed-back and neurovegetative mechanisms that maintain the balance between thermogenesis and thermolysis. The physiological variations of the body's peripheral temperature must also be interpreted according to age, sex, race, circadian and sleep-wake rhythm, the temperature of the ambient environment, the physiological state of the body at the time of determination. The difference between the central area and the peripheral area can be 3-5°C and is called caloric deficit or internal thermal gradient. The difference between the external area of the body and the surrounding environment can sometimes be important and is called the external thermal gradient.

The functions of the shell are:

1. Thermal buffer - the thermoregulatory behavior depends on the typological character, the efficiency of individual circulation, age, respiratory rate, movements, clothing, microclimate resulting in peripheral poikilotherm and central homeotherm behavior.
2. Variable thermal insulator (the shell protects the body against thermal excesses and maintains a constant core temperature).
3. Adipose tissue layer switch.
4. Thermal caloric receptor.
5. Effector organ of cooling.

Under the action of the cold stimulus, the skin temperature drops suddenly during the first minute, in the next two minutes it continues to drop but less, and after that it remains at the same level, the restoration is done quite quickly, generally after 20' - 30' the temperature approaches the initial one. The biggest increase is recorded in 1' - 2', after which a slow and gradual rise in temperature is observed.

Under the action of the warm stimulus, the skin temperature rises, the most important rise occurs in the first minute, in the following minutes there is even a decrease in temperature, and after the removal of the warm stimulus, the temperature returns to normal, the more marked decrease being in the first 2'. The temperature increase in the tissues is all the faster the more superficial the tissue, the less represented the adipose layer, and the more deficient the blood supply.

The cold stimulus causes the appearance of histamine in the skin, and the warm stimulus causes the appearance of acetylcholine.

The release of acetylcholine in the tissues is done under the action of an increased tone of the parasympathetic, while cold procedures would act in the sense of an increased tone of the sympathetic.

Thermal applications - thermotherapy

Thermotherapy is a treatment method, which uses as a therapeutic agent the thermal factor transported by various vectors: water (at different temperatures, in various states of aggregation), light, air, paraffin, mud, sand. It is part of the medical recovery methods, along with: electrotherapy, mechanotherapy, kinetherapy, balneotherapy, climatotherapy, massotherapy, pneumotherapy, etc. The therapeutic response, difficult to quantify, can be the same for different procedures or different for the same procedure, in different patients, depending on the dosage of the thermal factor and the reactivity of the patient.

The objectives of thermotherapy are:

- rebalancing the physiological links of thermoregulation
- increasing the body's specific and non-specific immune defense capacity by shaping the body's reactivity to the environment
- combating the physiopathological mechanisms of various ailments, especially of the myoarthrokinetic apparatus
- "hardening" of the organism, by increasing the possibilities of rapid adaptation to environmental temperature variations.

The effects of applying the thermal factor on the body are:

1. Improving the efficiency of the structures of the myoarthrokinetic apparatus by: increasing the efficiency of muscle contraction, increasing the circulatory flow, increasing the elasticity of muscle fibers and collagen and increasing the elasticity of periarticular structures.
2. Superficial and deep vasoactive effect
3. Training thermoregulation mechanisms by using contrasting thermal factors
4. Analgesic effect, both directly, by decreasing the sensitivity and excitability of neuromuscular spindles, and indirectly, by improving circulation, by decontracting and antispasmodic effect and by resolving inflammation.

The effects of local application, on limited areas, of the thermal factor are: decontracting, muscle relaxant, antispasmodic, analgesic, vascular-active, anti-inflammatory, resorptive.

The functions of the skin with a major role in the effects of Hydrothermotherapy:

- Reception of thermal excitations
- Contribution to the thermoregulation process
- Influences the hydro-mineral metabolism - through sweat secretion that can reach 1-3 liters (sauna), favors the elimination of some metabolites or toxic substances from the body
- Production of chemical mediators or vasoactive substances (acetylcholine, serotonin, histamine, bradykinin), prostaglandins - involved in immunological defense
- Absorption of chemical substances or gases with local or remote action
- Regulation of the ratio between peripheral and central circulation
- The skin - the rich vascular network - can store up to 1/3 of the total amount of blood through the vasodilation given by warm procedures
- Through vasoconstriction - the cold procedures - the blood short-circuits the integumentary circulation (arterio-venous shunts) and reaches the central organs without getting cold
- Alternating procedures - vascular training - optimization of the circulatory regime and thermal homeostasis

The skin is the first organ influenced by hydrotherapy, its structure and functions explain the relations between the external environment and the internal environment of the body. The normal functions of the skin ensure the success of the reactions determined by hydrotherapy on the body, in turn hydrotherapy positively influences the trophicity of the skin.



The most important properties of the skin are:

- *to receive - through the rich integumentary neuroreceptor apparatus, the thermal excitations transmitted in the form of nerve stimulus on the afferent pathways, reach the brain and from there through the efferent pathways return to the effector organs determining vasomotor, secretory and trophic phenomena;*
- *to influence heat exchanges - the body gives up 80% to the environment through the integument, thus by intake or import of heat, with the help of a hydrotherapy procedure we can influence the general metabolism;*
- *to influence thermoregulation - through the function of the sweat glands that adapt to needs in the sense of increasing or decreasing water loss from the skin;*
- *to influence mineral exchanges - by eliminating mineral substances and acids found in the superficial layers, which is largely determined by the increase in sweat secretion, which in some procedures can reach up to 1-2 liters/day, from the body's entire water deposit, plasma, intercellular spaces, colloidal substances, skin, subcutaneous cellular tissue;*
- *to participate in immunity processes - through the wealth of reticuloendothelial tissue, the skin plays an important role in intermediate metabolism and immunological processes;*
- *to absorb certain gases and organic substances - such as carbon dioxide, radon that have local and general action;*
- *to influence the distribution of blood - through the rich vascular network the skin can absorb up to a third of the total blood mass when the vessels are in marked dilation, the hydrotherapy procedures depending on the temperature influence the relations between the peripheral and the central circulation.*

The skin is of decisive importance in the application of hydrotherapy procedures, both for immediate and long-term effects, therefore we must pay special attention to its condition, temperature, appearance and reaction to different stimuli. The skin is the mirror of the dermato-vascular reaction, which will guide us in directing and dosing the applied procedures.

Physiological bases of hydrotherapy

The actions of hydrotherapy on the body are due to thermal, mechanical and chemical factors.

The thermal factor

Under the action of the thermal stimulus, the temperature of the integument, the volume of the vessels, the speed of circulation and the capillary pressure change, the general vascular reaction is due to the excitation of the contractile elements of the vessels by means of the thermoreceptors, the reflex arc occurring at the level of the superior nerve centers and in the cerebral cortex.

Experiences with hot or cold thermal stimuli, on different regions of the body, specified the way in which the skin temperature is influenced.

The thermal factor influences: thermoreceptors in the skin; the temperature of the blood in the superficial vessels; the volume of the blood vessels, therefore their capacity, both for the vessels in the periphery and for the deep ones.

There is an important variation of the circulating blood mass, depending on the temperature of the surrounding environment; blood circulation speed; capillary pressure, the release of chemical mediators that intervene, at the level of the circulatory, neurovegetative system Thus: when cold, histamine is released with action on the sympathetic, and when warm, acetylcholine is released, which stimulates the parasympathetic.

Hyperthermia causes the release of mediators involved in the non-specific defense of the body, probably through the non-specific excitation of the subthalamic region (for example, hyperthermia in patients with superficial metastases allows obtaining short-term remissions in 2 to 5% of cases).

Cryotherapy (cold) applications can have the following effects: analgesia, muscle relaxation, decrease in inflammation, decrease in spasticity, decrease in metabolic activity.

Heat applications aim to achieve the following effects: analgesia, muscle relaxation, hyperemia, increased collagen elasticity, acceleration of metabolic processes.

Hydrothermotherapy procedures

A. Above the temperature of indifference - requires thermoregulation mechanisms, having a local effect: analgesia, vasodilatation, muscle relaxation, elasticizing, resorptive trophic

B. Below the temperature of indifference - cooling of the skin, with analgesic, muscle toning, anti-inflammatory effects. Role in tempering the body.

The mechanical factor. The mechanical stimulus, even if it takes the second place, is not a negligible factor and sometimes gives special characteristics to the procedure to which it is associated, which influences the body's response.

Mechanical actions related to hydrotherapy procedures are divided into:

• hydrostatic pressure, which acts mainly on the cardiovascular and respiratory systems, resulting in an increase in the work of the heart. The hydrostatic pressure acts simultaneously with the upward pushing action increasing the mechanical action, exerting itself on the compressive parts of the body, the cavities and the venous circulation and has as a consequence important changes on the circulation, breathing and metabolism.

• the pushing force of the body submerged in water, in accordance with Archimedes' law, which, on the one hand, allows the execution of physical therapy exercises in conditions of muscle deficiency, and on the other hand, increases the demand on the body through its attempt to counteract that force . The action of pushing up - the body submerged in a liquid according to

Archimedes' law leads to a decrease in its weight, thus a man with a weight of 70 kg, immersed in fresh water weighs only 7.9 kg, and in salt water he gains a weight negative of 2.8 kg, which explains why in the locomotor apparatus injuries, movements that can be performed in water, cannot be performed in air.

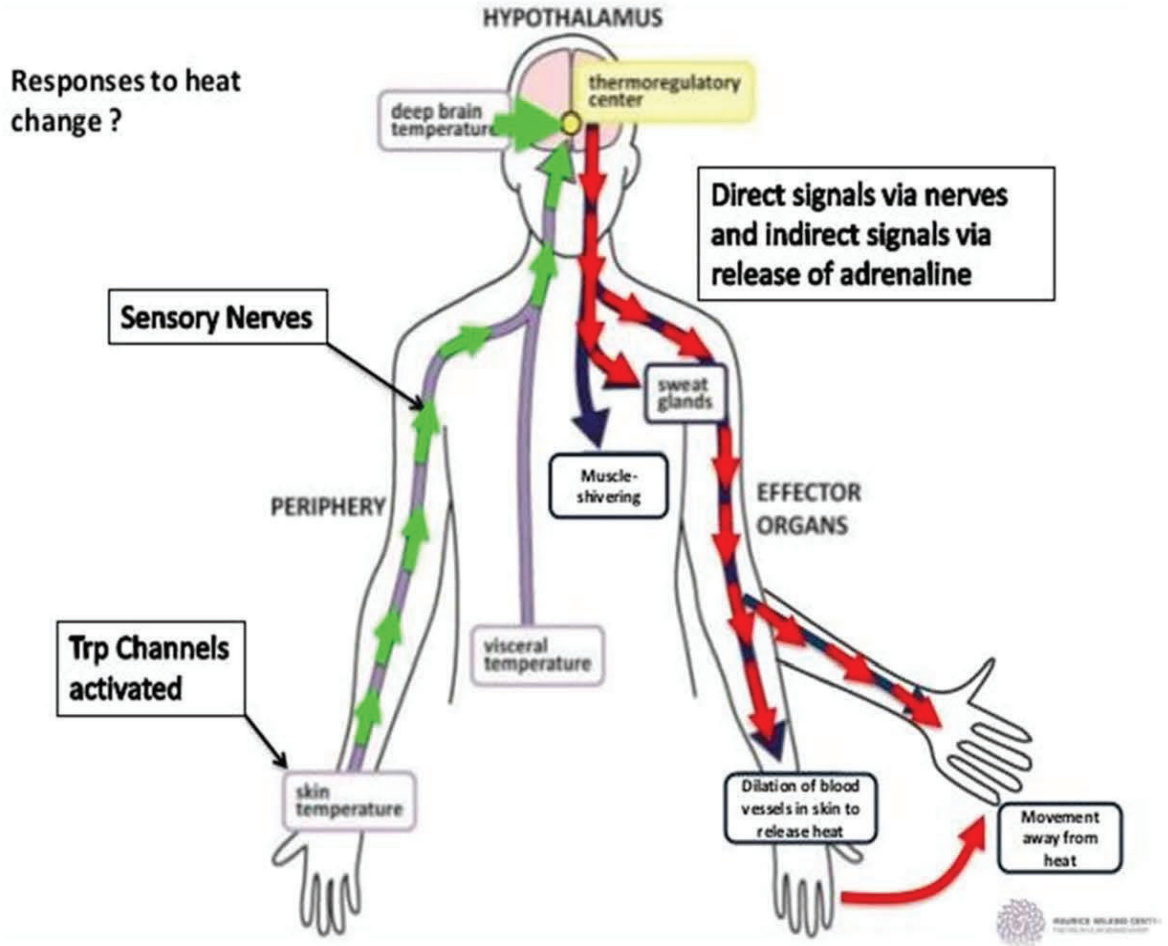
• auxiliary mechanical factors: showers, friction, brushing, gas bubbles, etc. added mechanical factors - this category includes a series of artificially performed maneuvers that favor, due to the strong vascular reaction, the use of procedures at a temperature 2° - 3° C lower, among them we mention artificial waves, continuous water flow, shower pressure, friction, brushing, air current and bubbles of different gases (air, carbon dioxide, oxygen).

The chemical factor

The chemical stimulant takes the third place and consists of the introduction of various substances into the water: decoctions of medicinal plants, various mineral salts, iodine, various medicinal substances. The chemical factor is optional, by adding medicinal plants, substances with an emollient, astringent, irritant effect, salt, iodine, gases.

The major contraindications of thermotherapy are:

- acute inflammation
- acute hemorrhage
- ischemia
- sensitivity disorders
- neoplastic diseases
- integumentary lesions - the role of integument verification
- blood disorders



THERMOREGULATION - the thermal behavior of the body

The constant maintenance of the core temperature is the result of the balance between thermogenetic and thermolytic processes. They are stimulated by the excitation of the thermal receptors, the Krause and Ruffini corpuscles, by the thermal stimuli (hot, cold) transmitted through the sensitivity pathways, regardless of their temperature and controlled by the hypothalamic centers.

Thermoregulation centers are located at the level of the hypothalamus. Thermogenesis (chemical thermoregulation) is carried out by redox-type cellular chemical reactions.

At rest and at an ambient temperature of 24 - 30°C (thermal neutrality), 70% of caloric production is provided by the viscera, i.e. through central thermogenesis, the rest being the result of peripheral thermogenesis. In conditions of physical exertion, calorigenesis is ensured almost integrated by the activity of the muscles. Even in the cold, thermogenesis is mostly achieved through muscle contraction, which can increase up to 20 times through thermal shivering and voluntary movement.

Thermolysis (thermogenesis, physics) is achieved through four physical processes: irradiation, conduction, convection and evaporation.

- Irradiation is defined as the process of heat energy transfer from hot objects to cold objects, without direct contact between them
- Conduction is the direct loss of heat through the contact between objects with different temperatures, at rest
- Convection represents heat loss in the surrounding environment through so-called convection currents; represents 12% of resting thermolysis. It also includes the heat losses from the respiratory tract, through the breathed air (thermal polypnea)
- Evaporation represents 25% of resting thermolysis (12% through breathing, 13% through skin).

Normal temperature value

1. The intrarectal temperature is constant during repeated measurements if the body is in a state of thermal equilibrium or if the central temperature undergoes slow changes; it is usually 0.3 degrees C higher than the aortic blood temperature. in conditions of rapid changes in the core temperature, the intrarectal temperature does not accurately reflect them.

2. The intravaginal temperature and the one measured inside the urinary bladder correctly reflect the central temperature in conditions of thermal balance or slow variations thereof; the rapid variations are not accurately reproduced by the values measured in these regions either.

3. The temperature measured at the oral level most faithfully reflects the state of central thermal regulation, due to the rich vascular network at the level of the lingual mucosa. The result can be slightly distorted, if the temperature measurement can be done after the patient has eaten or drunk, or if he breathes through his mouth while the thermometer is placed sublingually.

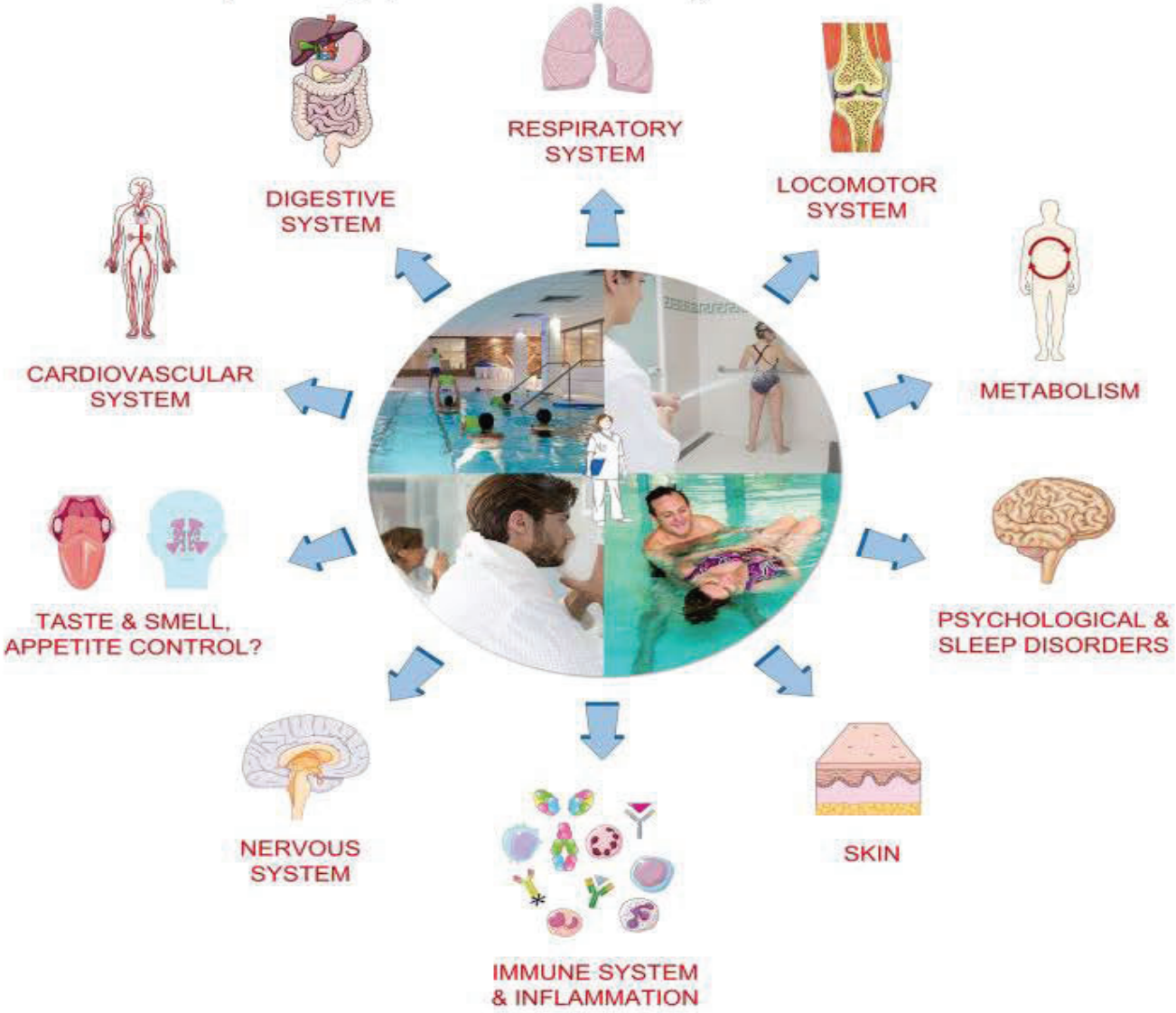
The normal temperature value measured orally is 36.7+-0.2 degrees C.

Physiological variations of human body temperature:

- waking sleep rhythm - in the morning at 6 o'clock the axial temperature is in the range of 36-36.4°C, while in the evening at 6 o'clock it is 37.4-37.5 degrees C.
- sex - at ovulation, the central temperature suddenly increases by 0.5-1 degree C and remains elevated throughout the persistence of the corpus luteum.
- the rate of food ingestion (digestion produces a significant amount of heat)

The body's reaction to the application of the thermal factor is assessed according to: the dermovascular reaction, the heart rate, the respiratory rate and the intensity of the patient's subjective reaction, which is pain when applying cold and burning when applying heat.

The action of hydrotherapy procedures on various organs and functions.



Hydrotherapy procedures cause different physiological responses

Action on the nervous system

Hydrotherapy procedures have an influence on the three systems:

- the central nervous system
- peripheral nervous system
- vegetative nervous system

The nervous system, through the network of skin receptors, is the first to perceive thermal stimuli. They reach the central nervous system through the afferent fiber pathways in the form of a nerve stimulus, and from here in the form of an impulse they return through the efferent pathways, causing functional manifestations both in the nervous system and in other systems and functions, and the vascular and trophic reflexes that arise can be used for therapeutic purposes in certain pathological conditions.

If we block the peripheral sectors of the analyzers, the cutaneous thermal excitants can reduce, and sometimes can completely interrupt the painful sensations, prevent the penetration of pathological impulses into the central nervous system, a fact that has a favorable influence on the state of the cerebral cortex and consequently on the evolution of the pathological process.

The skin temperature oscillates within fairly large limits in the same individual, in opposition to the internal temperature which is characterized by a remarkable constant, this being the mandatory condition for the normal evolution of the vital processes in the body.

The central nervous system is the one that provides thermoregulation, by reflex, as a result of the excitation of the corresponding nerve endings and directly, under the influence of changes in the temperature of the blood that irrigates it.

Any local excitation causes response reactions, which extend to the corresponding region and even to the whole body, but there are some more sensitive regions which, when excited, cause stronger reactions from the central nervous system, these are the back of the neck (collar area Scerbak) and the upper dorsal region.

Depending on the temperature and their duration, hydrotherapy procedures can be exciting or calming for the nervous system.

Heat and cold applied for a short time increase the excitability of the peripheral sensitive nerves and the central nervous system, and heat applied for a longer period decreases nerve sensitivity, and cold applied under the same conditions can lead to anesthesia (cryonaesthesia).

There are close relationships between the vegetative nervous system and hydrotherapy procedures, in the sense that warm procedures increase the tone of the vagus, and cold ones, increase the sympathetic tone.

Apart from the unconditioned reflexes that characterize the reactions of the nervous system to the absolute thermal stimulus, hydrotherapy can also cause conditioned reflexes, but their appearance depends on the nervous structure of the patient, the environmental conditions and the correctness of the application technique.

Action on the circulatory system

Thermal stimuli cause intense and complex reactions on the circulatory system.

The effects of heat applications on the cardiocirculatory system:

- increase blood mass by releasing blood from stores (liver, spleen);
- extensive peripheral vasodilatation;
- increases the speed of blood circulation in the peripheral vessels.

The effects of cold applications on the cardiocirculatory system:

- general peripheral vasoconstriction;
- increases peripheral resistance;
- the speed of blood circulation in the peripheral vessels decreases, the peripheral circulatory flow decreases;
- the constriction of the veins with the change in the color of the integument - differences in the color of the skin by changing the concentration of O2.

The effects of heat applications on the heart cause an increase in cardiac work by increasing the beat volume

Adaptive mechanisms:

- increasing the flow rate by increasing the return circulation
- increases blood volume by attracting extracellular fluids
- increases HR to 100/120 beats/min., even 140/160 beats/min.

The effects of cold applications on the heart:

- decreases cardiac work by 25%
- decreases HR (pulse) - in the cold environment cooling is avoided by arteriovenous shunting
- a blood flow of 0.8 ml/min./100cm^3 of skin tissue ensures cold nutrition.

It is known that a warm procedure causes a red coloration (erythema) of the skin as a result of reactive vasodilatation, while a cold procedure causes skin pallor to appear as a result of vasoconstriction.

The reaction to hot or cold is not always the same, it is determined by the temperature degree, depending on this, hot baths can cause vasoconstriction, and cold baths can cause vasodilation.

In general, the dermo-vascular reaction to the thermal stimulus is characterized by the successive appearance of three phases:

a) under the action of the cold stimulus:

- phase I – vasoconstriction, which normally lasts 1'-2', characterized by the appearance of pallor and anemia;
- phase II - of active vasodilatation, of arterioles, venules and capillaries, the skin is warm, has a pink-reddish color as a result of active hyperemia, the circulatory flow is intensified, and the vascular tone is preserved;
- phase III – passive vasodilatation, stasis, with capillary vasodilatation, concomitant with vasoconstriction of arterioles and venules, the skin is cold with a pinkish-purple color due to the increased exchange of gases between blood and tissues.

b) under the action of the hot exciter:

- phase I - vasoconstriction lasting 10" - 20" (as a defense reaction);
- phase II - active vasodilatation, with variable duration from 2' - 10' - 20';
- phase III - passive vasodilatation, when the warm thermal agent is used over a certain time (it depends on each organism), characterized by the pink-violet color of the integuments.

The dermo-vascular reactions spread reflexively over the entire surface of the skin, as well as on the mucous membranes, and are responsible for some changes, among which we mention:

- the circulation regulation mechanism - the dilation of peripheral vessels as a result of thermal excitation causes the amount of blood to increase in the periphery, which would cause an anemia of the internal organs with a drop in blood pressure and collapse, but this does not happen normally , because the human body puts its regulatory mechanisms into operation
- the mechanism of mobilizing blood from blood stores - the sudden increase or decrease in the mass of the blood stream in the skin is combated by the release of blood from the stores (liver, spleen, subpapillary venous plexus) during skin vasodilatation or pushing it from the peripheral circulation into the stores during skin vasoconstriction
- remote skin temperature change – the first contact with the cold or warm stimulus causes the temperature of the rest of the skin that does not come into direct contact with the stimulus to drop suddenly at the beginning, then gradually increase throughout the bath, and a parallel increase in the temperature of the skin with that of the bath occurs only during ascending partial baths
- peripheral resistance - decreases proportionally during hot procedures and increases during cold procedures, depending on the temperature
- circulation speed - in the peripheral arteries, the circulation speed increases strongly in warm baths and decreases in cold ones
- blood return time - compared to the average resting value (22"), the blood return time decreases depending on the temperature, the higher it is, the shorter the time
- the speed of the pulsatile wave in the aorta - under the influence of different temperatures, the speed of the pulsatile wave changes, so when it's hot it increases by 17-18%, and when it's cold it decreases by 4-5%

- the work of the heart – the warm stimulant increases the work of the heart by increasing the volume-beat and the minute-volume, an increase of approximately 30% is recorded in the baths of 39 degrees C, 40% in the hyperthermic baths, and in the cold baths below 28° C, minute - the volume decreases by 25%. The increase and decrease of the minute volume depends on the pulse frequency, being directly proportional to its increase in warm baths and decrease in cold ones.

Blood pressure undergoes a series of changes depending on the temperature of the thermal agent:

- in warm baths (36° – 40°C), the systolic blood pressure drops by insignificant values, and the diastolic blood pressure drops significantly;
- in hot baths, above 40°C, the systolic pressure increases proportionally with the increase in temperature, and the diastolic pressure remains unchanged or increases to a very small extent;
- in cold baths, both blood pressures increase, but the diastolic one increases the most;
- in ascending partial baths, systolic and diastolic blood pressure remain unchanged.

The action on the blood

Hydrotherapy procedures influence the composition of the blood, changing the figurative elements, the coagulation factors, the pH of the blood, the density:

- general cold procedures - increase the number of red blood cells by values up to 800,000, hemoglobin by 14%, and leukocytes up to three times the initial value;
- general warm procedures - causes a decrease in the number of red blood cells, hemoglobin and an increase in leukocytes up to 30,000-40,000 in the hot bath, phenomena explained by a series of reflex mechanisms determined by thermal factors, which lead to the mobilization of blood from the stores;
- coagulation factors - hot procedures increase coagulation, and cold procedures decrease it;
- Acidic pH (acidosis) – increases in cold baths by increasing carbon dioxide in the arterioles and alveoli, as a result of increasing the processes of burning fats and carbohydrates through chemical thermoregulation,
- Alkaline pH (alkalosis) – increases in warm and hot baths, by decreasing carbon dioxide due to hyperventilation, loss of some acid anions through sweating, increased diuresis and elimination of carbon dioxide through the skin;
- density - hot baths lead to a dilution of the blood due to the passage of some liquids poor in albumin from the interstitial spaces, to which is added the mobilization of blood deposits, causing an increase in mass; cold baths lead to a concentration of the blood in order to prevent heat loss.

Action on the respiratory system

Thermal stimuli reflexively influence the respiratory rhythm and amplitude within the complex mechanism of thermoregulation.

Short-term cold or hot applications, which affect large areas of the skin or particularly sensitive areas (neck, upper back, abdomen and chest), first cause a deep inhalation, then a short pause in inhalation, followed by jerky breathing , superficial and irregular, similar to a state of hypoxia, the frequency and amplitude of respiratory movements continue to increase, so that then everything returns to normal.

Baths of different temperatures cause different types of breathing:

- hypothermic baths (31° – 32° C) – cause shallow and irregular breathing;
- Cold applications (18° – 28° C) – cause an increase in respiratory volume, cause ample breaths, increasing the duration of both inhalation and exhalation;

- hot baths (33° – 41° C) – causes the appearance of deep breathing, which increases as the temperature increases, without the frequency increasing appreciably;
- hot baths (42° – 44° C) – cause Cheyne-Stokes breathing to occur, respiratory air and minute-volume increase a lot;
- partial ascending baths - causes deep and rare breathing.

In general, respiratory mechanics influence the abdominal circulation through the diaphragm, and in particular, the liver.

The thermal factor influences the respiratory function and gas exchange, under the influence of cold procedures, due to heat losses, chemical thermoregulation is triggered, which causes the consumption of carbohydrates and fats to increase, manifested by the increase in carbon dioxide eliminated and oxygen absorbed.

Procedures between 35° - 38° C (the "metabolic indifferent temperature zone") make the respiratory volume and oxygen consumption reach minimum values, very warm procedures make the partial tension of carbon dioxide decrease up to 16 mm, due to hyperpnea and the hyperventilation that occurs.

Under the action of baths of different temperatures, there are also changes in the values of the respiratory coefficient, these are explained both by the changes in the consumption of oxygen and the elimination of carbon dioxide, as well as by the nature of the substances burned in the body. An important role is played by the mechanical and circulatory effects of baths, namely the emptying of blood deposits.

The effects of hot/cold applications on the respiratory system.

Heat applications increase the respiratory rate, increase the need for O2 by 10-20% due to cardiac work, the blood pH rarely changes.

- the rhythm and amplitude of breathing are reflexively influenced - deep breathing
- decreases the partial pressure of CO2 in the alveolar air
- tachypnea, hyperpnea with hyperventilation
- decreases the respiratory coefficient

Cold

- the rhythm and amplitude of breathing are reflexively influenced within thermoregulation
- shallow breathing - there is a chemical regulation through the increase of absorbed O2 and CO2, with the increase of the breathed coefficient.

Action on the muscular system

Thermal stimuli influence both smooth and striated muscles.

Short-term cold applications increase the output of striated muscles, removing fatigue, and short-term hot applications have similar effects, but of a lower intensity.

Cold applications increase the tone of the striated muscles, cause the appearance of externalized clonic contractions in the form of involuntary tremors, and the skin takes on the characteristic "goosebumps" appearance due to the influence of its contractile elements.

Warm applications (36° - 37°C) decrease muscle tone, decrease muscle strength, remove spasms of striated muscles and have a calming effect on the nervous system.

Local or general thermal applications influence the smooth muscles of the digestive tube, depending on the normal or pathological state of the organs. In a normal state, warm applications on the skin of the abdomen, like a warm bath, cause an increase in gastric and intestinal tone, an increase in the speed of peristaltic movements, accompanied by hyperemia of the mucous membranes, and cold applications have the opposite effects.

In patients with increased tone, hot applications lead to a decrease in tone and motility, and cold applications increase tone and motility. The functional state of the cortical processes conditions the way the digestive organs respond to thermal stimuli.

Action on thermoregulation

The temperature of the human body is on average 37° - 37.2°C inside and 36.4°C in the armpit and shows variations of up to 1°C in 24 hours related to the body's rhythmic activity, with a maximum between 4-6pm and a minimum at night between hours 1 – 4. Any thermal stimulus from the external environment, higher or lower than the indifference temperature, triggers, by exciting the thermoreceptors, the thermoregulation function.

Hydrotherapy procedures, through thermal variations, put the body in a position to defend itself, the mechanisms being chemical thermoregulation or physical thermoregulation.

Chemical thermoregulation - consists in increasing or decreasing the production of own heat, so whenever the body's temperature tends to decrease due to internal causes or by decreasing the temperature of the surrounding environment, the intensification of metabolic processes is triggered in the body, especially in the skeletal muscles and liver, and if the external temperature increases, by decreasing the metabolism thermoregulation only takes place to a very small extent, because the metabolism can only decrease by at most 10% below the basic metabolism. Chemical thermoregulation - requires a normal state of metabolic and humoral function.

Physical thermoregulation - consists in regulating the caloric exchanges between the body and the environment, exchanges that are made by convection, radiation and evaporation. If the temperature of the body is higher than that of the environment, the heat loss of the body is done by convection and radiation, and if the temperature of the environment is higher than that of the body, the heat loss is done by the evaporation of liquids from the skin and mucous membranes. Thermoregulation is a complex physical process, in which the main role belongs to the cerebral cortex, the skin necessarily participates as the main organ of caloric exchanges with its nervous and vascular apparatus. Physical thermoregulation requires good functioning of the cardiovascular system.

Action on metabolism

Hydrotherapy procedures influence the metabolism in the direction of increase or decrease depending on the increase or decrease in tissue temperature.

- procedures between 35° - 38°C, the so-called "indifferent metabolic zone", lasting 10' - 15', do not change the metabolism of healthy people, they influence the metabolism of convalescents.
- warm procedures between 38° - 40°C, cause slight increases in metabolism, due to the burning of carbohydrates and fats.
- Prolonged hot procedures between 39° - 40°C, the hot ones above 40°C, lead to an increase in body temperature and thereby considerably increase the metabolism both by increasing the consumption of carbohydrates and fats and by burning protein substances.
- cold procedures, even of short duration (full frictions, general showers), cause a very sharp increase in metabolism - the anabolic effect.

Metabolic changes are translated by variations in respiratory volume, oxygen consumption and carbon dioxide elimination, the increase in metabolism occurs to a greater extent if thermal procedures are combined with intense mechanical manipulations.

A longer hydrotherapy cure increases protein assimilation, a fact that is highlighted by the lower nitrogen content of the feces.

At the same time, disassimilation also increases, which translates into a considerable increase in urea nitrogen in the urine, uric acid excretion increases up to 20% and ammonia excretion also increases, Ca increases in the blood and Na decreases, and through the urine, especially after hyperthermic procedures eliminate phosphates, sulfates and chlorides.

Effects of hot/cold applications on metabolism

Warm applications cause an increase in metabolism, changes in respiratory volume, changes in O2 consumption and CO2 elimination.

Thermal stimuli above 38 degrees Celsius and cold ones determine the stimulation of carbohydrate, lipid and protein metabolism.



The effects of hot/cold applications on the immune system:

Warm - good tissue perfusion with blood → mobilization of antibodies - direct effect on germs sensitive to heat (bactericidal action). The effect of the thermal factor on inflammation. Older and newer research confirms the effectiveness of thermotherapy in reducing inflammation. However, applications of extreme cold decrease acute exudative inflammation. Chronic proliferative inflammations are relieved by the application of gentle heat, while hyperthermic applications amplify the acute exudative inflammatory process.

Action on the endocrine system

The hot or cold thermal stimulus also has an influence on the endocrine system, both the accentuation of the functions of hyposecretory glands and the reduction of hormone production in hypersecretory glands can be obtained.

In thyroid hyperfunctions, improvements are obtained through hydrotherapy procedures, which translate mainly by balancing the various deregulated vegetative mechanisms.

Basal metabolism and iodine uptake highlighted the quantitative changes of the gland in case of thyroid hyperfunction or hypofunction, the adrenal gland reacts with an increased elimination of 17-ketosteroids, hypofunction of the sexual glands can also be significantly improved with the help of hydrotherapy procedures.

There is also a better tolerance to carbohydrates in diabetic patients, which explains the good influence of hydrotherapy on the pancreas.

The effects of heat applications on renal function:

Warm: - renal vasodilatation causes an increase in renal perfusion, which increases diuresis

Triggering thermolysis, renal function intervenes in saving fluids, causing renal vasoconstriction, which leads to a decrease in diuresis.

3. Hydrothermotherapeutic reaction (HTT)

The hydrothermotherapeutic reaction - the set of responses of the body to the action of the stimuli of the hydrothermotherapy procedures.

The therapist should also inspect for any wounds, blisters, or rashes, as they will also affect the decision of which interventions are most appropriate and safe to use.

The physiological action of water and thermal factors is exerted through the skin. The skin is the first organ to encounter water factors. Through its characteristic structure - the vast vascular network and nerve receptors - multiple and varied responses, local and general reactions can be obtained. For clinicians, the integument was the seat of the symptoms of many diseases, even if the affected organs were located at a great distance, this could only be explained by the vast vascular and nervous network that metamerically (zonally) connects the organs with the integument (the Tarin-Head metameric areas). . These skin responses to water agents reflect the general reactivity of the body, specific to each individual (hyper-, hypo- or normoreactivity).

The provocation phenomena are general reactions, aggravation of some of the clinical phenomena, in connection with the use, less well dosed, of the hydric agent or with the lack of normal response of the sick organism. It is the spa reaction or the old "spa crisis" known since ancient times, in connection with the use of mineral waters.

It was not possible to test the body's reactivity through a precise laboratory test. In any case, the patient has, subjectively, a feeling of warmth, and objectively, redness of the skin appears.

The reactivity can be appreciated by the Dalmady (Sturza) method, which consists of pressing with the police on the integuments for 3 seconds; after lifting, a white spot remains for 3-5 seconds (normoreactive). In hyporeactives the white spot disappears after 8-9 seconds (weak reaction), and in hyperreactives it disappears very quickly (1-2 seconds). In conclusion, this local reaction is also called dermo-vascular reaction and it is good to be known, because it differs in children, adults, old people, men or women, healthy or sick people.





For assessment - the DALMADY dermo-vascular reaction - after each HTT procedure, the skin is compressed. The procedure has a favorable effect when the pale spot disappears in 2-5" after digito-pressure

Pleasant feeling of warmth, mild euphoria, good mental tone, desire to move, decreased blood presure pink-reddish color of the skin, warm integuments

Unfavorable effect if it disappears after 8-10 seconds.

Negative reaction - feeling cold, chills, headache, irritability, malaise, decreased appetite, cold, pale, cyanotic skin, goosebumps, increased blood pressure.

This reaction allows us to appreciate the effect of a single procedure and not of the entire cure.

Evaluation of reaction in HTT

Appreciation of pulse changes

• increases by 10-20 beats/minute during general thermotherapy procedures to which there is a favorable reaction

• increases to 120 – 140 beats/min or the pulse becomes irregular during some HTT procedures to which the body develops an unfavorable reaction.

Estimation of Hieldebrand coefficient = pulse/respiration. Ideally, N=5 = 80/16. If N < 4 = moderate tolerance to the respective procedure.

Appreciation of subjective sensations

Late subjective sensations

• sleep disorders, appetite, headache, dizziness - due to overdose in intensity, duration, rhythm.

Early subjective sensations

- Pain in the extremities during cold procedures

- considered as a normal reaction if it disappears at the end of the procedure

- if it persists after the procedure and is accompanied by pallor, cyanosis, coldness in the extremities, then the reaction is abnormal and the treatment is interrupted

Burning sensation during hot procedures

- on a limited surface it must be borne by the patient

- if pain occurs in the extremities, stop the treatment

The factors on which dermo-vascular reactions depend:

• The intensity of the thermal factor,

• Amount of heat transmitted/yielded

• The initial state of the caloric deficit of the peripheral area

• Constitutional reactivity to thermal factors

• Various pathological conditions.

The dermovascular reaction represents the modality of modification of the superficial circulation upon the local application of the thermal factor. The dermovascular reaction is the mirror of the whole organism's reaction, because, in fact, the entire circulation responds to the application of the thermal factor, even if this application is only done locally, on limited areas of the body. These responses, of the general circulation, to a local thermal factor, are called consensual reactions.

Thus, when cold is applied, they occur in order: local vasoconstriction, lasting 1-2 minutes, accompanied by skin pallor, followed by arteriolar, capillary, venular vasodilatation, with active type hyperemia of variable intensity and duration: the phase follows of capillary vasodilatation with blood stasis and arteriolar and venular vasoconstriction (passive hyperemia): the color of the skin gradually becomes purple.

When heat is applied, there are: short-term vasoconstriction, 10-20 seconds, active hyperemia, also lasting tens of seconds, and finally, passive hyperemia, with capillary and venular vasodilatation.

Thus, reactions identical to the dermovascular one were found at the level of the entire integument and at the level of the mucous membranes, even if of a lower intensity, without active hyperemia being visible and at the level of the deep vessels of the cavitating organs (heart, stomach, intestine) of the renal vessels, splenic vessels.

Inverse reactions to the dermovascular one occur at the level of the hepatic vessels.

Assessment of the skin's (integument) characteristics, including: colour, continuity, and temperature, is necessary when determining the condition of the soft tissue being treated. Skin pigmentation or colour is based on the amounts of melanin and haemoglobin that are present. Melanin is a substance that gives skin and hair their colour and may also be referred to as a pigment. The temperature of the skin surface indicates the current state of the tissue. Elevated skin temperatures indicate either inflammation in the area or possibly infection or a burn. Decreased skin temperatures may indicate vascular compromise.

Cerebral vessels are very little influenced by local applications, at a distance from the thermal factor.

CURE REACTION IN HYDROTHERMOTHERAPY (HTT)

• occurs after 8-12 days of HTT: sleepiness, insomnia, strangeness, fatigue, hyperexcitability, headache, changes in blood pressure, heart rate, mild subfebrile, tachycardia or bradycardia, diarrhea or constipation, especially the exacerbation of the symptoms of the treated condition (often allergies), or the exacerbation of latent foci of infection, etc.

• are phases of deregulation, overregulation of the homeostatic mechanisms with the aim of stabilizing and optimizing the morpho-functional body of the body

• Does NOT require interruption of treatment, possibly 2 days break

• requires differential diagnosis of organic diseases

• More frequent in balneoclimatology - bioclimatic stress - acclimatization

- adapting the intensity of the stimuli to the extent of the crisis symptoms

The effects of local heat applications are:

- the accumulation of caloric energy in the skin and in the subcutaneous cellular tissue,
- local, distant and deep circulatory changes
- amplification of local metabolism
- resolution of local inflammatory processes
- analgesic effect
- peripheral thermoregulation stimulation effect

The effects of general heat applications are due:

- the effects on the main devices and systems
- generalized superficial vasodilation
- the deep vascular response made according to reflex reactions and thermoregulation stimulation

Reaction to hydrotherapy

Reaction to hydrotherapy means the totality of the responses of organs and different systems to the action of thermal stimuli.

The mirror of the whole organism's reaction is the dermo-vascular reaction, it serves as an indicator and guides us in the practical application of hydrotherapy.

The manifestation of a *good dermo-vascular reaction* shows us that the functional changes of the other organs, systems and functions take place and develop in a physiological sense, and obtaining it is mandatory.

Objective - it is manifested by the appearance of a pinkish-reddish coloration of the skin accompanied by warming of the skin.

Subjective - translates into a pleasant warm sensation, good mood, increased appetite and desire to move.

The lack of dermo-vascular reaction translates into:

Objective – the appearance of skin pallor, "goosebumps", bluish or marbled blue appearance and skin coldness.

Subjective - the sensation of coldness, chills or tremors, headache, nervousness, malaise and loss of appetite.

The physiotherapist must follow the patient carefully, avoid the lack of dermo-vascular reaction by adding to the hydrotherapy procedures the mechanical maneuvers that help. A method for highlighting the dermo-vascular reaction is the one highlighted by Dalmady, in this way the skin is compressed with the finger, then the elapsed time is followed until the pale spot produced by the pressure disappears. It is appreciated before and after the procedure and it is considered a good

reaction if the disappearance of the pale spot, produced by pressure, occurs in 2" - 5" and as a bad reaction if the disappearance of the pallor occurs after 8" - 10".

During the hydrotherapy treatment, an improvement in the dermo-vascular reaction is observed as a result of improved reactivity and better circulation.

Hydrothermotherapy indications

- Medical recovery - musculoskeletal disorders, rheumatic, neurological, orthopedic-traumatic disorders
- For tempering the body, increasing non-specific resistance
- Neuro-vegetative dystonias, asthenic neurosis, neuro-psychasthenias
- Feverish-compressed states, partial baths
- Rehabilitation of cardiovascular and respiratory diseases
- Spastic diseases of the digestive tract
- Fibromyalgia, myogelosis
- Endocrine and metabolic dysfunctions - hypothyroidism, gout, diabetes

Contraindications of hydrothermotherapy

- Neoplastic diseases - oncology collaboration
- Cachectic states
- Evolutionary tuberculosis regardless of location
- Cardio-respiratory decompensations
- Repeated, profuse bleeding
- Venereal diseases in the acute and contagious stage
- Normal pregnancy starting from the third month and pathological pregnancy
- Dermatological conditions, trophic disorders of the integument
- Mental disorders, epilepsy, chronic alcoholism
- Renal and biliary calculi
- Acute and subacute stages of diseases
- Important disorders of the peripheral circulation, vascular fragility

Correct application/prescription formula for the HTT procedure:

- Name of the procedure (baths, paraffin, poultice, shower, etc.)
- Type of procedure (general or local)
- Temperature of the procedure
- Place of application (specify the area)
- Duration
- The pace of application
- Total number of **sessions**
- Special indications (mobilization, washing, etc.)

General rules for practicing hydrothermotherapy

In order for hydrothermotherapy to achieve a maximum of curative and prophylactic effects, we must take into account certain rules in its application.

- The patient will be thoroughly examined before the application of any hydrotherapy procedure even if it is not his first treatment, because the appearance of some super-added phenomena require the interruption of the treatment against his will, who usually wants to continue.

- Hydrotherapy procedures will not be applied immediately after heavy meals, possibly after a light snack, ½ hour before applying the procedure.
- Large procedures must be indicated in the morning hours.
- If two procedures are applied during the same morning, it is mandatory that there be a break of at least two hours between them. It will be avoided to prescribe too many procedures, so that the reactions of a new procedure do not overlap with the action of an already performed procedure.
- After warm and hot procedures and after sweating procedures, it is mandatory to apply a cooling procedure, to combat relaxation and peripheral vascular atony caused by heat (vascular straightening).
- After the hydrotherapy procedures, it is mandatory to wipe the skin with a sheet, slowly or vigorously, depending on the intention to accentuate or diminish the dermo-vascular reaction.
- The physiotherapist must strictly follow the indications in the treatment prescription, regarding the temperature, duration, intensity, topography of the procedure and apply the correct technique.
- The physiotherapist must ensure the patient, during the treatment, optimal comfort conditions, avoid inappropriate discussions, noise, unpleasant smells, long waiting.
- If an accident or intolerance occurs during the procedure, the physiotherapist must explain to the patient what happened and regain his confidence in the applied therapy.

The hydrotherapy room and its equipment. A hydrotherapy section must be very well divided so that the work of the physiotherapist and the comfort conditions for the patient are optimally achieved. Broadly speaking, a hydrotherapy section must include a dressing room and rooms for different general and partial hydro and thermal procedures, and the different treatment points inside the same room, separated by incomplete partition walls to ensure optimal patient comfort conditions and ensuring privacy;

The area required for a bathroom is 8 m2, for showers 3 - 4 m2 and a distance of 3 - 3.5 m for the Scottish shower and lighypertensioning affusion, between the technician and the patient. In the packing rooms, 3.5 - 4 m2 are calculated for each 0.8 m2 bed; Room height 2.5 – 3.5 m, walls covered with white tiles up to at least 2 m, mosaic floor, preferably light colored tiles with drain slope and wooden grates, lighting should be very good, if not appropriate natural lighting can be achieved, fluorescent lamps will be used so that the dermo-vascular reaction is visible;

The temperature of the treatment rooms should be 22° - 23°C, and of the undressing and rest rooms 20°C; there should be room thermometers in each room; The ventilation of the rooms must ensure a favorable environment, the humidity does not exceed 75%; The supply of cold and hot water must be permanently ensured, the pipes must be large-sized to ensure a constant flow, and the drains and filling taps must be oversized to ensure filling and emptying in a maximum of 3'-4'; Each treatment point must be equipped with alarm clocks; Perfect cleanliness and order must be kept in the hydrotherapy pavilion; In modern treatment facilities, it is required that the rooms are equipped with sound systems to ensure a pleasant atmosphere through melotherapy or for information.

The physiotherapist: is the most important figure and has the biggest role in the smooth running of the hydrotherapy section and in the success of the applied treatments. Must have appropriate attire, impeccable white equipment, rubber apron for procedures that require this; to be polite with patients, not to show a bored or annoyed face when asked for explanations; not to have discussions, no matter what topics, with colleagues during work; to respect the planning of procedures to avoid congestion or gaps in production, which generate dissatisfaction among patients.

4. Compresses and hydrophores - definition, mode of action, methods of application, indications and contraindications

The compresses are the simplest and most widespread hydrotherapy procedures, they are carried out with the help of pieces of cloth, varied in shape and size, soaked in water at different temperatures and applied to different regions of the body.

Compresses are classified according to:

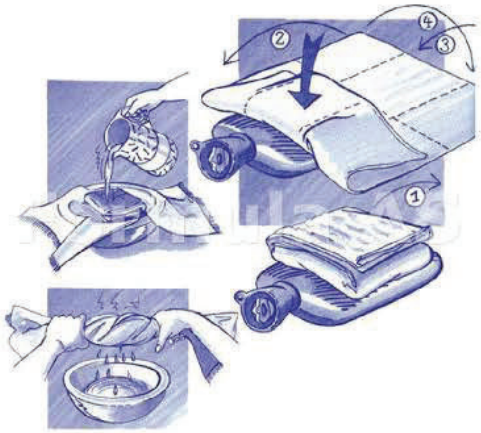
- temperature;
- region of application.





By temperature:

- cold;
- warm;
- alternating;
- stimulants;
- with steam.



By region:

- head;
- nape;
- neck;
- thorax;
- precordial;
- trunk;
- abdominals;
- genital;
- calves;
- fingers and forearm.













Application technique.

A. General rules.

In order for the effects of the compresses to be good - we must take into account a series of general rules in their application technique:

The compress must be intimately applied to the skin and not allow air to enter.

The humidity must correspond to the type of compress: the cold and hot ones will be semi-melted, so that the water does not spontaneously drain on the skin; the stimulating ones will be squeezed well, so as to avoid wetting the covering compress.

The dry covering compresses must exceed the underlying compresses by 1-2 cm.

The compresses must not be too tight so as not to cause circulation disorders: venous compression in the extremities or oppressive sensations on the chest.

If the stimulating compresses do not warm up after 10-15 minutes or their application causes chills, they are interrupted, being able to be applied again to the same region only after rubbing or brushing it.

Compresses are only applied on healthy skin, because moisture and repeated applications could cause maceration, favoring the penetration of pyogenic microbes, in the case of existing pyodermas.

I. Cold compresses

Materials needed: pieces of cloth of different shapes and sizes, bucket of cold water. bed or sofa, alarm clock.

The actual application technique. Soak the compress in cold water, squeeze and fold it 5-6 times, then apply it to the affected area. Every 5 minutes, the compress is changed, thus maintaining the low temperature. This can also be achieved if the compress is combined with hydrophore or ice pack application.

The total duration of a compress varies in relation to the disease, falling between the limits of a minimum of 20 minutes and a maximum of 60 minutes.

Action mode. Apart from some compresses applied to specific areas, whose action has a general character, most compresses have a local action, limited to the underlying organs and tissues on which they are applied.

The action of the compresses is based on the thermal factor.

Cold compresses base their effect on the following properties: vasoconstriction, anti-hemorrhagic, anti-inflammatory, anti-thermic.

II. Warm compresses.

Materials needed: same as above. plus a thermometer.

Regarding the temperature of the water in the bucket, it will be between 38 and 43° for warm compresses and 45-55° for hot ones.

The application technique is the same as for cold compresses, with the particularity that, unlike them, warm compresses are always covered to maintain their temperature.

Compresses are changed every 5 minutes.

The total duration of application is a minimum of 20 minutes and a maximum of 60-90 minutes.

Mode of action of warm compresses: antispasmodic, analgesic, hyperemetic, resorptive (especially in chronic inflammations).

III. Alternating compresses.

Materials needed: same as above.

Application technique. According to the technique presented, apply a warm compress at a temperature of 40-50° for a duration of 2-3 minutes, after which, on the same place, a cold compress of 12-16° is applied for a duration of 1/2- 1 minute.

These compresses alternate 5-6 times. It always starts with a warm compress and ends with a cold one. Mode of action: stimulation of blood circulation and toning of the neuromuscular system, especially locally.

IV. Stimulating compresses or Priessnitz compresses.

Materials needed: 2 pieces of cloth of similar shape, one of them being slightly larger and of a fuller material (never waterproof); a bucket of water at room temperature.

Application technique. Dip the smaller piece of cloth in water, squeeze it well and apply it to the affected area. A second, dry compress is applied over this, in such a way that it exceeds the wet compress by 2-3 cm. The duration of application is 2-6 hours or until drying.

Action mode. Stimulation of nervous activity and the circulatory system with the modification of biological processes.

V. Steam compresses.

Materials needed: 2 pieces of flannel, a piece of plain cloth or a towel, a waterproof cloth, 1 bucket of water at a temperature of 60-70°.

Application technique. A dry flannel is placed on the affected area, over which a piece of cloth or towel soaked in hot water (60-70°) and well squeezed is applied, and the other flannel is applied over it. Everything is covered with waterproof cloth or a heating pad is applied.

The total duration of the procedure is a minimum of 20 minutes and a maximum of 60 minutes.

They have an effect: resorptive, analgesic, antispasmodic

Compresses, in general, are used for their curative effect due to the thermal factor.

There are also compresses with various substances, such as: alcohol, magnesium sulfate, burow solution that act through the chemical factor, their main effect being that of reducing edema and local inflammation.

It should be emphasized that, usually, cold compresses are indicated in acute inflammatory or painful processes; and the warm ones are applied in subacute or chronic processes, the stimulating compresses are also useful in chronic sufferings, stimulating the local defense capacity and metabolism.

Application technique according to regions, indications and contraindications.

Head and neck compresses – they can be hot, cold or stimulating, the first two are most commonly used.



Cold head compresses are indicated in: cerebral congestion, cerebral hemorrhages, meningitis and during thermotherapy procedures to avoid cerebral congestion. A remark about cold compresses on the back of the neck is that, in addition to the local reaction, they also have a general, reflex, remote action on the activity of the heart, breathing and nervous system in the sense of sedation.

Warm head compresses are indicated for acute or chronic neuralgia, migraines, rheumatic pains and pains caused by angiospasms.

Neck compresses – can be hot, cold or stimulating.



Cold compresses for the neck are indicated in acute tonsillitis (acute tonsillitis), phlegmons, laryngitis, diphtheria.

Warm compresses are indicated in inflammation of the tonsillar region accompanied by edema and cyanosis.

Chest compresses – can be hot, cold or stimulating

Cold compresses to the chest are indicated in hemoptysis, acute processes of the organs in the chest, such as: bronchitis, pulmonary congestion, pneumonia.

Warm chest compresses are indicated in chronic intercostal myalgia and neuralgia, chronic bronchitis and pleurisy with remnants of exudates and pleural adhesions, spasms of the abdominal organs (colitis, cholecystitis).

Chest stimulating compresses (cruciate compresses) are indicated in acute and chronic bronchitis, acute and chronic pleurisy, pulmonary tuberculosis, various pneumopathies.

Precordial compresses – usually applied cold

Precordial cold compresses strengthen systole, lengthen diastole and make arrhythmias disappear, and are indicated in functional arrhythmias, palpitations, myocarditis accompanied by tachycardia during infectious diseases, in Sokolski-Bouillaud rheumatism.

Precordial compresses are contraindicated in advanced myocardial damage.

Compresses on the trunk - can be cold, warm and stimulating

Cold compresses to the trunk are indicated in febrile conditions, hemoptysis, acute inflammation of the thoracic organs.

Warm compresses are indicated in the same conditions as warm compresses on the chest, with the difference that the affected area is larger.

Stimulating compresses can be combined with hydrophores on the abdomen and precordial region and are indicated in febrile conditions, acute bronchitis, acute infectious diseases, pneumonia, acute pleurisy, myalgia and intercostal neuralgia.

Abdominal compresses - they can be hot, cold and stimulating

Abdominal cold compresses are indicated in acute inflammation of the abdominal organs (acute peritonitis, appendicitis, cholecystitis, adnexitis) or abdominal hemorrhages.

Warm abdominal compresses are indicated in hepatic or intestinal colic, chronic inflammation of the female genital sphere such as: periurethritis, parametritis, salpingitis, salpingoovaritis.

Abdominal stimulating compresses are indicated in chronic diseases of the abdomen.

Genital compresses – can be cold and stimulating

Cold and stimulating compresses are indicated for hemorrhoids, orchitis, epididymitis, vaginal itching, vulvitis and other genital conditions.

Compresses on the calves - the most often used are the stimulating ones

Stimulating calf compresses are indicated for nervous asthenia, insomnia, phlebitis and varicose veins, congestive disorders of the brain.

Fingers and forearm compresses – (wrap each finger separately and the forearm) can be cold and stimulating.

Cold compresses are indicated in finger burns, inflammatory phenomena in Sokolski-Bouillaud rheumatism.

Stimulating compresses are indicated in rheumatic arthritis, accompanied by joint swelling, with the aim of stimulating circulation.

Hydrophores

Hydrophores are rubber or metal devices, made of circular or parallel arranged tubes, fixed with cloth strips or elastic sheet and one of the ends is connected to a water source (bowl or faucet), located at a level higher (about 1 m) and the other connected to a drain or channel located below.

Classification – two criteria are used according to:

- the region where it is applied;
- the shape of the hydrophore.

Depending on the region where they are applied, the hydrophores are divided into hydrophores for the head, nape, neck, spine, heart, abdomen, back, extremities, urethral, vaginal, rectal.

Depending on the shape, the hydrophores are divided into circular hydrophores (for the head), round (for the heart), rectangular (for the spine), oval (for the abdomen) and specially shaped hydrophores for the urethra, vagina and rectum.

Application technique.

The operating principle is based on the continuous flow of water through the tubes at the desired temperature, identical to the compresses that are usually applied to keep its temperature constant. The factor on which the action of the hydrophores is based is the thermal factor, cold in acute conditions, warm and hot in chronic conditions and stimulating when we aim to activate the functions of the organs in a certain region.

The mode of action, duration of application and indications are identical to those of the compresses.





5. Poultices - definition, mode of action, methods of application, indications and contraindications

Poultices represent the therapeutic application on the skin of the affected area of various organic or mineral substances at certain temperatures and in different mixtures. They are wet or dry, hot or cold. The wet and warm ones are frequently used:

a) **Wet** - the substances used are mixed with hot water to form a paste that is inserted into a textile bag and thus applied to the skin of the area to be treated. It is covered with a sheet to maintain the temperature for a longer time, and after cooling is removed. Poultices are used with:

- Bread core, bran, wholemeal flour, flax seeds or flour, chamomile, hay flower, mallow, althal -boil
- Cream or cottage cheese - cold, warm
- Peppermint - scalding or moistening with warm water
- Mustard, horseradish - still water
- Mud and clay - warm

b) **Dry** - heated to the desired temperature, put in the bag and applied to the indicated area. You can use many substances, medicinal plants, the most often used being:

- Wheat, rye and corn bran
- Weeds, various flowers, roots, plants with therapeutic virtues, etc.
- Salt, sand.

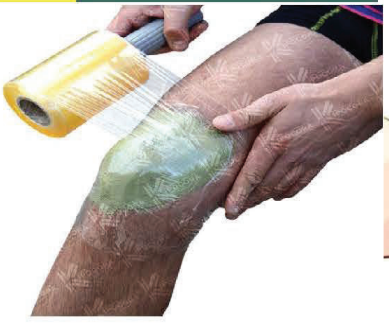
The poultices act through the chemical and thermal effect, having an antispastic, antalgic, hyperemetic and resorptive therapeutic effect.












Action mode

The action of the poultices is based on the thermal factor, with a predominantly local, hyperemetic, resorptive, antispasmodic and analgesic effect, and to the poultices with medicinal plants, in addition to the thermal factor, there is also the chemical factor, represented by the essential oils they contain.

Wet poultices use medicinal plants or other organic substances, which acquire, by mixing with warm water, a pasty appearance. The respective mixture is placed in a bag or between two pieces of cloth and applied to the area to be treated, then covered with a piece of cloth: thicker to prevent cooling. It is kept until it starts to cool down. Poultices are used with bread, bran, flax seeds, wheat flour, barley, oats; corn, medicinal plants (chamomile, mint, mallow), plants containing essential oils (mustard, horseradish). Mustard poultices are kept until the local burning sensation appears.

Poultices with chamomile. Take an appropriate amount of chamomile, boil it in water, then put it in the bag. It is tied to the mouth, squeezed by pressing between 2 caps and applied to the indicated region. Chamomile can be boiled directly in the bag.

Peppermint poultices. The leaves of Menta piperita (good isma) or Menta crispa (crease isma) are used, they are scalded or moistened only with warm water in order not to let the essential oils volatilize. The application technique is identical to the other herbal poultices.

Mustard poultices. Mustard flour (Sinapis nigra or Sinapis alba) is used, mixed with water at room temperature until a paste is made, a little warm water is added before application so as not to cause the patient an unpleasant sensation, it is inserted between two pieces of cloth or a sachet and apply to the indicated area. The duration of the procedure depends on the appearance of the burning sensation. Remove before bubbles form at the application site.

Cabbage poultice - Mastitis is an inflammation of the mammary glands triggered by various causes such as infections, wounds, breastfeeding. Cabbage leaf poultice helps relieve pain, but to increase the effect, garlic can be added. Place a cabbage leaf directly on the affected area, then place 2 sliced cloves of garlic and then a piece of cloth, then the bra. Garlic also acts as a natural antibiotic, and the arsenic content helps relieve pain.

Dry poultices use wheat bran, rye bran, corn bran, salt, sand, which are heated beforehand to a bearable temperature, put in a bag and placed, dry, on the area to be treated.

Treatments with clay poultices and compresses are used for external use. Such poultices are prepared only in glass, earthenware, wood or porcelain vessels. After they are used, such poultices are thrown away because they will contain toxins. The dose of clay suspension used is determined according to the type of condition the patient suffers from and according to his age. Poultices are applied to the hands, feet, skin in the area of the liver, pancreas, kidneys and other organs.

Indications (identical to those of the compresses). The most common indications are: myalgias, neuralgias with various locations, acute and chronic rheumatic arthralgias, abdominal perivisceritis, horseradish and mustard poultices are indicated for their important derivative (reversive) effect, especially in acute and chronic inflammatory diseases of the organs abdominal and thoracic, in neuralgia, spasms and muscle contractions.



6. Wraps / packaging - definition, mode of action, methods of application, indications and contraindications

Wraps are hydrotherapy procedures that consist of wrapping a part or the whole body according to a certain technique.

Depending on the application technique, the wraps are divided into:

- **wet wraps;**
- **dry wraps;**
- **wrappings with paraffin;**
- **packing with mud;**
- **packing with sand.**



Wet packaging

Wet wraps involve wrapping a part of the body or even the whole body in a wet or dry sheet, in paraffin, sand or mud, over which a blanket or other dry sheet is applied. Wet wraps use temperatures of 18-20°C and can be, depending on the extent of the area to be treated: full, three-quarter, lower half, trunk, upper.

The duration of a wrapping is 60-80 minutes maximum; it is associated, especially for complete ones, with a cold compress on the forehead. After wrapping, a short cooling procedure is applied, such as bathing, showering, washing, as after any kind of hyperthermic procedure. The mode of action of the wraps is based on the action of the thermal factor at a general level, of the whole body.

Indications for wet wraps vary depending on the duration.

Thus, those of short duration, 10-15 minutes, are indicated for febrile patients (antithermic effect), asthenics, depressives (toning procedure), dysmetabolic (stimulates burning).

Those of medium duration, of 20-50 minutes, are indicated in neuroses, anxious states, overwork, in patients with thermoregulation disorders:

The prolonged ones, of 60-90 minutes, are recommended for patients with metabolic disorders, obese, gouty, in some chronic intoxications.

They are contraindicated for patients with cardiovascular diseases, including hypertension, for those with decompensated chronic ailments of the vital organs, in dermatological diseases.

The mode of action of wet wraps.

Wet wraps are procedures that have an important general action on the body.

The factor on which their action is based is the thermal one.

Schematically, the action of the wraps can be differentiated into 3 phases, which depend on the duration of the procedure and the patient's reactivity.

- Phase I - also called the excitation phase occurs due to the contact between the skin and the wet and cold sheet, a contact that causes an excitation of the nervous system. At the level of the skin vessels, vasoconstriction occurs, heart contractions become stronger, breathing deeper and faster, the temperature rises slightly, the patient feels cold.

  At the level of the skin vessels, vasoconstriction occurs, heart contractions become stronger, breathing becomes deeper and faster, the temperature rises slightly.

  The patient feels cold.

  After 1' - 3', vasoconstriction is replaced by active peripheral vasodilatation and the increase in blood circulation speed. The feeling of cold is replaced by a pleasant sensation of heat, the body gradually gives up the heat of the sheet until the two temperatures equalize. This means that in afebrile patients, through the thermoregulation action, the burning is stimulated, in those with fever, the temperature drops by 1° - 2°C, if we change the wrapping a few times, and if chills appear, the wrapping is interrupted. This phase lasts 15' - 20' and has a toning effect on the body
- The second phase appears as a result of the continuation of the procedure. The sheet heats up further. Moderate moist heat causes a dilatation of the skin vessels, which results in blood being removed from the internal organs and sent to the periphery, lowering the temperature, slowing the pulse and breathing. The patient has a pleasant feeling of warmth, tendency to sleep. This phase has the character of a sedative phase. It appears after about 15 minutes and is maintained for about 50 minutes.
- The third phase takes place when the patient is still wrapped. The sheet continues to heat up, the heat builds up due to the blanket, and the procedure becomes hyper-thermic. The patient sweats profusely. The procedure becomes exciting for the nervous system. The pulse and breathing accelerate. The duration of this phase is 50-90 minutes.

Depending on the region on which the wet packs are applied, they are:

- complete – the whole body;
- three quarters - from the armpit down, including the trunk and the lower limbs, leaving the upper limbs free, which are covered with a dry sheet;
- lower – from the navel down, the upper limbs covered with a dry sheet;
- upper - includes the arms and the upper part of the body up to the level where the fingers touch the thigh, the rest being covered by the sheet and blanket;
- of the trunk - the portion between the armpit and the pubis, the rest also covered by the sheet and blanket;
- modified – a half wrap combined with a cross compress.

Wet wraps are procedures that have an important general action on the body, the factor on which it is based is the thermal factor, and which can be differentiated into three phases, which depend on the duration of the procedure.

Depending on the duration and therefore the phase, they have different indications.

Wet wraps of short duration 10' - 15' are indicated:

- in febrile patients;
- during infectious-contagious diseases (can be repeated several times/day);
- in functional disorders of the central nervous system;
- depressive states;
- general asthenia;
- in therapeutic metabolism stimulation complexes

Wet wraps of average duration 20' - 50' are indicated:

- for their calming effect;
- in tired patients;
- in case of insomnia;
- in case of motor neuroses (chorea, tics, spastic constipation);
- ulcer disease;
- itching.

Long-term wet wraps 50' - 90' are indicated:

- in metabolic disorders;
- obesity;
- gout,
- neuromyositis;
- polyneuritis;
- in heavy metal poisoning.



Contraindications:

- decompensated heart diseases;
- advanced hypertensive disease;
- pulmonary tuberculosis;
- inflammatory skin diseases

Dry wraps

Dry wraps consist of wrapping a stretched part or the whole body in a woolen blanket, applied directly to the body, with the application of a cold frontal and precordial compress.

Dry packaging can be partial or complete. The most frequently used is complete dry wrapping, which is performed only with the blanket directly on the skin, without a sheet, following the same technique as for wet wrapping, the duration being 1h 30'. Since dry wrapping is a highly sweaty procedure, we can increase the heat retention caused by wrapping by adding hot water bottles or hot water bottles to the sides of the body over the blanket.

Being an energetic procedure, we must constantly supervise the patient, and in case of the appearance of the phenomena of dizziness, headache, palpitations, restlessness, the procedure is interrupted and we administer a vascular recovery procedure shown above. Partial wrappings are performed according to the same technique. To further stimulate sweating, we give the patient a glass of cold water during the wrapping. Wrapping always ends with a cooling procedure such as washing, showering or a short cold bath.

It is a hyperthermic procedure, which aims at intense stimulation of thermolysis and, in particular, of sweating. The patient must be supervised and the procedure must be stopped if: dizziness, headache, palpitations, nausea appear. At the end, a cooling procedure is recommended. The effects of these dry packs are also due to the thermal factor with general action; their main

result is the acceleration of metabolic processes. They are indicated in hypothyroidism, obesity, hyperuricemia, chronic intoxications, chronic rheumatic diseases.

Action mode

Dry wraps have a general action, their therapeutic effect is due to the important thermal factor, achieved by the mechanical action of the blanket applied directly to the skin, as well as by the heat retention achieved by it. These sweating procedures increase the metabolism, increase the burning and under their influence the pulse and breathing accelerate.

Indicaţii:

- hypothyroidism;
- obesity;
- chronic diathesis;
- chronic intoxications;
- chronic rheumatism.

Contraindicaţii:

- toate bolile cronice sau acute cu efecte de caşexie;
- tuberculoză;
- sindroame miocardice.
- bolile cardiovasculare, suferinţe cronice decompensate, stări debile sau caşectizante, tuberculoza, stări febrile, boli de piele.

Paraffin wraps

Paraffin wraps involve the application of melted or partially solidified paraffin to a limited area of the body, according to a certain technique. The application of paraffin is done according to several techniques, the preference for one or the other is determined by the shape of the region on which we have to act.

Paraffin or ozokerite (solid fractions obtained from the distillation of crude oil) are used and have the property of storing a large amount of heat (50°C – 60°C), which can then be transferred to the region where it is applied, and because the first layer in contact with the skin it solidifies forming an insulating layer, the rest of the heat from the paraffin plate is slowly released, which leads to the deep heating of the tissues.

Action mode

Wrapping with paraffin has a local action, which is due on the one hand to the thermal factor, on the other hand to the compression of the superficial vessels, it causes a deep and uniform heating of the tissues, the surface of the skin reaching 38°C - 40°C, and at the place of application it produces a strong hyperemia and abundant sweating. Duration of a wrap 20' - 30'.

Paraffin wrapping consists of applying melted paraffin to a certain region of the body, according to several techniques, depending on the area concerned: brushing, paraffin bath for hands and feet, paraffin wax or paraffin slabs. Beforehand, the paraffin is melted at 65-70° so that unmelted pieces of paraffin remain. The temperature of use is 50-55°.

The thickness of the applied layer is 0.5-1.5 cm

The duration of the application varies between 20 and 60 minutes. The same paraffin can be reused several times, provided it is cleaned and sterilized beforehand.

Check the condition of the skin, apply paraffin, cover with a sheet.

The action of paraffin is due to the thermal factor. It causes a uniform heating of the skin up to 38-40° and of the subcutaneous tissues, producing intense hyperemia and profuse sweating at the

application site. Today, paraffin pillows are used, they can be sterilized, heated and then cooled to 42-45-50 degrees Celsius and applied directly to the body or through a sheet on the body.

Paraffin has thermopexic properties, i.e. it can store a large amount of heat which it slowly releases to the body by solidification.

The large thermal gradient between the paraffin and the skin causes an intense excitation of the thermoreceptors, with a reflex response of important peripheral vasodilatation, which, however, cannot take over the entire amount of heat. More slowly, there is also a transfer of caloric energy to the body through conduction, which, in long-term applications with the constant maintenance of the initial temperature and on extended surfaces of the skin, can lead to the accumulation of heat in depth and to the increase of the core temperature.

The indications for paraffin wraps include: degenerative or post-traumatic disorders of the locomotor system, chronic and subacute inflammatory disorders of the locomotor system (rheumatoid arthritis), peripheral nervous system disorders, perivisceritis, chronic adnexitis. They are contraindicated in: dermatological diseases, tuberculosis, malignant diseases, internal bleeding.



Indications:



1. Diseases of the locomotor system:
• contusions;
• chronic osteomyelitis;
• subacute and chronic arthritis;
• infectious and deforming arthritis.
2. Diseases of the digestive system and accessory glands:
• chronic hepatitis;
• gastritis;
• ulcer disease;
• perivisceritis.
3. Disorders of the peripheral nervous system:
• neuralgia;
• neuritis.
4. Gynecological conditions: chronic appendicitis.

Contraindications:

- pyoderma;
- eczema;
- tuberculosis;
- bleeding tendencies;
- malignant tumors.

Mud packs (peloids)

The mud wrap consists of applying mud heated to 38-44°C on a limited region or on the entire surface of the body. A cold compress is usually applied to the forehead.

The mode of action of the muds is due to several factors, namely: the excitation of the skin nerves by the thermal factor, reflective reactions, the formation of H-type substances (histamine) in the skin, the increase of skin permeability and the specific action of substances resorbed in the body. The action is due both to the thermal factor, but especially to the chemical substances contained in the Mud. The duration of the procedure is 20-40 minutes. At the end, a warm shower is recommended.

The indications are degenerative, chronic inflammatory and post-traumatic disorders of the locomotor system, soft tissue rheumatism, sequelae after rickets or poliomyelitis, chronic inflammatory conditions, uteroanexia, sterility.

Contraindications include febrile conditions, chronic inflammatory rheumatism during activity, high blood pressure, heart and kidney diseases, bronchial asthma in crisis.

Directions

Diseases of the locomotor system:

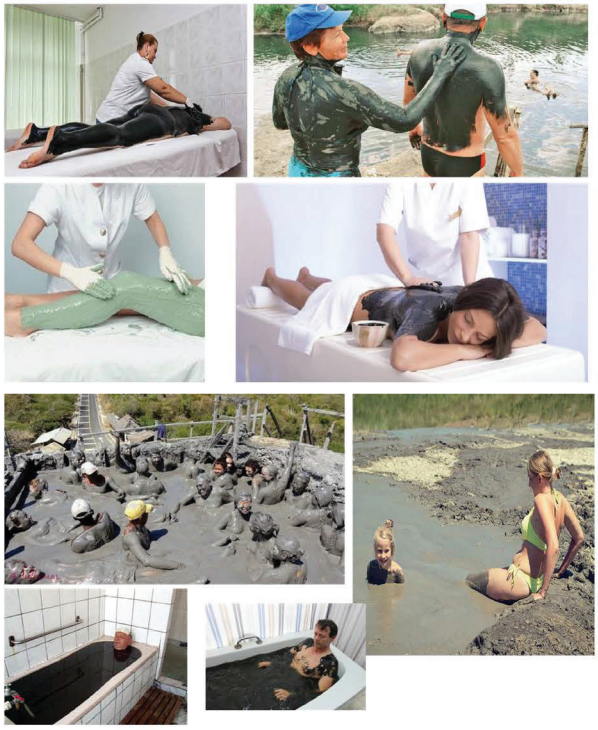
- secondary rheumatism;
- degenerative rheumatism;
- cellulite;
- bursitis;
- myalgias;
- rickets sequelae;
- polio sequelae.

Gynecological conditions:

- chronic utero-adnexal diseases;
- sterility.

Contraindications

- arterial hypertension and hypotension;
- bronchial asthma;
- kidney diseases;
- rheumatism with febrile evolution;
- general contraindications.



The mud baths

Mud baths are general applications of mud that are carried out in tubs, lasting 20' - 30' - 50'. The mode of action is similar to that of mud packs to which the action of hydrostatic pressure is added.

Indications: identical to mud packs.

Contraindications: identical to mud wraps, old age, malnutrition, convalescence after certain diseases.

Mud baths are general applications of mud that are carried out in tubs, mixing water with mud in a concentration that increases progressively from 10% to 25% at a temperature of 36-44°.

The duration of the bath varies from 15-40 minutes. It starts with a half bath, gradually reaching a full bath. The head rests on a rubber pillow, and a cold compress is placed on the forehead. At the end, a simple warm bath or a warm shower is indicated, at 37-38.

An hour of rest is mandatory, the mud bath being very demanding for the cardiovascular system, especially due to the intense thermal and mechanical factors applied.

Indications and contraindications are similar to mud wraps and ointments.

It should be mentioned that the high density of Mud, compared to water, makes the caloric resistance much higher than that of water, so the release of caloric energy to the body becomes more difficult and in a smaller amount.

Anointing with mud is a complex and demanding alternating procedure, which is practiced, in particular, for the purpose of hardening the body. The patient, completely undressed, sits in the sun for a few minutes, in an area protected from the wind, until the skin warms up well.

Complete anointing with cold mud follows, after which patients continue exposure to the sun for at least 20-30 minutes until the mud dries.

During this time, it is recommended to apply a cold compress on the forehead or, at least, wear a hat. The procedure continues with a short bath in water or lake and ends with another exposure to the sun (optional)

Apart from the alternating action of the thermal factor, the effects of anointing with mud are also based on the specific action of substances resorbed in the skin.

The indications are represented by: post-traumatic sequelae of the locomotor system, arthrosis, obesity, hypothyroidism; psoriasis.

Contraindications are; advanced age, atherosclerosis, arterial hypertension, cardiac and cerebrovascular diseases, convalescence periods, febrile diseases, kidney diseases, chronic inflammatory rheumatic diseases in the active period.

Mud poultices – mud applications at different temperatures on limited areas of the body. Gynecological applications - in the form of vaginal tampons with mud at 39-40°C for 2 hours or vaginal irrigation with mud dissolved in water and heated to 37°C.

Mud massage - stretching and massaging with mud. Through the action of detoxification and exfoliation, the mud massage cleans and purifies the skin, restoring its brighypertensioness and softness. The mud massage is intended for people who complain of back pain, those who suffer from arthrosis, osteoporosis, but also those who simply want to relax.

The chemical properties of the Mud are given by the water-peloid content (depending on the amount of colloidal substances) and the mineral substance content (20-40% in the sapropelic Mud). The mud has the capability of thermopexy and hydropexy. Among the chemical components with proven effectiveness are: humic component, bituminous component with estrogen-like action, hydrogen sulphide, a series of ions. Peloids having a real pharmacodynamic action through the ionic exchanges that occur at the level of the skin and mucous membranes with which it comes into direct contact.

Thus there is a double passage at the skin level, influencing the body's hydro-mineral balance; they can accumulate Mg+, K+, Br+, or they can be influenced either in the sense of retention or elimination of sodium carbonates or chlorides by increasing the retention of calcium or phosphorus. A regulation of the body's mineral composition is practically achieved. The mud also contains growth factors, auxins (biogenic stimulators) and biotins (sulfo-gluco-lipid compounds with anti-inflammatory effect).

Humic acids have hyaluronidase properties.

Hydrogen sulphide produces hyperthermia, having a regulatory effect on histamine, thus favoring desensitization processes.

There is also a mechanical effect of mud application, the interoreceptors are stimulated, especially the baroreceptors, stimulation that leads to the activation of neuroendocrine cardiac depressant processes (the Bainbridge effect) and the Henry-Gauer reflex of vasopressin inhibition,

which causes a drop in blood pressure. Thus, a mud bath at neutral temperature can lower BP by up to 30%.



The thermal effect of peloidotherapy determines the relief of pain, the reduction of muscle contractions and has anti-inflammatory effects - the higher the application temperature, the greater the immune-stimulating and cardio-vascular tonic effects will be, the application being possible due to the special properties of the mud thermopexy.

The reactions at the level of cell membranes and structures in the cytoplasm, cellular and intercellular functions, the expression of receptors, the activation of some enzymes (cytochrome-oxidase, ATP-ase, alkaline phosphatase), oxygen consumption, etc. are influenced.



Thermogenesis and thermolysis reactions are obtained, optimizing the balance of the mechanisms involved in thermoregulation, which ultimately determines a better performance of adaptive systems and homeostasis.

The anti-inflammatory effect of Techirghiol mud therapy in arthritic pathology was proven by increasing the level of superoxide-dismutase (SOD) and decreasing the level of glutathione, emphasizing the protective character against oxidative stress, as well as decreasing the level of inflammatory cytokines such as TNF-1 and IL-6.



General contraindications

- Acute febrile conditions;
- infectious, venereal diseases, during the period of contagion and convalescence (syphilis, gonorrhea);
- cachectic states, regardless of the cause;
- malignant tumors, regardless of shape, location or evolutionary stage;
- repeated hemorrhagic conditions,
- blood or system diseases, with alteration of the general condition (anemias, leukemias, lymphomas);
- pathological pregnancy in any month and normal pregnancy over 3 months;
- epilepsy,
- psychopathies with social behavior disorders;
- chronic alcoholism with neuropsychic disorders, drug addictions;
- decompensated diabetes;
- manifest heart, liver or kidney failure.

Special contraindications

- Rheumatoid polyarthritis – acute form;
- ankylosing spondylitis with advanced respiratory failure, systemic lesions;
- recent unconsolidated fractures, unstable spine fractures, with potential secondary medullary injury, pathological bone fractures;
- polyneuropathies in the acute stage, paraneoplastic neuropathies;
- hemiplegias of infectious, malignant tumor, hemorrhagic etiology;
- painful ischemic heart disease, severe rhythm and conduction disorders, decompensated valvulopathies, decompensated heart failure, patients with embolic potential, decompensated pulmonary heart;
- active pulmonary tuberculosis, pulmonary mycoses, bronchiectasis with severe hemoptysis, silicotuberculosis, manifest pulmonary insufficiency,
- bronchial asthma with frequent attacks or asthmatic conditions.

Sand packs

Sand packs and sand baths (psamotherapy) consist of the total or partial covering of the body with sand at a temperature of 45-50°. The application of sand is done in a bathtub and lasts 20-40 minutes. The action is based on thermal and mechanical factors and is general on the body, similar to other hyperthermic procedures. The hypersweating produced is absorbed by the sand, so the procedure remains dry for a long time; in a second, late phase, this application also becomes wet, through imbibition with perspiration, which has a cooling effect.

Sand wraps or sand bath is a procedure that consists of covering the body with sand at a certain temperature (45°C - 50°C), lasting 20' - 40', followed by a cold shower 20°C - 22°C.

Action mode. The factors on which the action of this procedure is based are the thermal factor and the mechanical factor produced by the irritations caused by the grains of sand on the skin, the sand absorbs sweat, and in order to be reused, it is washed in special installations, and in their absence it is thrown away .

The procedure falls under the category of thermotherapy procedures with general action on the body, with indications and contraindications identical to theirs.

Indications: degenerative and inflammatory rheumatism conditions (rheumatoid arthritis, ankylosing spondylitis) and post-traumatic ones of the MAK apparatus, disorders of the peripheral nervous system, disorders of the internal organs

Contraindications: tuberculosis, dermatological diseases, neoplasia, hemorrhagic syndrome.





7. Frictions and brushing - definition, mode of action, methods of application, indications and contraindications

Frictions are hydrotherapy procedures with toning action, whose effect is based on the thermal and mechanical factor. Frictions are thermotherapy procedures that use, for therapeutic purposes, in addition to the thermal factor, the mechanical factor.

Depending on the temperature, the frictions are divided into cold and alternating, never hot.

In depending on the region it is applied in: partial - when it affects the upper and lower limbs separately or together, complete - when it affects the entire body surface in segments or completely.

The method of execution consists of friction-type massage maneuvers, vigorous, at the level of the treated area initially covered with a towel soaked in cold water (18-20°C), then with a dry sheet and, finally, with a blanket.

The alternating ones first use a towel soaked in warm water (38-40°C) then one soaked in cold water (16-18°C) following, after that, the sequences above.

In complete frictions, a certain order of execution is respected. Namely: start with the right lower limb, then the left, followed by the posterior triangle, the anterior thorax, the lateral parts of the triangle and, finally, the abdomen in the direction of bowel evacuation, a cold compress is applied to the forehead or the back of the neck. After the procedure, the patient is well covered and left to rest for 20-30 min.

A correct execution from a technical point of view should not cause cold reaction. Sometimes the procedure can be completed by pouring a large amount of cold water or by directing a current of cold air over the patient (so-called sheet bath or air current bath).

Contraindications consist of: diseases: cardiovascular, dermatological, nervous system disorders, atherosclerosis, febrile conditions, decompensated chronic diseases, cachectic states.

Mode of action of friction.

The factors on which the friction action is based are the thermal factor and the mechanical factor.

The cold or alternating stimulus causes an excitation of the nervous system, an increase in respiratory movements and their depth, a slight increase in cardiac activity, intensification of circulation with a tendency to heat loss, and a slight stimulation of metabolism.

Partial and partially complete frictions are considered procedures for toning the neuromuscular apparatus; apart from this, they have a general sedative action, they regulate sleep.

Indications: overwork; nervous asthenia; undiagnosed febrile conditions; convalescence after febrile illnesses; compensated heart disease; peripheral circulation disorders; acrocyanosis; muscle atrophy; joint pains; paresis and paralysis.

The complete frictions have an action similar to the partial and partially complete ones, but much more intense, so in the first phase under the influence of the cold stimulus, on an extended surface, an intense integumentary vasoconstriction occurs, which has as a consequence a difficulty in cardiac activity with an acceleration of the heart rate, and in the second phase vasoconstriction is followed by a vasodilatation that eases cardiac activity, favors heat loss and stimulates metabolism. Full frictions require a great resistance of the body and are highly exciting procedures.

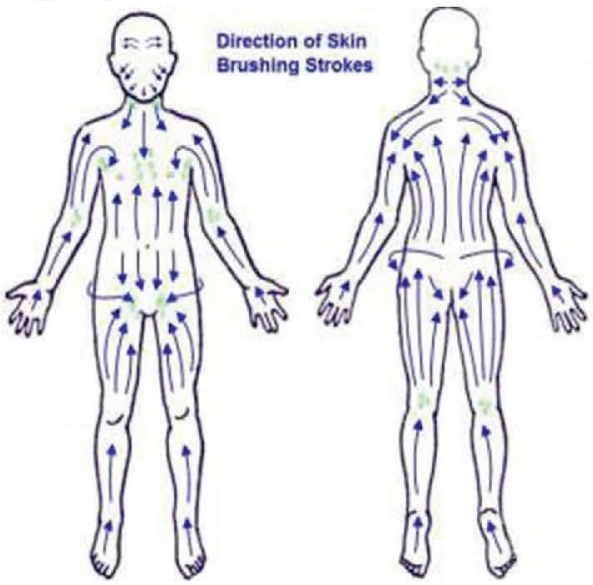
Indications: obesity; uric diathesis; hyperthyroidism; depressive neurasthenia; chronic bronchitis; pulmonary emphysema.

Contraindications: hemorrhages; dermatological conditions; acute and chronic neuralgia; generalized arteriosclerosis; decompensated heart diseases; hypertensive disease.

The brushes

Brushing are procedures whose effect is based, in particular, on the mechanical factor applied with the help of a brush; they act on the peripheral circulation. They can be divided into dry or wet and complete or partial; they can also be performed by the patient (self-brushing).

The application technique for complete brushing requires a certain order of action. The therapist standing on the right side of the patient, starts with the left leg, continues with the foot and ankle, then the left thigh. Next comes the right inner limb, then the left and right upper limbs, the cervical region, the shoulder girdle region and the posterior thorax, the anterior thorax, the abdomen.



At the level of the lower limbs, brushing is done by moving two brushes rhythmically, uniformly, the movements performed are circular. At the level of the spine, the movements are longitudinal, and at the level of the ribcage, movements are made along the ribs, from back to front. At the level of the abdomen, the movements performed are circular. The same rules apply for partial brushing.

For wet brushing which are alternating procedures, alternate brushing is used, with the brushes soaked in warm and cold water or brushing under the shower. At the end, wash with cold water or take a short shower, then dry rub. The duration of a brushing varies between 14 and 45 minutes. They act on the peripheral circulation, causing vasodilatation and have an exciting effect on the nervous system and a stimulating effect on thermoregulation and metabolism. They can be used as a precursor to tempering.

Brushing are procedures that address the peripheral circulation and whose effect is due to the mechanical factor, carried out with the help of oval, rectangular or special brushes with a soft, medium or rough roughness.

Brushings are independent procedures, but they can also be used as procedures that precede frictions, in order to increase the dermo-vascular effect, they have a total duration of 8'-10', and from case to case they can be extended up to 30' – 45'.



Brushing acts on the integumentary circulation, causing a vasodilatation that eases the work of the heart, removing part of the blood from the central circulation. It is an exciting procedure for both the nervous system and the cardiovascular system. It is used as a toning (hardening) procedure, because, through the loss of heat that occurs due to peripheral vasodilatation, it leads to an increase in metabolism.

Indications: peripheral circulation disorders in rheumatic diseases; mild heart failure (partial strokes); convalescence after febrile illnesses; nervous asthenia; obesity; hypothyroidism.

Contraindications: hyperthyroidism; eczema; varicose veins; pronounced heart failure; generalized arteriosclerosis; hypertension.

8. Washes and affusions - definition, mode of action, methods of application, indications and contraindications

Washes

They are procedures with a mode of action and indications similar to friction, but gentler, due to the much lower intensity of the mechanical factor. Depending on the temperature, they are divided into cold (18-22°C), warm and alternating. Depending on the region of the body where it is applied, they can be partial or complete. It is performed by washing the affected area with a towel soaked in water at the prescribed temperature, with movements in both directions at the level of the limbs and trunk and circular movements at the level of the abdomen. At the end of the procedure, the patient is covered with the sheet and blanket or gets dressed and moves for a few minutes. Indications for washes refer to convalescent states, some febrile states, they are also indicated as cooling procedures after important thermal applications.

Washes are hydrotherapy procedures with moderate action, whose effect is based on the thermal factor.

Classification

Depending on the temperature, washing is divided into:

- cold – 18ºC – 22ºC (most used);
- warm – 38ºC – 40ºC;
- alternating.

Depending on the region of the body that we apply, the washes are divided into:

- partial washings – upper and lower extremities, upper half of the body, lower half of the body;
- complete washes – involving the entire surface of the body.

The mode of action is similar to that of friction, with the difference that, here the mechanical factor is missing, the action is much gentler.

Indications:

- in patients with increased reactivity;
- febrile conditions;
- in very weak patients during the convalescence period;
- as cooling procedures, after strong thermal procedures, with the aim of restoring vascular tone and transforming paralytic vasodilatation (passive or cyanotic) into active vasodilatation.

Affusions

Affusions are the procedures by which a column of water without pressure is projected onto the body. Depending on the temperature, they are divided into cold (18-22°C) and alternating (38-42°C and 18-22°C); Depending on the body region involved, there can be complete or partial fusions.

The application of the water column is done with the water jet very close to the skin, until the appearance of the dermovascular reaction. The partial ones can be of interest: legs, calves, thighs, the entire lower body, the upper limbs, the entire lower body, the posterior thorax, the back of the neck. The general ones are applied first, on the back, then on the front. They have as a variant the lighypertensioning affusion, which, in fact, is a shower, applying from a distance of 3-6 m and with a pressure of 1.5 atmospheres.

Alternating infusions use the combined application of hot and cold water at the mentioned temperatures, always starting with the warm application: the alternation is repeated 3 times.
The mode of action is based on the appearance of the dermovascular reaction, intense and on an extended area of the skin with the secondary determination of consensual visceral remote reactions.
They have a general effect of regulating thermal balance, metabolism and tempering the body.
The lower ones can achieve temporary decongestion of the pelvic and abdominal organs and even of the cerebral circulation. The higher ones accelerate the respiratory and cardiac frequency, with the general stimulation of the body. Locally, it stimulates the regulation of superficial circulation, tones the muscles, stimulates intestinal peristalsis.
Indications for affusions refer to: peripheral circulation disorders, muscle hypotonia, depressive or overworked states. They are also used as cooling procedures after intense thermal applications.
Contraindications are: acute and subacute inflammatory disorders of the pelvic organs, metrorrhagia, pregnancy, acute or subacute inflammatory conditions of the abdominal organs.
Affusions are procedures that consist in projecting, without pressure, some columns of water on the various regions of the body, with a predominantly thermal effect.

Classification

Depending on the temperature, the fusions are divided into:

- cold – 18°C – 20°C;
- alternating – 18°C – 22°C and 38°C – 42°C,

Depending on the region to which they are applied, the mergers are divided into:

- partial affusions - lower - calves, knees, thighs, and upper - arms, back, nape;
- general affusions – general affusion and flash affusion.

Lighypertensioning affusion – a procedure incorrectly called affusion, because it is a shower, it is applied from a distance of 3 – 6 m and under a pressure of 1.5 atm with the Scottish shower, and is used as a vascular recovery procedure after hyperthermic procedures.
Affusions base their effect on the thermal factor, at the place of application there is a strong and sudden vasoconstriction, followed by an immediate vasodilatation, and in their absence, the infusion is contraindicated. Affusions can be applied as standalone procedures or as vascular recovery procedures after hyperthermic procedures.

Indications:

- peripheral circulatory stasis (varicose veins);
- acrocyanosis;
- paresis and paralysis of the lower limbs;
- depressive states;
- physical and intellectual overwork;
- pleural and pericardial adhesions;
- asthma.

Contraindications

- metrorrhagia;
- subacute and acute appendices;
- acute cystitis;
- pregnancy;
- nephritis and dermatitis;
- renal and biliary calculosis.

9. Baths - definition, mode of action, methods of application, indications and contraindications

Baths are procedures that use plain water at different temperatures and in different states of aggregation or water in which different substances are added, with a therapeutic role. In the application of the bathrooms, especially the general ones, a few rules must be taken into account:
a) general baths are applied in the first half of the day - large procedures, demanding for the body;
b) a time interval must be kept between the ingestion of food and the application of the general bath (30 minutes after breakfast, 2-3 hours after a slightly richer meal);
c) general baths are not applied after significant physical effort or after states of high nervous tension;
d) enter the water slowly, only after checking the water temperature; the water must cover the shoulders, unless other special indications are made;
e) for hyperthermic baths, a cold compress is applied to the forehead;
f) for a relaxing posture, there must be devices for supporting the head and legs in the bathroom;
g) the patient must be supervised throughout the procedure, which is interrupted at the slightest sign of intolerance
h) a period of rest must follow after the bath

Baths are hydrotherapy procedures that are practiced with plain water at different temperatures or with water to which various ingredients are added.

Classification

Baths are classified according to several criteria:



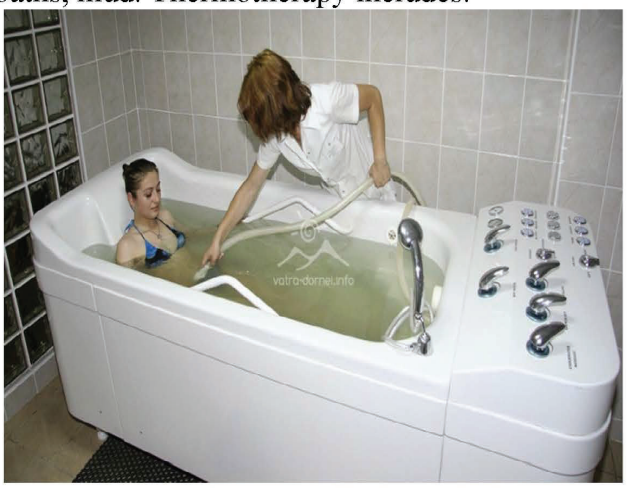
Depending on their character:

- simple bathrooms,
- medicinal baths,

Depending on the temperature:

- cold baths (below 20°C);
- cool baths (between 21° - 33°C);
- indifferent (between 34° – 35°C);
- warm (between 36° - 40°C);
- hot (over 40° – 45°C);
- alternating (cold 18° – 20°C / warm 38° – 40°C)

The environments that allow the use of this important thermal exciter are those with lower conductivity: water vapor, heated air, sand, sunbaths, mud. Thermotherapy includes:



- • hot air baths;
- • steam baths;
- • light baths;
- • sunbathing;
- • sand baths.
- • mud baths

Depending on the duration:

- • short duration (up to 5');
- • of medium duration (between 10' - 20');
- • long-lasting (over 20'),

Depending on the surface:

- partial bathrooms;
- general bathrooms.

Special bath application technique. In addition to the classification criteria above, there is also a classification according to some special aspects of bathrooms:

- bath with waves;
- half bath (Halbbad);
- bath with a brush;
- kineto-therapeutic bath;
- bath with massage;
- foot baths;
- hand baths;
- ascending hand baths (Hauffe);
- sitting baths;
- medicinal baths (baths with chemical ingredients, baths with medicinal plants and related organic substances, baths with various gases, baths with radioactive substances).

Medicinal baths are divided into:

1. Baths with chemical ingredients:

- iodine baths;
- baths with sublimate (disinfectant);
- baths with soap;
- salt baths.

2. Baths with herbs and related substances:

- baths with chamomile or mint or combined;
- baths with malt, wheat bran or starch;
- mustard baths;
- baths with cetin, spruce bark, oak, chestnut.



3. Baths with various gases:

- baths with oxygen bubbles, air bubbles;
- carbon dioxide baths;
- dry carbon dioxide baths (general and partial mofettes).
- baths with radioactive substances - baths with radon (radon concentration between 50 – 400 Mach units).

Action mode

The factors on which the action of the baths is based are the thermal factor, the hydrostatic pressure, the mechanical factor (brush, waves, friction, massage), the chemical factor, the excitement caused by the mass of water on the body exerted by means of the skin circulation.

Indications:

- diseases of the cardiovascular system;
- diseases of the respiratory system (TB, other chronic respiratory diseases);
- blood diseases (anemia, chlorosis);
- functional disorders of the nervous system.
- neuroses;
- neuritis;

- neuralgia;
- infectious dermatological conditions, mycotic, eczema, pruritus, urticaria, scleroderma;
- hypertonic disease in the neurogenic phase;
- nervous asthenia;
- physical asthenia;
- insomnia;
- infectious diseases with fever (cold procedures);
- sequelae after hemiplegia;
- gastric and intestinal atony;
- enteritis;
- hemorrhoids;
- chronic rheumatic diseases; chronic intoxications;
- obesity;
- chronic bronchial asthma;
- angina pectoris;
- arteriosclerosis;
- constipation;
- amenorrhea, dysmenorrhea;
- impotence;
- urinary incontinence;
- bladder and intestinal colic;
- atony and uterine prolapses;
- ovarian insufficiency.





Contraindications:

- arteriosclerosis with hypertension;
- chronic nephritis;
- Pulmonary tuberculosis with tendency to hemoptysis.
- accentuated states of weakness;
- pathological dermo-vascular reactions;
- general contraindications of balneophysiotherapy

The light bath is part of the superficial, dry thermotherapy procedures that heat the tissues through one or a combination of the three mechanisms: conduction, conversion and convection. The light bath uses the action of infrared (IR) and visible radiation on the body, emitted by incandescent lamps and is applied in a closed space, in special devices, for a duration of 10-20 minutes (over 20 minutes, due to sweating, turns into a wet procedure, difficult to bear), the patient is supervised, the thermal application being followed by a cooling procedure.

It represents an intense thermotherapy procedure, on the one hand, due to the heating of the air around the body to 60-80°C, on the other hand, through the direct thermal effect on the body.

The duration is 10-20 minutes; if it lasts longer, it can turn into a wet procedure due to sweating; this causes the initial high temperatures to become; more difficult to bear (evolution in two phases, similar to a hot air bath).

Application can be done partially (upper or lower half of the body) or generally.

The patient is continuously monitored in terms of cardiorespiratory functions and general condition, a cold compress is applied to the forehead, and at the end a cooling procedure is recommended, with water at 22°.

Indications

- obesity
- chronic degenerative and post-traumatic ailments of the NMAK apparatus
- the body's hardening process



Contraindications

- hypertension
- heart diseases
- advanced atherosclerosis
- pulmonary tuberculosis
- neoplasias
- hyperthyroidism
- chronic inflammatory rheumatism in the spurt

Sunbathing

Sunbathing involves the total or partial exposure of the body to the direct action of the sun's rays. The indication and exposure time are assessed according to age, physiological state, condition, eventual sensitivity to ultraviolet, season and other meteorological factors.

The duration is progressive depending on the age of the patient, his physiological state, the conditions treated. The temperature is 30-33°.

The action of sunbathing is complex, based on the thermal effect of infrared radiation, but also on the effect of light and ultraviolet rays, the action of other meteorological factors is added: wind, humidity, etc.

Indications:

- rickets
- chronic degenerative rheumatism
- psoriasis
- chronic inflammatory gynecological conditions
- hypothyroidism

Contraindications:

- hypertension
- heart diseases
- advanced atherosclerosis
- tuberculosis
- neoplasias
- hyperthyroidism
- chronic inflammatory rheumatism

Air bath

The air bath consists of the partial or total exposure of the naked body to the action of hot (20-30), cool (15-20°) or cold (4-15) air.

The duration is variable depending on the temperature and the method of application, partial or complete.

It starts with 5-10-15 minutes daily, gradually increasing by 5-10 minutes to 1-2 hours, once or twice a day.

Cold or cool air bath in windy conditions is avoided; gymnastic movements can be associated.

The action of the air baths is based on the effect of the complex of meteorological factors, not only the thermal factor carried by the air and manifests itself on the mechanisms of thermoregulation, metabolism, the nervous system and non-specific resistance of the body.

They are indicated in: cardiovascular and respiratory diseases, including pulmonary tuberculosis, anemia, functional disorders of the nervous system.

Contraindications are represented by: advanced atherosclerosis, chronic nephritis

The gas bubbles in the bath break against the patient's skin, exercising a gentle massage, an efleurage that gives an active hyperemia, lowering the peripheral barrier. The patients' feet are placed in tubs.



The temperature is 30-35°C, with a duration of 5-20 min.

- sedative
- vasodilator on arterial circulation
- hypotensive,
- feed on atonic wounds.

Indications

- peripheral circulatory disorders
- sequelae of phlebitis
- neuroses
- H.T.A
- ulcer disease

Baths with medicinal plants

Baths with medicinal plants or organic substances may contain: infusion of chamomile, mint, mustard flour, bran, malt, oak bark, chestnut bark.

For the bath with infusion of chamomile flowers or mint, use 500-1,000 g of chamomile flowers, respectively 300-500 g of mint leaves. Indications include: rheumatic diseases, neuralgia, asthenia neuritis, anxiety. The aromatic substances in the bath have a sedative effect on the central nervous system.

The bath with mustard flour uses a paste obtained from 10-100 g of mustard flour and water at 25 0, which is inserted into a bag that will be placed in the bath for a few minutes until the water acquires a greenish-yellow color and a penetrating smell of mustard. It has a revulsive and exciting effect on the skin. It can be indicated in bronchitis, milia, neuritis, chronic degenerative or inflammatory rheumatism.

The bath with wheat bran, with malt or with starch is characterized by a longer maintenance of the temperature of the water in the bath, due to the poor thermal conductivity that they, the flour, have. In addition, they also have an emollient effect on the skin. A decoction of 1-3 kg of barley malt boiled for 30 minutes in 5-6 l of water or 1.5 kg of wheat bran or 1-2 kg of starch is used for a general bath. They are indicated in dermatological conditions, neuralgia, rheumatic diseases.

The bath with oak or chestnut bark (decoction of 3 g of iron tree bark in 5 liters of water for 30 min) has an astringent effect on the skin. It is indicated in acute and chronic eczema, urticaria, drug allergies.

Duration 20 minutes

There are baths to which herbal infusions or decoctions are added, after they have been filtered. Patients are placed in tubs, in these tubs different plants are used such as: mint, thyme, lavender, rose petals, chamomile.

It is applied at a temperature of 25°C, with a duration of 5-20 min.



- sedative
- relaxing
- antiseptic
- anti-inflammatory
- cicatrizing
- astringent on the skin

Indications

- neuroses
- rheumatic conditions
- HYPERTENSION
- ulcers
- diseases of the upper respiratory tract
- myalgias
- Neuritis



Contraindications

- acute rheumatism
- hypotension
- heart conditions
- pulmonary conditions
- acute infectious diseases
- phlebitis

Galvanic bath

It represents the simplest form of therapy based on electric current, but also the oldest. The electrotherapy procedure, used in physical and recuperative medicine, is a procedure that has as a therapeutic agent the continuous electric current, with a voltage of 50-60 volts, but of weak intensity.

The current is applied through carbon electrodes, which are immersed in tubs full of water. The patient inserts the upper or lower limbs or all four limbs into the tubs.

The duration is 15-29 min, with a voltage of 50-60 volts, but of weak intensity.



- vasodilator
- antalgic

Indications

- rheumatic diseases
- peripheral circulatory disorders (arthritis, Raynaud's disease).

Contraindications:



- skin lesions
- open wounds
- eczema
- varicose ulcer
- dermatitis

Enterocleaner or intestinal bath

As the name enterocleaner means nothing more than an intestinal bath or in other words an enema.

To perform this procedure we need a special installation, the most common models can be used in an enameled bathtub.

Underwater intestinal baths are applied only by prescription and under the supervision of a doctor, the treatment is contraindicated for patients who have a greater risk of perforation of the intestine following an existing pathological process.

The intestinal bath is recommended 2-3 hours after the last meal, in no case after a larger meal.

The temperature of the water for the bath must be 35° - 37°C and of the liquid for washing between 37° - 42°C, the solution for washing is a solution of sodium chloride, in a concentration of 0.6% (180 g of kitchen salt in 30 l of water) or a seawater solution with an appropriate concentration.

The use of tap, distilled or pure water will be avoided, especially for cardiac patients and patients with weak circulation.

In case of need, tea infusions or plant extracts can be added to the salt solution, most often chamomile, mint or valerian are recommended depending on the indications.

For a correct intestinal lavage, we need at least 10-25 l of lavage liquid.

If the tap water is chlorinated and there is no dechlorination facility, the preparation of the washing liquid is more complicated, because the chlorinated water can cause damage to the intestinal mucosa and changes in the flora, in this case the entire amount of washing liquid must be boiled first, after to which salt and possibly medicines are added.

The average duration of a bath is 45' - 60'.

General baths at indifferent temperature use water at 34-35°C.

The duration of such a bath is 10-30-60 minutes.

The mode of action is based on the mechanical factor and less on the thermal factor, as we are talking about water temperatures at which the exchange of caloric energy is practically zero. In the first minutes, the pressure exerted on the body causes an acceleration of the heart rate and breathing rate, resulting in a toning and refreshing action of the short-term baths (10-15 minutes). If the bath is prolonged, a slight sedation effect occurs.

Cold (18-22°) and cool (28-32°) baths are based on the thermal factor and the dermovascular reaction to cold. When the patient enters the bathroom, intense (depending on the external gradient) generalized cutaneous vasoconstriction occurs. Thus, thermolysis is inhibited and then thermogenesis processes are activated. There are several ways of applying cold and cool general baths: full bath in tub or pool, immersion bath, wave bath, flowing water bath, wave bath, half bath, brush bath. Complete cold baths in the tub or pool use water at no more than 15°, last 10-30 seconds and are usually applied after a thermal procedure; during the bath the patient makes intense movements, and after the bath he wipes himself well and rests or exercises in the open air. They base their action on the thermal factor, intensely exciting.

They are recommended in: obesity, hypothyroidism, diabetes, after states of intense mental or intellectual fatigue.

They are contraindicated in heart diseases, neuroses, decompensated general diseases, debilitating diseases, dermatological diseases, of the peripheral vessels.

Immersion baths are made using an ordinary bathtub with water at 15-18 C°; the patient enters the water for a few seconds and then is taken out; repeat dipping 3-4 times. The effect is more

similar to that of cold full baths. It is indicated in infectious diseases with high fever, after thermotherapy procedures, intense physical asthenia.

The wave bath uses a tub with a special device for creating waves and water at 28-32°, up to half of the tub or up to three quarters. The duration is 3-4 min. It is useful in convalescence, in states of asthenia or overwork.

The half bath (halbbad) is performed in a valve with water at 32° C, in which the patient enters only halfway (up to the navel). During the first part of the procedure, water from the tub is poured over the patient's back and shoulders 10-15 times, following friction maneuvers, the procedure is repeated at the level of the lower body. Follows the friction under the water of the whole body from top to bottom.

All the maneuvers can be repeated or you can go to the second, cooling time, by adding cold water until the prescribed temperature is reached (30-29°). Then frictions are made again under the water, in the opposite direction compared to the first time and finally 10-15 castings on the back, possibly an energetic casting of a larger amount for tonic purposes and to stimulate breathing and circulation.

The duration of such a bath is 3-5 minutes, rarely reaching 10 minutes.

It is a tiring procedure, both for patients and therapists.

Its toning, exciting, anti-thermic and tempering action is based on the two therapeutic factors, mechanical and thermal. It is indicated in febrile infectious diseases, in spastic patients, in gastrointestinal atony, nervous asthenia, as a cooling procedure after high thermotherapy for hardening the body, after prolonged immobilization.

Contraindications are accentuated states of weakness, pathological dermovascular reactions, etc.

The brush bath is actually a bath at a temperature of indifference, for which a bathtub filled three-quarters with water at a temperature of 34 C is used and a brush with the help of which the patient is brushed under water from top to bottom, repeating maneuvers 2-3 times.

The duration of this bath is short, 3-5 minutes.

Due to the accentuated mechanical factor, its action is more intense than that of the half bath.

Baths above the temperature of thermal neutrality can be warm (36-37C), hyperthermic (38-39C) and intensely hyperthermic (over 40C)

1. Hot baths are applied in the form of simple baths, physiotherapy baths and massage baths.

Simple hot baths are made in a simple bathtub with hot water of 36-37C and last between 15-30 min. They have a muscle relaxant and general sedative action and a thermoregulation training effect.

Simple warm baths are indicated in: neuritis, neuralgia in spastic patients, joint pains, neuroses, asthenia, insomnia.

Physiotherapy bath

The kinetotherapeutic bath is a simple warm bath, in which passive and active analytical and global exercises are performed underwater, 30 minutes. You can combine the underwater massage (massage bath) or the underwater shower.

Indications include post-traumatic, orthopedic, chronic degenerative rheumatic, neurological conditions.

Mobilization under water is less painful, thanks to the anti-algesic and sedative effect of warm water; on the other hand, the movements are easier due to the muscle relaxant effect on the muscles with changes in tone, the effect on the retracted periarticular soft tissues and the loss of body weight, according to Archimedes' law.

Hyperthermic baths

Hyperthermic baths are practiced in the sub-form of simple hyperthermic baths and ascending hyperthermic baths.

Due to the overload and intense excitement it causes, hyperthermic baths are indicated with care and only after a careful, complete assessment of the patient.

They can be indicated in patients with ankylosing spondylitis in an inflammatory setting in order to simulate non-specific immunological processes in order to modify the patient's reactivity, as a hardening procedure, in dysmetabolic states.

Ascending hyperthermic baths are preferable to simple ones.

Their principle of application is based on the gradual intensification of demands on the body, by progressively increasing the temperature of the bath water from 35°; from minute to minute by 1°C, by adding hot water.

The temperature of the water and the patient's (inductively central) temperature are constantly monitored, as well as the pulse, blood pressure and respiratory rate.

A patient temperature of 39 degrees can be reached, at a water temperature of 41-43°.

The duration is 60-90 minutes.



Indications include: chronic degenerative and inflammatory rheumatic diseases, especially ankylosing spondylitis, chronic neuralgia, neuritis, bronchial asthma, chronic poisoning, obesity.

The steam bath is an intense thermotherapy procedure, which is usually applied at a general level; but it can also be partial.

The patient is placed in a special device, like a cabinet, which can be placed vertically or horizontally. It is equipped with a steam tap and a thermostat.

The patient's head remains outside, a cold compress is applied to the forehead.

It starts with an initial temperature of 38-42°, and it gradually rises to 50-55°.

To increase the sweating process, give the patient 1/4-1/2 liters of water.

At the end, a cooling procedure such as washing, fusion, etc. is applied.

The total duration of the procedure varies between 5 and 30 minutes, depending on the patient's resistance, his state of thermal training and the goal pursued.

The action of these baths is based on the high moist temperature that causes an intense excitation of the body, with cardiac, ventilatory and metabolic stimulation.

The indications for this bath are: heating procedure that precedes cold applications for the short-term bath, peripheral circulation disorders for the medium-term bath, and for the long-term bath (15-30 minutes) obesity, hypothyroidism, chronic degenerative rheumatism, chronic rheumatism inflammatory outside of acute pustules, neuralgia, chronic neuritis, chronic intoxications.

Partial bathrooms

Partial baths are divided according to temperature into: cold, warm, alternating and ascending - baths (Hauffe).

Depending on the therapeutic factor involved, they can be, like the general ones: simple or medicinal

Depending on the region of the body on which it is applied, the most frequently used are: hand baths, foot baths and sitz baths

Hand baths use vessels deep enough for the hands and forearms to fully enter the water; they are cold, warm, alternating or descending.

1. Cold hand baths use: temperatures below 15 degrees.

Those of short duration (1-2 minutes) have a decongestant effect for the internal organs, including the thoracic ones and the brain.

The most prolonged ones, of 5-10 minutes, have an anti-inflammatory and anti-sweat effect.

2. Warm hand baths last 10-20 minutes, temperatures between 37 and 45° are used.

They produce peripheral vasodilatation and, by reflex, coronary vasodilatation and relaxation of the bronchial muscles.

They are indicated in rheumatic, post-traumatic diseases, inflammatory diseases of the airways, bronchial asthma crisis, empirically in angina pectoris crisis.

Alternating hand baths use, alternatively, temperatures of 40° and 15-18°, respectively. in warm water, the hands are held for 2-3 minutes, until the dermovascular reaction appears, and in cold water for 20-30 seconds.

The maneuver is repeated 3-5 times.

It always starts with a warm bath and ends with a cold bath. Thermal alternation activates the peripheral circulation and decongests the thoracic organs.

The indications for these baths are represented by local vasomotor disorders and peripheral neurological disorders, post-traumatic conditions.

The ascending hand baths (Hauffe) have the same application methodology as the general ascending baths. They produce vasodilatation both locally and at the level of deep organs, through consensual reactions.

Footbaths use vessels that allow water to cover up to the level of the upper third of the calf.

They can be, like those for the hands, cold, warm, alternating and ascending and have the same application technique, the same mode of action and the same indications.

Sitting baths require vessels of special shapes. They are, depending on the temperature, warm, alternating and ascending cold.

1. Cold sitting baths, with a temperature of 18 degrees, last 1-5 minutes, being indicated for constipation, amenorrhea, impotence, urinary incontinence, insomnia.

The longer ones of 5-10-20 minutes can be useful in acute enterocolitis, subacute inflammation of the genital organs.

They are contraindicated in cystitis, uterine colic.

2. Hot sitz baths are practiced at a temperature of 36-40 and last 10-20 minutes, having the effect of reducing muscle tone, combating vascular spasms and accelerating resorption processes.

They are indicated in dysmenorrhea, uterine colic, bladder and intestinal colic and chronic prostatitis, chronic inflammation of the genital organs.

3. Alternating sitting baths are stimulating and toning for the organs in the small pool. They are indicated in uterine atony, uterine prolapse, ovarian insufficiency.

4. Ascending sitting baths have the same effect, of driving blood circulation and peripheral and central thermoregulation, as all types of alternating procedures.

General medicinal baths use for treatment, in addition to the thermal and mechanical factor, the chemical factor represented by various chemicals, medicinal plants, gases, radioactive substances.

For baths with chemical ingredients, the water temperature in the bath is 35-37 degrees, and the duration is 10-20 minutes

The iodine bath is made by dissolving 50-100 g of potassium iodide in water for a full bath or 5-10 g for a partial bath; you can also use table salt.

The tubs or vessels in which the bath is taken must be made of wood, and the patient is covered, to avoid the harmful action of iodine vapors.

The action of this bath is mainly based on the effects that iodine has on the body: vasodilatation, decrease in blood viscosity, reduction of inflammation, increase in non-specific defense power of the body.

The indications are: chronic inflammatory diseases, rheumatic diseases, chronic genital inflammations, neuralgia, dermatological diseases.

The salt bath is prepared with 6-10 kg of salt for a general bath, respectively 1-2 kg for a partial one. Its effects on the organism consist of: superficial vasodilatation, influencing the general metabolism, influencing the phosphocalcium balance, increasing the elimination of uric acid, anti-inflammatory and resorptive effect.

They are indicated in chronic diseases of the locomotor system, chronic genital ailments, hypothyroidism.

Ex. Bazna salt baths

Use Bazna Salt in the form of compresses, poultices, partial and general baths.

For the compress, poultice and partial baths, dilute 25g of Bazna Salt in one liter of water, and for general baths, 300g of therapeutic salt in approximately 50 liters of water.

The use of Bazna salt is for prophylactic, therapeutic and recovery purposes.

The prophylactic treatment is indicated for healthy people prone to diseases of the locomotor system, ligamentous and musculo-articular laxity

Indications - chronic rheumatic pathology, chronic gynecological, post-traumatic

PRAID salt - Sulfoiodide bath salt

Way of ussage:

We put 0.5kg of bath salt in the tub and add some hot water. After the salt dissolves, fill the tub with water (approx. 35L). The treatment time is approximately 20-30 min. There will be no showering after the treatment. After treatment we suggest rest. We recommend 2-3 weekly sessions.

Indications Bath salt: joint rheumatism and arthrosis, post-traumatic sequelae of the limbs, asthma, neck pain, skin diseases (allergies, inflammation), respiratory diseases, gynecological problems, muscular dystrophy, muscle cramps and dystonia, chronic bronchitis. Effect - antiseptic and anti-inflammatory.

Gas baths often used in our specialty can be natural or artificial and use gases such as carbon dioxide, hydrogen sulphide, oxygen

Baths with C02 have a special device - artificial baths - which create, at a pressure of 0.5-1 atmosphere, fine bubbles of C02 in the bathtub with water at 30-35 degrees, filled half, three quarters or completely;

The duration of this bath is between 5 and 20 minutes. Dry CO2 baths can also be prescribed: when the patient cannot bear the high hydrostatic pressure.

Apart from the common factors with the other baths, the latter owes its action mainly to CO2, which performs a gentle massage of the skin and which, after being resorbed, acts chemically on the body, causing the release of histamine and acetylcholine with a peripheral vasodilatory effect.

As a result, the drop in blood pressure is obtained.

In addition, carbonated baths have a calming effect on the nervous system.

The indications of these baths include: compensated cardiovascular diseases, arterial hypertension, chronic obliterating peripheral arteropathy.

MIXED CARBOGASOUS MINERAL WATERS (minimum 1 gr.CO2/l), bicarbonate, sodium chloride, iodide, ferruginous, arsenical, slightly sulphurous with a total mineralization of 3.2-22.4 gr./l, which can be used both in the form of external cure as well as baths in individual bathtubs in diseases of the cardiovascular system as well as in the form of internal cure - crenotherapy cure.

The therapeutic effects of carbonated mineral water baths are based on the action of carbon dioxide and less on the pharmacodynamic action of the mineral salts in the composition of the mineral water.

The temperatures used in carbonated baths are below the values of 34°C, below the thermal indifference temperature of water.

Carbon dioxide is absorbed through the skin, it increases arteriolar blood flow from the skin, the vasodilator effect being directly proportional to the concentration of carbon dioxide in the mineral bath.

The most important mechanism of action of CO2 baths is the chemical one, realized by direct resorption through the skin: 30-35 ml/min/skin surface.

In tissues, CO2 causes the release of vasoactive substances for capillary vessels: acetylcholine, histamine, with a peripheral vasodilator effect. As a result, blood pressure decreases and diastole lengthens.

In the baths, there is also the mechanical action of the carbon dioxide bubbles on the skin, creating a micromassage, small explosions of the gas nozzles, the thermal effect of the water and the chemical effect through the direct resorption of CO2 through the skin.

Carbonated baths have a calming effect on the nervous system.

The effects of carbonated mineral waters

1. Peripheral vasodilators with moderate cardio-circulatory systemic demand.

2. Cerebral vasodilators produced by carbon dioxide.

The duration of the bath is 20-30 minutes. Rate: 1 session per day or every 2 days.

The hypothermic effect of the CO2 bath balances after the bath within 30-60 min.

Resorts with mixed carbonated mineral waters recommended for recovery from cardiovascular diseases: Covasna, Băile Tuşnad, Buziaş, Vatra Dornei, Borsec

Baths with carbonated mineral waters are indicated along with special dietary regimes and the continuation of drug treatment in the following cardiovascular diseases:

arterial hypertension stage I and II under therapeutic control;

secondary arterial hypertension without signs of renal failure;

chronic ischemic cardiopathies, sequelae after myocardial infarction at least 3 months after the acute episode; operated valvulopathies without significant clinical and hemodynamic disturbances, at least 3 months after the surgical intervention;

Compensated aortic/mitral insufficiency; peripheral arteriopathy:

peripheral chronic obliterating arteriopathy stage l and ll, Burgher thrombangitis, peripheral circulatory disorders;

chronic venous diseases: states after superficial thrombophlebitis at least 1 month after the acute phase, states after deep thrombophlebitis at least 6 months after the acute phase, varicose veins operated after at least 3 months after the surgical intervention.

Type of treatment: therapeutic and recovery

There are also specific contraindications:

- Myocardial infarction with complication and severe evolution in the acute phase;
- Painless ischemic heart disease with serious rhythm disturbances, conduction or heart failure;
- Recent thromboembolic accidents;
- Heart failure;
- Cerebral arteriosclerosis with mental disorders;
- Cerebral thrombotic accidents with significant neurological sequelae;
- Decompensated kidney diseases;

- Disorders of hydroelectrolytic metabolism.

Mofetic bath - dry CO2 bath

Natural mofette ► natural emanation of carbon dioxide

The major indication of mofettes: secondary prophylaxis and recovery of some cardiovascular diseases.

Mofete: Covasna, Tuşnad, Balvanyos, Buziaş, Vatra Dornei

In mofettes, the therapeutic effect is based only on the chemical factor. The penetration of CO2 through the skin increases the cutaneous blood flow through arterial vasodilatation, but also systemic vasodilatation.

Moffets are technical arrangements in the shape of an amphitheater, with a polygonal, square, oval or round contour, with a varied number of steps or steps, which allow a comfortable position of the patient during the treatment.

The level of carbon dioxide must be below the level of the heart.

Mofetarias installed directly on the source, wet or dry, as the case may be, are built from concrete, stone, brick, wood and must be provided with internal steps for different heights.

The spas must be equipped with automated gas level warning systems in the spa areas.

The capacity of a party is a maximum of 30 - 50 people.

The duration of a procedure is 5-20 minutes, it starts gradually, it must not be followed by another associated procedure.

By tradition, the gas level is set with the match, where the match goes out is considered as the place where the CO2 level rises.

Being heavier, carbon dioxide forms a blanket in the lower part of the mofette, the area occupied by the lower half of the trunk, where it exerts its beneficial action

The clothing of the patients who are recommended mofetarian baths is made of rare cotton or wool fabrics to allow the human body to be in contact with the mofetarian gases as completely as possible.

Natural therapeutic gases are Neogene post-volcanic emanations that are distinguished among natural therapeutic substances by their geochemical genesis, specific to the geological areas of Romania, and consist of spontaneous natural emanations of carbon dioxide and/or gaseous compounds of sulfur, mainly hydrogen sulphide.

The character of mofetic gas is also attributed to the carbon dioxide resulting from the process of natural decarbonisation of natural mineral waters ► naturally carbonated during the extraction works of these waters.

The mofettes are gases resulting from the post-volcanic emanations existing in the area of curvature of the Carpathian arc, from which the carbon dioxide existing in a proportion of 95-98% is used as a therapeutic factor.

Along with carbon dioxide, Mofetarian gas also contains other gases of volcanic emanation: ammonia, sulfur, etc. as well as helium and radon in small quantities that exert a spray of CO2 molecules increasing its penetration power.

Mechanism of action

CO2 is inhaled and dissolved in plasma, respectively it is absorbed through the skin and has the following experimentally proven effects on the body:

on cerebral circulation: increases cerebral blood flow by 75%, which increases the power of concentration and intellectual performance;

on the peripheral circulation: skin hyperemia by direct action on the metaarteriole, with an increase in skin temperature by 1.5 - 4°C;

increase of muscle blood flow by 44% in the skeletal muscles;

hemodynamics of the heart►arterial vasodilatation►decreasing the pre-ejection period, increasing the ejection period;

decrease in blood pressure;

decrease in catecholamines, decrease in blood lipids;



Directions

Peripheral arteriopathy st I, II, III

Arteritis, venopathies, calf ulcers, sequelae after MI, after stroke, hypertension st I, II

Dematological, gynecological diseases, chronic degenerative rheumatism

Contraindications

Ischemic heart disease, rhythm disorders, Heart failure, hypertension sd.III

Renal, respiratory diseases

Baths with oxygen bubbles and air bubbles

The temperature used is 30-35° for those with oxygen and 32-37° for baths with air bubbles, and the duration is 15-30 minutes.

The main action is that of sedation of the central nervous system.

Hot air bath

The hot air bath, although initially a dry hyperthermic procedure, due to hypersweating, turns into a wet procedure. The main mechanism of action, as with all dry hyperthermia procedures, is the reflex mechanism, by exciting the skin thermal receptors; the response to this excitation consists in a lighter vasodilatation, with a milder systemic circulatory demand.



10. Showers - definition, mode of action, methods of application, indications and contraindications

Showers are hydrotherapy procedures represented by columns of water, steam, or hot air, of different temperatures and pressures, projected from a certain distance, on certain surfaces of the body or on the whole body.

Depending on the temperature, the showers are divided into:

- cold (Kneipp shower);
- warm;
- alternates;
- with steam;
- with hot air,

and depending on the shape of the jet:

- rosette;
- roll;
- Scottish;
- fans,



Depending on the direction of the water column:

- vertical (ascending or descending);
- horizontally;
- circular

There is another category of special showers:

- massage shower;
- the underwater shower;
- Vichy shower.

Features of showers



Massage shower - consists of a set of techniques applied to the whole body or some parts of it; the procedure is performed in specially designed, clean, ventilated rooms, with water temperature that does not drop below 20 °C.



During the application of the massage shower, the athlete is lying on a table (bench) slightly inclined towards the lower limbs, covered with a sheet (over a waterproof surface).

The water is directed through a device with multiple holes along its length, mounted above and parallel to the body on the bench, so that the columns of water fall simultaneously. Open the device or the showers (4-6 rosettes) fixed on top and, while the water flows over the athlete's body, the massage is performed. The pressure with which "rainwater" falls, from a height of 60 cm, at a temperature of 38-40 °C, is reduced; there is more of a sprinkling (affusion), for 20 minutes. The massage procedures used are the same as in the case of dry massage, except for tapping. The massage shower is followed by a jet shower and rest for 30 minutes.

The shower-massage produces a strong vasodilatation that favors the resorption processes, the effects being relaxation, muscle relaxation and pain relief.

The underwater shower – consists of applying a shower with high pressure (1-8 atmospheres) and a temperature 1-3 °C higher than bath water (36-38 °C) on the submerged body.



The water column is projected through a hose, equipped with a cylindrical nozzle, placed underwater, 30 centimeters from the body; the cylindrical water jet is oriented obliquely (30°) on the segments and perpendicularly, with circulatory movements on the joints.

The duration of the procedure is 5-15 minutes.

The effects are relaxation, decontracture, sedation under the action of the massage and the thermal factor of the water, activation of circulation at a deep level in large areas, with muscle layer and adipose tissue. The underwater shower produces deep hyperemia in the area of application, favoring resorption processes and myomuscular relaxation and stimulating the motor activity of some abdominal viscera.

Scottish shower - consists in the alternate use of hot and cold water. Cold water, with a temperature of 18-20 °C in one, and hot water, at a temperature of 40-45 °C, passes through two rubber tubes, which have narrowed metal ends. The athlete is at a distance of 2-4 m from the water source; the water jet is projected on it, with a pressure of 1.5-2 atmospheres, first hot water - 10-15 seconds, then cold water 5-10 seconds, repeating this 2-4 times.

The Scottish shower activates the circulation, stimulates the metabolism and tones the neuro-muscular system.

The jet shower – consists of projecting hot water (36-40 °C) on the body, at a low pressure, for 1-4 minutes. The application of water starts from the lower limbs, then moves to the abdomen, trunk and upper limbs. The jet can be designed through a hose or mobile shower, without rosette. The effects of the shower jet are relaxing and calming.

The jet shower - according to the American method - uses the water temperature, initially of 32-36 °C, gradually decreasing to 18 °C, in order to achieve vasoconstriction.

The method is used to produce relaxing effects, especially in the neuro-psychic sphere (the feeling of "light body"), for athletes who have a small performance interval between two efforts.

Emotional showers

Recently, in the wellness area, more and more emphasis is placed on the effects that chromotherapy and aromatherapy have on our well-being. Emotional showers are more than simple showers. They use different types of lights, sounds, aromas, water effects, which awaken all the senses and help us relax.



Emotional showers used to cool the body after the sauna session. They invigorate the body by spraying very fine drops of cold water, while a cool aroma envelops the air in the shower. And to completely detach yourself from everyday worries, these showers are equipped with speakers that will play the sound of the waves or the sea.

Emotional showers with programs that alternate hot and cold water, used to improve circulation, relax muscles and tone the skin.

Emotional showers can be used simply for relaxation or to eliminate stress or fatigue. In this sense, there are emotional showers that have a series of programs such as tropical shower, cold mist, with chromatic effects, aromatherapy or music therapy.



The Vichy shower

The Vichy shower is a special type of water-based massage, a special form of hydrotherapy with an unexpectedly good role in immediate relaxation, improving blood and lymphatic circulation.

The Vichy shower consists of a set of 5-7 shower heads, smaller than the usual ones, arranged longitudinally above a treatment table so that a "warm water cascade" is obtained while the patient is lying down.

The therapist covers the intimate areas or the patient lies in the prone position with the face

protected. The water flows at a pressure and temperature set in advance by the therapist.

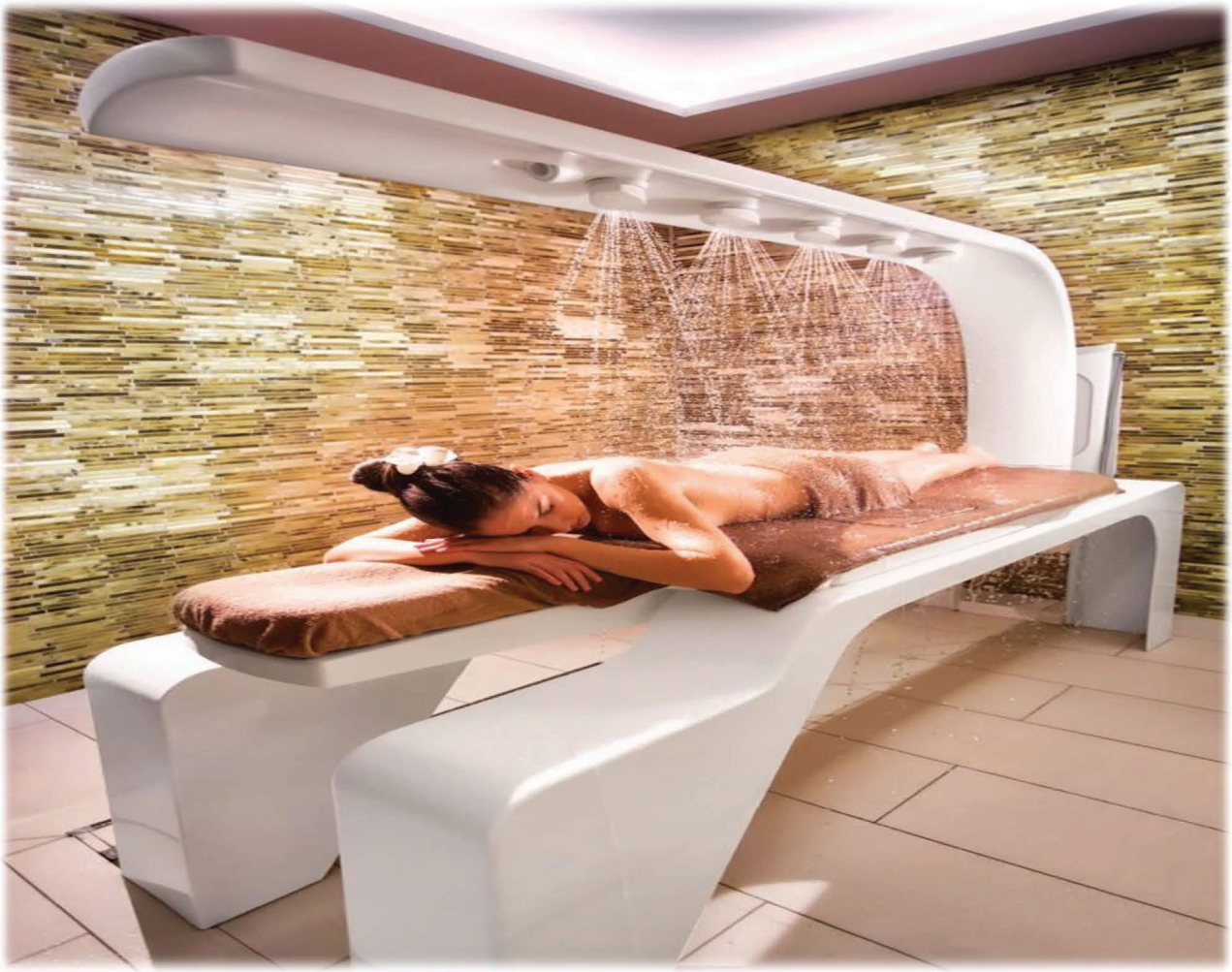
To increase the efficiency, it can be combined with the relaxation massage performed while the water is flowing and to which essential oils or scrubs are added.

The Vichy shower with massage is one of the most special and sought-after methods of rapid relaxation. It can be recommended as a simple form of hydrotherapy or as an integral part of body treatments after exfoliation, massage with mud, different types of wraps (with mud, anti-cellulite gels, moisturizing gels). To improve well-being, take a regular Vichy shower at least every 2 weeks.



The benefits of the Vichy shower are:

- improving blood circulation
- improvement of lymphatic circulation
- exfoliation of dead cells
- skin hydration
- prevention and removal of cellulite
- decrease in muscle pain



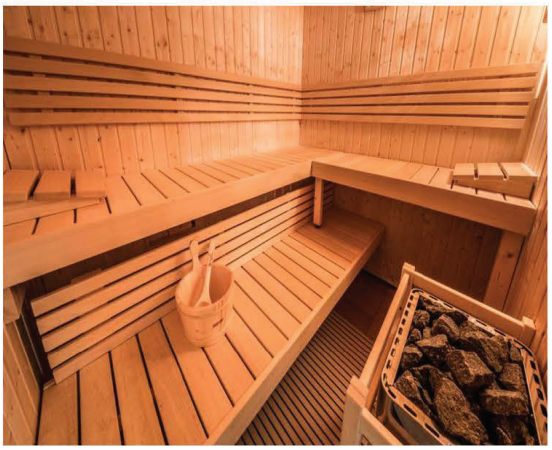
11. Sauna - definition, forms of sauna, mode of action, methods of application, indications and contraindications

SAUNA - represents a variant of the hot air bath initially used by the Nordic peoples for the purpose of tempering the body and thermal rebalancing; it is, in fact, a complex procedure, with contrasting thermal factors. The sauna known today in the Western world originates from Northern Europe. The oldest known saunas in Finland. In the sauna there was a fireplace where the stones were heated to high temperatures. The history of the Finnish sauna is 2000 years old, and it actually begins in Asia. Migratory peoples from Mongolia populated the present-day territory of Finland. It is said that they built the first saunas, to fortify their bodies. The first Finnish saunas are those called savusaunas or smoke saunas. These differed from today's saunas in that they were heated by heating a pile of rocks called kiuas by burning large amounts of wood for around 6 to 8 hours and then letting the smoke escape before enjoying löyly or sauna heat. A properly heated "savusauna" gives heat for up to 12 hours.

To begin with, the patient is introduced into a wooden (pine) room with very dry air, heated to a high temperature of 80-100°, in which the thermoregulatory systems are required slowly but very effectively; As a result, thermolysis occurs, involving especially evaporation through hypersweating and hyperventilation.

The air humidity thus reaches 1-5%. To increase the demand, steam is added (by pouring cold water on hot coals), or a form of mechanical stimulation of the skin is applied, which increases vasodilatation and the release of histamine. Duration 5 - 10 - 20 minutes.

At the end, a cooling procedure is done by immersion in cold water; the feeling of cold does not appear due to the large thermal gradient between the skin (shell) and the core, which makes the skin act as a protective sleeve against low temperatures.



Overview:

Dry air, 5-10-20 minutes, 80o-100oC
Adjustable humidity, built from wood.
Higher temperature at upper level
Alternative to cooling the body (shower, swimming)
On average 2-3 exposures/week
Heart rate: 120-150 b/min.

Forms of sauna:

- Dry sauna
- Wet sauna
- Infrared sauna
- Sauna with ozone

Among the types of saunas, the steam sauna (wet sauna) has a lower internal temperature and higher humidity compared to the temperature and humidity of a dry sauna.



Variants of wet sauna:

- Caldarium (Roman steam bath)
- Hamam (Turkish steam bath)
- Banja (Russian steam bath)
- Temazcal (Mexican bath)
- Irish steam room
- Tylarium (combination between a traditional sauna and a moderate steam bath)

Sauna (in Finnish sweat room) is a small overheated room (70 - 90oC), equipped with benches, which can be next to a swimming pool, or a fitness studio.

The sauna can be used as a dry air sauna or a steam sauna that can contain different plant extracts - Herbalsauna.

Medical effect

The sauna has an effect of hardening the body against colds, or improving some neurovegetative disorders. Raising body temperature up to 39 °C has an effect similar to that of febrile states, a state in which pathogens that cannot withstand temperatures above 37 °C are eliminated. The overheated body from the sauna comes into contact with a cold bath, which has the effect of relaxing the muscles, lowering blood pressure, activating blood circulation, the immune system, breathing and metabolism with the elimination of harmful substances from the body through sweating.

Unwanted effects that may occur are temporary cases of sterility in men, the effect is due to the high temperature that has a negative effect on the spermatozoa. In the same way, visiting the sauna is not recommended for heart patients, with thrombosis, varicose veins or those suffering from an acute infectious disease.

The sauna is contraindicated for people who have:

- serious organic deficiency;
- serious mental deterioration;
- senile deterioration;
- diabetics;
- people suffering from multiple sclerosis;
- in people suffering from cardiovascular diseases (hypertension, arrhythmia
- cardiac, cardiac ischemia, vascular accident, thrombosis, etc.) must be avoided
- certain procedures, especially those that use hot water
- pregnant women should avoid hot baths and saunas.

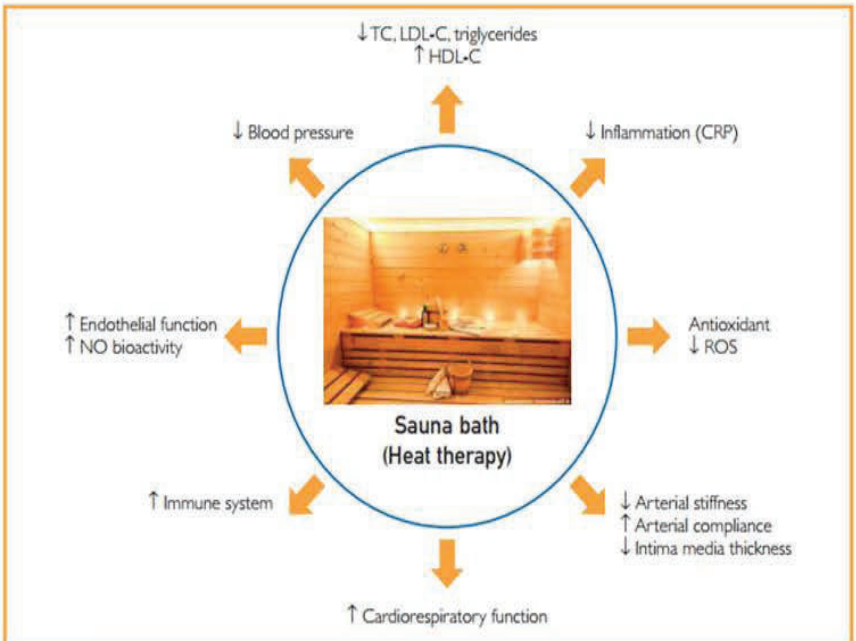


FIGURE 2. Pleiotropic effects (proposed mechanistic pathways) of Finnish sauna baths. CRP = C-reactive protein; HDL-C = high-density lipoprotein cholesterol; LDL-C = low-density lipoprotein cholesterol; NO = nitric oxide; ROS = reactive oxygen species; TC = total cholesterol.

The beneficial effects of sauna are: intensification of metabolism, weight loss (but which is based on the excessive elimination of water and not on account of adipose tissue), detoxification, improvement of circulation, muscle relaxation, stimulation of the immune system, modification of pain tolerance.

The sauna is indicated for respiratory diseases, muscle contractions, it is used as a method of training and warming up for athletes and prophylactically - for hardening the body.

Sauna is recommended, but with caution, for hypertensive and cardiac patients and is not indicated in acute inflammation of internal organs (liver, kidneys), viral or bacterial infections, fever, acute myocardial infarction, epilepsy, glaucoma, chronic venous diseases, tumors, depression , mental illness.

The ozone sauna is a capsule in which the patient's head remains outside to avoid inhaling ozone.

Sauna with ozone - effects in eliminating cellulite, water retention, reducing fat deposits, maintaining muscle tone,

Scientific Evidence of Sauna Therapy

1. Cardiovascular effects

Effects on blood pressure:

- reduction of systolic and diastolic blood pressure after 30 min sauna sessions

– improving arterial stiffness (pulse wave speed)

– frequent sauna sessions (4-7/week) decrease by 47% the risk of developing HYPERTENSION at 24.7 years

– reducing the risk of sudden cardiac death (SCD)

– the cardiovascular protective effect of the Finnish sauna is at least comparable to the long-term effects of physical activity.

Prospective study: 2315 Finnish men followed for 20.7 years, the frequency and duration of sauna sessions are inversely proportional to the risk of sudden cardiac death (SCD), fatal coronary heart disease and all-cause mortality.

Prospective study: 1628 participants, men and women, followed for 15 years - frequent sauna sessions (4-7 sessions/week) reduce the risk of incidental (ischemic or hemorrhagic) stroke by 62%, compared to a single session/week.

2. Neurocognitive effects

Prospective study: 2315 healthy men, aged 42-60 years, followed for 20.7 years. Frequent sauna sessions (4-7/week) reduced the risk of dementia by 66% and the risk of Alzheimer's disease by 65%, compared to those who took only one session per week.

3. Pulmonary effects

Improving lung function by increasing vital lung capacity, ventilation and forced expiratory volume, transient improvement in lung function in some patients with COPD. The sauna improves the respiratory function of patients with bronchial asthma or chronic bronchitis.

4. Other benefits

 Reduction of pain and symptoms associated with musculoskeletal conditions (arthrosis), rheumatoid arthritis, fibromyalgia.

 Relieves headaches

 Decreased risk of psychosis shown in a study where participants who practiced 4-7 sauna sessions/week had a 78% lower risk compared to those who practiced it only once a week (J.A. Laukkanen, PhD, unpublished data , February 7, 2018).

 Sauna helps patients with psoriasis by eliminating hyperkeratotic scales3

 Protective effect on the skin, by increasing the stability of the epidermal barrier, increasing hydration

 Increased quality of life, shown in a study of 524 octogenarians where sauna users had better physical function, vitality, social functioning and general health than non-sauna users

Biological mechanisms

Pathways involved in cardiovascular diseases:

The increase in circulation at the integument level causes an increase in cardiac output (DC) but also a decrease in blood flow to the internal organs.

Increased sweating causes the heart rate (HR) to increase, but the beat volume is maintained within normal limits.

The increase in temperature causes stimulation of the sympathetic nervous system, increasing noradrenaline levels, similar to the increases induced by maximal physical activity

Hormonal changes: Increases the level of renin, cortisol, growth hormone.

Precautions/Contraindications

Sudden deaths related to sauna sessions were at least partly due to alcohol consumption. A combination of sauna and alcohol consumption increases the risk of hypotension, cardiac complications and traumatic events.

Absolute contraindications to the sauna: unstable angina pectoris, recent myocardial infarction, uncontrollable hypertension, ischemic/decompensated heart failure, severe aortic stenosis.

Other possible contraindications: fever, acute infections or inflammatory conditions, as well as skin conditions: urticaria.

Caution: people with orthostatic hypotension or severe valvular disease (BP may drop sharply, even in the period after the sauna session).

Exposure to short alternating sauna sessions with rapid cooling is generally safe (for the healthy). It can be associated with atrial and ventricular arrhythmias (patients with cardiovascular diseases - not recommended

Clinical implications

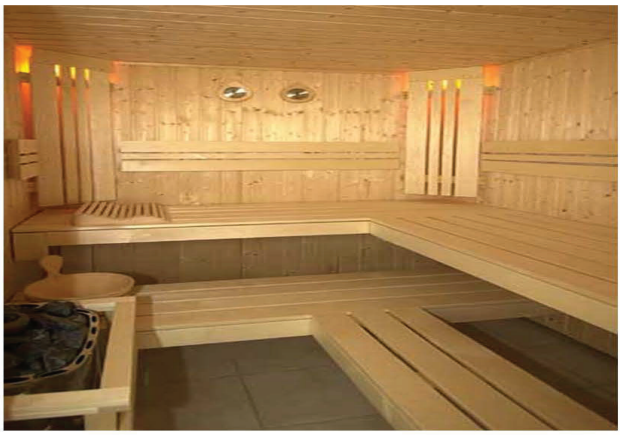
Overall, the sauna is a well-tolerated, recreational, simple to use and enjoyable activity. It does not involve physical effort and has a good safety profile. Randomized clinical trials with long-term follow-up are still needed to demonstrate whether these associations reflect the casual effect of frequent sauna sessions in the mentioned conditions and whether sauna can produce long-term changes in cardiovascular conditions.

In the future, the sauna could also be recommended to patients with cardiovascular risk factors and stable cardiovascular conditions as a pleasant activity. However, definitive studies are needed.

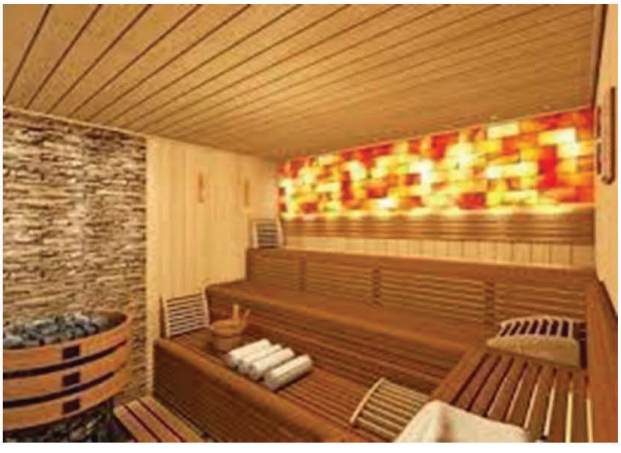
Interventional studies are needed to understand the pathophysiological mechanisms underlying the association between sauna use and health benefits and whether these associations could be translated into clinical benefits. The sauna could be the answer to the need for activities that increase health and well-being, especially in sedentary populations, but also as a complement to physical exercises.

Dry sauna

- Dry air, 5-10-20 minutes, 80o-100oC
- Adjustable humidity
- Wood
- Higher temperature at upper level
- Alternative to body cooling (shower, swimming)
- On average 2-3 exposures/week
- HR 120-150 b/min







Wet sauna Among the types of saunas, the steam sauna (wet sauna) has a lower internal temperature and higher humidity compared to the temperature and humidity of a dry sauna.





Caldarium (the roman steam bath)

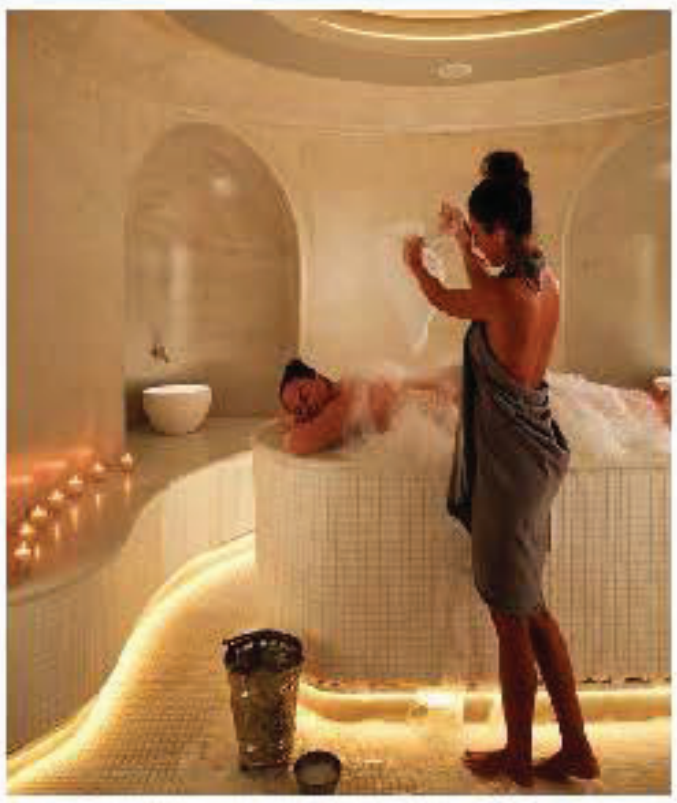
The steam bath is a stand-alone multifunctional cabin or built into a masonry room, it is very well waterproofed and thermally insulated, usually covered with mosaic, natural stone or marble in different shapes, colors and textures, with the climate of the cabin having temperatures between 42-48 degrees Celsius, relative humidity of RH=98-100% created by a steam generator/boiler that introduces hot steam into the sauna cabin.



Turkish Hamams

A Turkish bath is a public bathing place associated with the culture of the Ottoman Empire and the wider Islamic world. A variation on it as a method of cleansing and relaxation became popular in the Victorian era, then spread through the British Empire and Western Europe. The Hammam is the heir to the Roman and Greek baths, combining them with the Central Asian traditions of steam bathing and ritual washing. The Hammam is a Turkish bath, being based on steam. The name of this sauna comes from the Arabic "ham" which means "hot".







Irish steam room



Banja - Russian steam bath

Inside the Russian bath, the temperature can reach 100°C, so it is recommended that those who enter the sauna for the first time do not linger more than a few wonders and follow no more than two or three rounds. People who choose the Russian bath must follow a shock-ritual that consists of alternating hot-cold-whipping'. It should take place over the course of two hours, in several halves. After exposure to the hot steam, a cold shower follows. After the shower, the "whipping" takes place with a kind of broom made of birch, oak or eucalyptus branches, soaked in hot water. The "whipping" is done over the whole body, either by the person himself or by a sauna partner.









The three chained actions - exposure to heat, then cold, and finally whipping' - are aimed at promoting good circulation, deep cleansing of the skin, elimination of toxins from the body, toning of the body, strengthening of immunity, elimination of fatigue and restoration of energy, combating depression. In order for the effects of the sauna to be faster and potentiated, it is also recommended to perform a scrub and a massage with essential oils at the end of the whole process.

Temazcal (mexican bath)





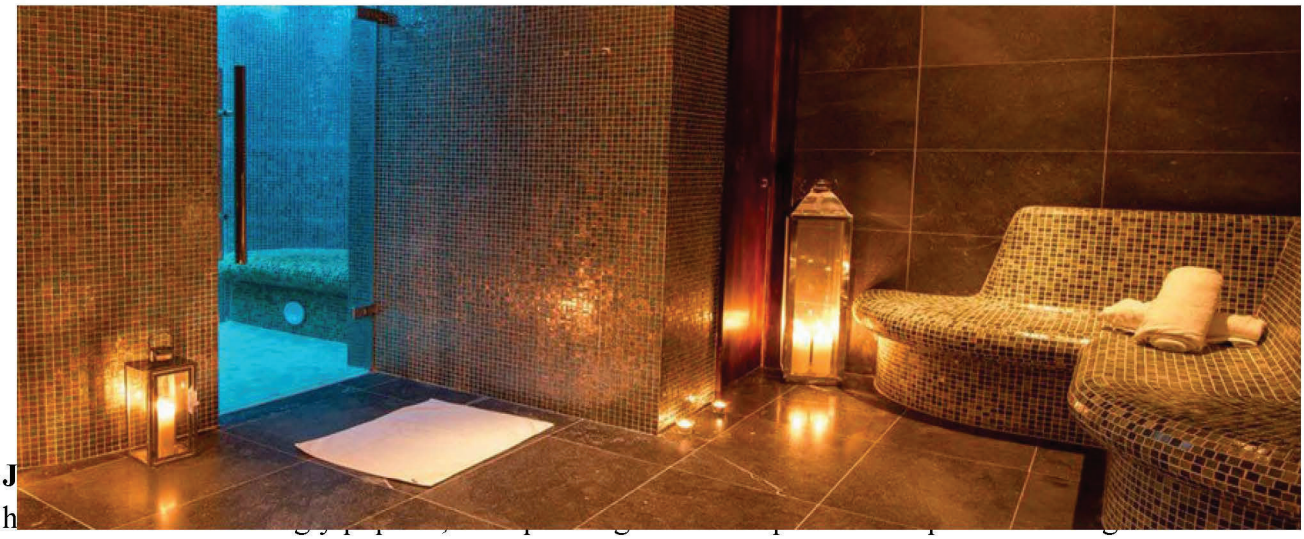








Tylarium (combination of a traditional sauna and a moderate steam bath)



J

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Infrared Sauna - Infrared radiation is heat that is on the longer range of the electromagnetic spectrum, is considered gentler and more comfortable, and is able to penetrate deep into the body's tissues. The water molecules in our body are the first to react to the infrared heat, and once activated, they dilate the blood vessels and set the entire metabolism in motion. Infrared heat has a unique ability to penetrate deep into the skin to the level of the nerves.



Ozone sauna - is a cabin in which the patient is closed, with his head out so as not to inhale the ozone. Although ozone is toxic when inhaled, its use in therapy has been scientifically proven to be a correct treatment for:

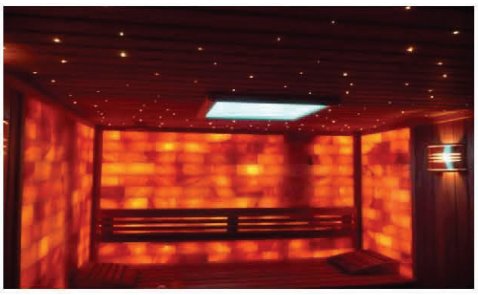


-arthrosis
- for the fight against viral diseases such as HIV or SARS
- treatment of ischemic heart diseases
- treatment of muscle degeneration
- cancer treatment



Salt sauna

It has a proven therapeutic effect, which is recommended for people suffering from respiratory problems. Salt brought from the Himalayas, containing a high number of minerals, trace elements and beneficial microorganisms. To achieve the desired level of salinity, the walls of the saunas are covered with salt bricks, which create negative ions.



12. Cryotherapy - definition, mode of action, methods of application, indications and contraindications

The term cryotherapy is composed of two terms: cryo (derived from the Greek term "κρυο" for cold) and therapy, resulting in - cold therapy.



Cryotherapy is the application of temperatures below 0°C to the skin for therapeutic purposes. The vectors used are: ice, cold air and water close to freezing temperature. The most used is ice, in molds with stationary field applications (compresses) or mobile (massage). The application indications for cryotherapy include: post-traumatic conditions, inflammatory rheumatic conditions, muscle contractures, spasticity, soft tissue rheumatism.

Nowadays, when it comes to ice, we immediately think of winter sports or the ice bag used by coaches on the sports field to relieve pain after a shock. The expected effects are analgesia, antispasmodic and decontracting effect, anti-inflammatory effect.

The most common contraindications are: ischemia, Raynaud's syndrome, sensitivity disorders, cryoglobulinemia, cold allergy, cold-induced pressor response.

Cryotherapy is a therapeutic method that uses cold to reduce inflammation and fight against pain. Cryotherapy uses "cold" as a therapy factor: cold compresses, ice cubes, frozen gas bags, sprays, dry ice (liquid nitrogen of -196ºC), solid carbon dioxide (-78.5ºC), mixture of dimethylether, propane and isobutane (-55ºC). The "cold" treatment is applied to the surface of the skin, it is simple and painless.

Historic. Cold treatment is a therapeutic method used since ancient times. 400 years before Christ, Hippocrates used snow or ice to relieve pain. In the Middle Ages, freezing was used for preoperative anesthesia. Since ancient times, cold has been used for its miraculous effects in treating injuries, for its anti-inflammatory and analgesic effects, stimulating metabolism and strengthening the immune system.

The first known application was used by the ancient Egyptians to treat inflammations as early as 2500 B.C., following which this technique was used by the Greeks and Romans to treat skin conditions and injuries. Hippocrates, the famous physician of the ancient Greeks, saw the anti-inflammatory and analgesic potential of cold and used this new procedure on his many patients.

Almost 200 years ago, a German scientist, Sebastian Kneipp, jumped into the frozen waters of the Danube to treat his tuberculosis (a deadly disease at that time), thus proving that even the most serious diseases can be treated by stimulating the immune system .

In tsarist Russia, bathing in frozen waters in the winter took the form of a health ritual, the body receiving an extraordinary tone.

Cryosurgery (as part of cryotherapy) became a modern medical alternative thanks to the work of James Arnott (1797-1883), an English doctor who wrote about the applications of extreme cold between 1819 and 1879. Arnott was the first person to use extreme cold at the level locally to destroy the affected tissue, using a mixture of salt and crushed ice (two parts finely crushed ice and one part sodium chloride) with palliative effects on the tumors and which resulted in the reduction of local pain and bleeding. However, the salt/ice mixture was not enough to reduce the temperature of the tissues and effectively treat the tumors.

In 1877, the French physicist Louis Cailletet manages to produce liquid oxygen through a different method, much more accessible than the one proposed by the Swiss physicist Raoul Pictet.

In 1899 Campbell White from New York becomes the first doctor to use refrigerants for medical use, advocating the use of liquid air in the treatment of a wide spectrum of ailments such as: lupus erythematosus, herpes zoster, nevi and warts, varicose ulcer and others. In 1892 the Scottish physicist James Dewar designed the first thermos vessel (vessel within a vessel), with vacuum insulation, which facilitated the storage, transport and handling of liquefied gases.

In 1907, Whitehouse, also a New York physician, described the use of a sprayer for liquefied gases but found this technique difficult to use and discontinued its use in favor of a cotton swab.

In 1950 Allington was the first to use liquid nitrogen (-196˚C) for medical use. He demonstrated that the properties of liquid nitrogen are similar to those of liquid air, carbon dioxide and liquid oxygen. After World War II, liquid nitrogen became widely available and was preferred to liquid oxygen, which had high explosive potential.

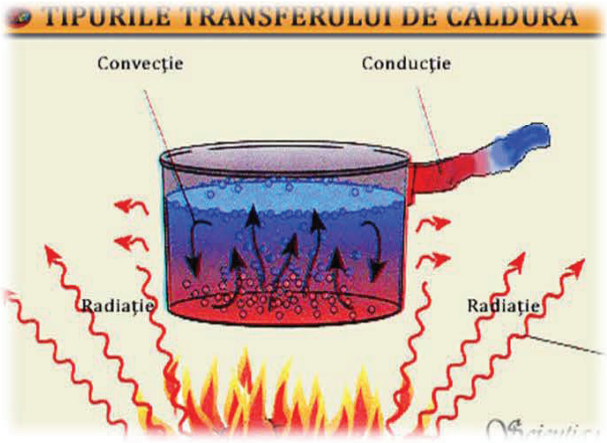
Cryosurgery is a minimally invasive procedure and is often preferred over other traditional types of surgery because of the minimal pain caused, minimal scarring and the cost of its use. Warts, moles, solar keratoses and small types of skin cancer are eligible for cryosurgery treatment.

Several internal diseases are also treated with cryotherapy, including liver cancer, prostate cancer, lung cancer, oral cancer, cervical lesions and, more commonly, hemorrhoids. Plantar fasciitis and fibroids can also be treated with cryotherapy. Although proven to be effective, this treatment method is suitable to be used only for tumors larger than 1 cm. Diffuse metastases, which often accompany cancers, usually cannot be resolved by cryotherapy.

Cryotherapy is a valuable adjunct to medical recovery that uses cold water, ice, and carbonic acid to cool a segment of the body. It can be applied in the form of cold packs, short-term immersions (1 minute) in an ice-water environment, massage with ice cubes, contrast baths. The effects are: decrease in local metabolism, vasoconstriction (followed by protective vasodilatation), decrease in edema, muscle relaxation, decrease in bleeding, decrease in pain and inflammation.

In acute pain, cryotherapy is better than heat therapy. Cold applications on the affected area can contribute to the reduction of muscle spasm, both in myofascial and traumatic pains. It is often used in athletes in case of injuries, combined with laser therapy and kinesiotaping. The action mechanism can be divided into three phases in cryotherapy:

1. Heat transfer phase
2. Destruction of cells
3. Inflammation.



1. Heat transfer

The mechanism by which cryotherapy destroys the targeted cells is through the rapid transfer of heat from the devices used during the technique to the skin. Most often, liquid nitrogen is used for cryogenics, which has a boiling point of -196ºC.

The rate of heat transfer depends on the temperature difference between the skin and the liquid nitrogen. When cryotherapy uses the spray technique, liquid nitrogen is applied directly to the skin and evaporation (caused by heat transfer) will occur which occurs when heat from the skin is rapidly transferred to the liquid nitrogen. This process causes the liquid nitrogen to evaporate almost immediately.

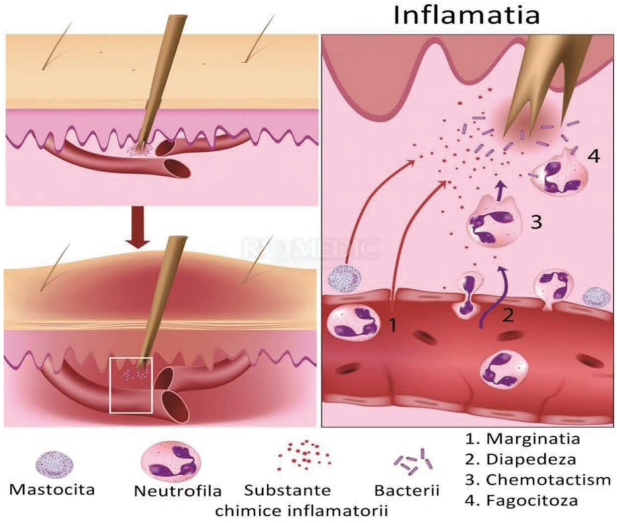
2. Destruction of cells

Cell damage occurs during thawing after cells are frozen. Due to intracellular hyperosmotic conditions, ice crystals do not form until -5°, -10° C. The transformation of water into ice concentrates the extracellular substances resulting from dissolution and resulting in an osmotic gradient in the cell membrane, will cause further damage.

Rapid freezing and slow thawing maximize tissue destruction of epithelial cells and is the fastest treatment for malignant conditions. Fibroblasts produce less collagen after rapid thawing. Therefore, rapid thawing may be recommended for the treatment of benign or keloid lesions in areas prone to scarring.

Keratinocytes must be frozen at -50° C for optimal destruction. Melanocytes are delicate and only require a temperature of -5° C for destruction. This fact is the reason why hypopigmentation occurs after cryotherapy in people with darker skin.

Types of skin cancer with malignant lesions require a temperature of -50°C, while for the destruction of benign lesions a temperature of -20°C -25°C is recommended.



3. Inflammation

The last response to cryotherapy is inflammation which is usually seen in the form of erythema and edema. Inflammation is the response to cell death and helps destroy local cells. Cryotherapy causes the basement membrane to separate, resulting in the formation of pustules.

Effects of cryotherapy

To be effective, cryotherapy must generate a thermal shock to the skin, i.e. a significant drop in temperature in a minimal period of time. Thermal shock represents the passage of the skin temperature from 34°C (physiologically normal temperature) to below 15°C (the body temperature must not drop below 5°C otherwise there is a risk of cell damage). Applying low temperatures to the skin has many beneficial effects; for example, in the case of muscle, joint or post-traumatic pain.

Analgesic effect

The cold reduces the sensation of pain. The maximum effect is obtained immediately after application, in the first 10" - 15", and lasts, depending on the case, between 30' minutes and 3 hours (the average being one hour). This analgesic effect applies because the cold causes the pain threshold to be raised (painful stimuli should be stronger to trigger a painful message at the receptors), as well as the pain message is slowed down (the painful message is transmitted more slowly to the central nervous system, thus resulting in a reduced perception of pain by the individual).

Anti-inflammatory action

Inflammations are manifested by the production of algogenic substances, substances that maintain inflammation and cause the sensation of pain by the injured cells, through vasodilatation that facilitates the permeability of the blood vessel walls. Thus, the plasma enters the extravascular environment, generating the appearance of edema. The importance of inflammation, capillary permeability and cellular response is directly related to tissue temperature.

The cold will have a certain action on the various components of the inflammatory reaction. Thus, quick intervention and the application of low temperatures cause a decrease in the production of apologetic substances and prevent vasodilatation (vasomotor effect), which limits the infiltration of liquids into the tissue, preventing the formation of edema. Thanks to cryotherapy, inflammatory phenomena decrease in intensity.

Muscle relaxant action

Skin contact with very cold substances causes a decrease in muscle tone. In the secondary plan, a relaxation of the muscles is observed, which is very important, especially in the case of contractions. The cold is equally beneficial in the case of hemorrhages generated by a traumatic shock, because it has a hemostatic action.

By stimulating the TR PM 8 receptor, (transient melastatin potential receptor 8) also called the menthol receptor. This receptor is the main element of the cold sensation. It is also sensitive to thermal variations and is stimulated by cold at temperatures below 25°C, but also by other substances, such as eucalyptol. Applied to the skin, menthol gives the sensation of cold, the source of the analgesic and local anesthetic effect.

Cryotherapy indications:

Cryotherapy is an appropriate treatment especially in muscular, musculo-tendinous-ligamentous and joint pathologies. Cutaneous application of cold is beneficial in treating:

- ✓ elongations caused by excessive stress up to the limit of muscle stretching;
- ✓ broken muscle fibers, i.e. the muscle bundle, as a result of a violent and rapid contraction of the muscle (intrinsic cause), or an external aggression on the contracted muscle (extrinsic cause);
- ✓ tendinitis (painful inflammation of a tendon);
- ✓ contusions (muscle tissue crushing following a direct shock);
- ✓ haematomas (intramuscular blood accumulation following crushing or tearing of the tissue);
- ✓ sprains (traumas accompanied by the elongation of ligaments);
- ✓ arthrosis (during the period of acute inflammation) which are chronic diseases with slow evolution, characterized by wear and tear of the articular cartilages, which worsen with movement and improve at rest;
- ✓ arthritis (during the period of acute inflammation), chronic diseases characterized by inflammation of the joints, most often related to an inflammatory or infectious pathology, alternating periods of aggravation with periods of improvement. The pain usually occurs at night and is more or less continuous;
- ✓ the feeling of heavy legs, a consequence of poor circulation in the veins, which causes blood stasis.

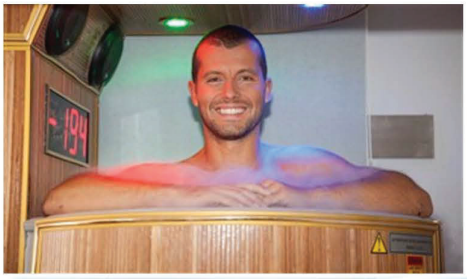
Cryotherapy has maximum effectiveness if it is applied in the first 72 post-traumatic hours and is effective throughout the acute phase, with a tendency to decrease in the chronic phase.

Cryotherapy is used in dermatological conditions to treat:

- ✓ superficial scars caused by acne;
- ✓ warts, fungi, granulomas;
- ✓ seborrheic warts;
- ✓ cystic acne,
- ✓ keloids,
- ✓ juvenile acne and rosacea,
- ✓ telangiectasias,
- ✓ condylomatosis, oral and vaginal leukoplakias,



- ✓skin carcinomas and hemangiomas,
- ✓also has an important contribution in treating mild cases of skin cancer.





Aerocryotherapy - perhaps the most spectacular of the therapies derived from cryotherapy in terms of its vast and multiple applications, consists in exposing the body to extremely low temperatures with the help of liquid nitrogen vapors.

It was initiated in Japan through the work of Professor Tosimo Yamauchi in the 70s. The patients were exposed to temperatures of up to -180˚C, using liquid nitrogen vapors and the results of the project speak for themselves, in 10 years more than 2000 patients suffering from severe rheumatic diseases entered the door of his clinic, at 80% from them the pains disappearing completely.

The homeopathic principle "similia similibus curantur" also applies to aerocryotherapy. The medical efficiency of aerocryotherapy is determined by the speed with which the temperature drops and its value

Advantages of cryotherapy:

- ✓ short healing time (rapid healing of the crust occurs);
- ✓ minimal discomfort (sting to a slight pain);
- ✓ good skin tolerance (even for children);
- ✓ lack of bleeding and post-operative care (post-operatively wash the treated surface with water);
- ✓ minimal risks of scarring;
- ✓ practicality and ease of handling within the method;
- ✓ absence of anesthesia.

Side effects of cryotherapy:

- ➢redness and swelling of the treated area with or without the formation of liquid bubbles;
- ➢skin peeling.

How cryotherapy works:

The principle of action is the desensitisation of the nerve endings and the induction of a local necrosis, at the level of the tissues to be re-epithelialized.

Keratinocytes and melanocytes in the epidermis are susceptible to freezing, unlike fibroblasts and collagen fibers in the dermis.

This treatment causes cell destruction in the superficial layer of the skin, through anoxia (decreased oxygen supply to tissues and cells) and effects on microvascularization.

Liquid nitrogen cryotherapy (liquid nitrogen peeling) is used to treat:

- warts (warts),
- actinic keratoses,
- angiomas,
- acne and cuperosis.

Peeling with carbonic snow - is more than half a century old and is recommended in the treatment of acne scars and brown spots (due to excessive exposure to the sun), this type of therapy can also be applied to children or elderly people. (peeling)

The surface to be treated is swabbed with dry ice (in a concentration and duration that depends on the doctor, the type of skin and the desired result), with the help of a cryocautery. The treatment is based on 1-3 freeze-thaw cycles lasting 10-30 seconds (repeated every 20-30 days). The nitrogen liquid applicator is handled with slow, circular movements on the surface of the skin, with little pressure. Within 48 hours desquamation (removal of the horny layer of the skin) occurs. It is recommended to repeat the treatment 5 - 6 times with an interval of 15 days between sessions. Avoid application in the warm season to avoid unsightly pigmentation. In order to perform an exfoliation treatment, it is applied all over the face, while for the treatment of certain injuries it can be applied separately.

Body wraps for skin firmness. Cryotherapy wraps are a skin cleansing and beautifying treatment that helps reduce the appearance of cellulite and sagging skin. This procedure detoxifies the body and provides metabolic balance by eliminating excess fluid. Cellulite will be reduced and microcirculation will be stimulated so that the skin is firmer. The technique is effective for people who have sagging skin due to ageing, weight loss or after liposuction - so it could be an ideal alternative for a skin beautification treatment due to weight loss after pregnancy. Wraps with the help of cryotherapy provide a firm appearance and tone the skin and improve skin elasticity.

Contraindications:



- bleeding injuries,
- wounds, ulcers,
- moles,
- the use of cold applications in people who are unstable and hypersensitive to cold or who have sensitivity disorders,
- heart diseases,
- neoplasias,
- arteriopathy, Raynaud's syndrome, paroxysmal hemoglobinuria in the cold.

Benefits in cryotherapy treatment:

- stimulates cells that produce collagen;
- reduces wrinkles;
- causes the skin to stretch, and it becomes smoother, firmer
- stimulates skin regeneration, accelerating the healing of injuries.

Other indications:

- neurological conditions, which are manifested by increased spasticity (cryotherapy is more effective in these cases than the application of heat);
- inflammatory rheumatological conditions (reduction of inflammatory pustules), arthrosis (pain reduction, relaxation), tendinitis, bursitis, cervical, back or lumbar pain, algoneurodystrophy;
- traumatology and orthopedics to relieve pain during recovery exercises, but also to prevent bleeding.

Hylotherapy - is the therapy that allows the controlled use of cooling in the desired areas of the face and body. An accessory is wrapped around the traumatized area, is connected to a cooling device and circulates water so that the traumatized area will be cooled to a specific temperature. The difference between hilotherapy and other cryotherapy approaches is the temperature range and constant application. By controlling the temperature between 10° and 20°C, the typical benefits of hylotherapy appear, such as immediate vasoconstriction with reflex vasodilatation, decrease in local metabolism and enzyme activity, decrease in oxygen requirement. Hylotherapy is frequently used for recovery after orthopedic surgery, plastic surgery, oral and maxillofacial surgery.

13. Hydrokinetotherapy – Aquagym. The role of hydrothermotherapy in medical rehabilitation

The effects of hot water hydrotherapy can be systematized as follows:

- peripheral vasodilatation - with the attraction of blood from the organs to the muscular system, which nourishes and oxygenates the tissues, relieving the body;
- reduction of muscle contractions and pains;
- intensifies exchanges at the cellular level;
- stimulates the metabolism, the functions of the digestive and respiratory system;
- improves the flexibility of the tendons and the lubrication capacity of the synovial fluid at the level of the joints;
- balances the pH of the internal environment;
- calms, sedates the central nervous system, facilitates sleep.

The effects of cold water hydrotherapy can be ordered as follows:

- peripheral vasoconstriction, with an influx of blood inside the body, to the organs, followed by peripheral vasodilatation, with the attraction of blood towards the skeletal muscle tissues, with the supply of oxygen and nutrients, the effects being relaxation, relaxation;
- reduction of muscle contractions and pain relief, muscle relaxation;
- reduction of local inflammations.

Hydrokinetic therapy in the pool

Specially arranged pools, support bars, ramp, lift

Depth 1.20-1.40 cm

Temperature 35-36°C

Taken before and after the program

The threshold of chlorine is exceeded

Before Urine Examination, gynecological

The program lasts 30 min, 5 min adaptation, 15 min exercises depending on the pathology, 10 min relaxation

Role TA, FC

In group HKT role pools, patients perform the movements indicated by the teacher by themselves

Those who need help are recommended the kinetotherapeutic bath

Hydrotherapy is the use of water and exercise for health and wellness and is fundamental to both a treatment base and spa experience.

Hydrotherapy is a tool in medical recovery.

Properties of water

The therapeutic mechanism of hydrotherapy is based on four properties of this liquid:

Buoyancy: a body submerged in water is pushed with a force opposite to gravity; the weight that the body loses in this process is equal to that of the volume of water displaced, so the pressure and stress normally applied to the muscles and tissues is significantly reduced;

Buoyancy: The support of the water takes the weight of the body and limbs. This helps with the movement of stiff or weak joints, or when assistance is required to move a joint or limb (following fracture or surgery). This is extremely useful when normal walking or weight-bearing is restricted or painful.

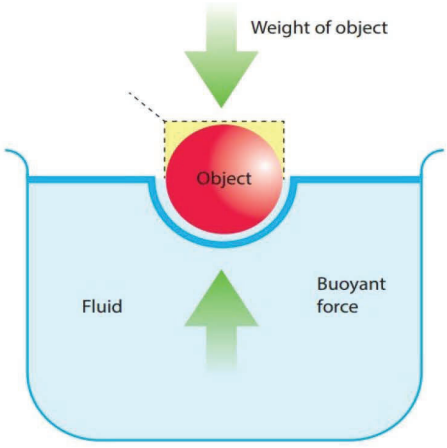
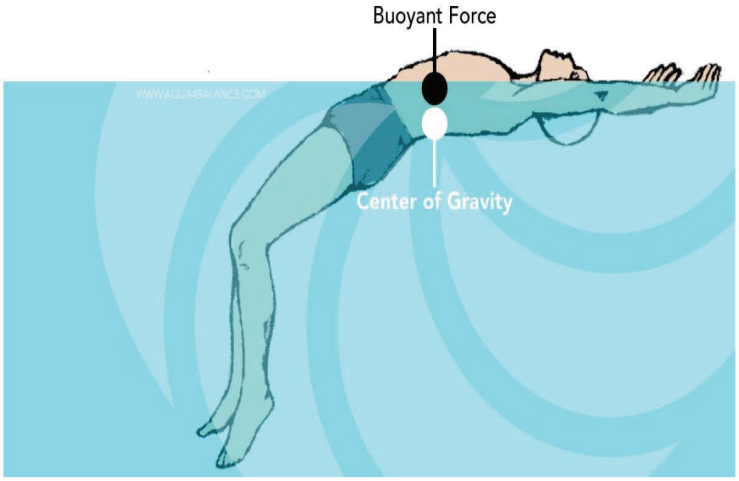
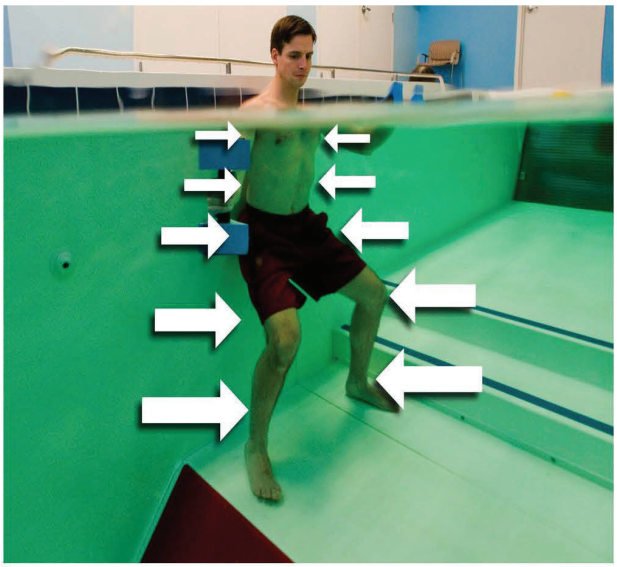


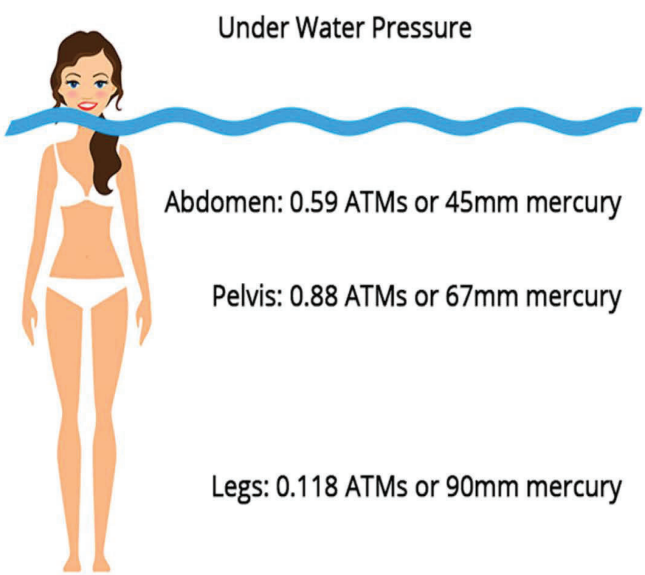
Figure 1.17 Buoyant force



Hydrostatic pressure – Pressure is defined as force per unit area. When the body at rest, at given depth there will be equal pressure exerted in all direction by water. When unequal pressure is exerted the body will move. The more the object is immersed in the water the more pressure will be exerted; this is beneficial for the patients who suffer from edema. The hydrostatic pressure can be also useful for breathing. There will be pressure exerted on the chest wall to resist expansion of the chest So that the muscle can be strengthen by this way and work of breathing will be increased. It also can fasten removal of lactic acid leading to decrease in muscle soreness.;

Hydrostatic Pressure: The pressure exerted by the water will help to reduce swelling. This is how hydrostatic pressure is thought to further help in rehabilitation, particularly after recent inury or surgery. j





Specific heat – is the energy required to increase the temperature of a substance by one degree Celsius; in the case of water, heat loss is 25 times greater than that in air, and performing physical exercises in warmer water (approximately 33 degrees Celsius) leads to an increased body temperature; depending on the physical condition of the patients and the intensity of the prescribed training, a certain temperature of the water will be established;

Specific heat and Latent heatwarmth of the water helps with muscle relaxation and also helps with pain relief: The. This helps improve the movement of a stiff joint or limb. The warmth also aims to help with general relaxation.

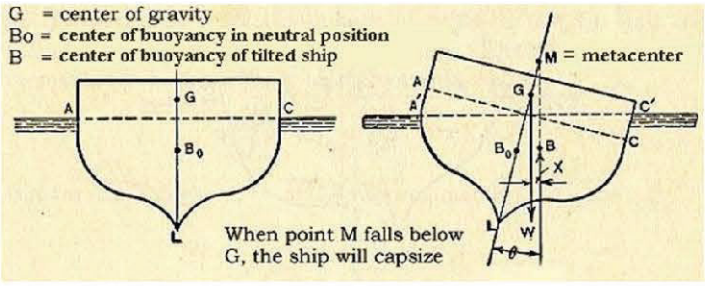
Viscosity – is the frictional resistance of a body moving in a fluid; the viscosity of water varies depending on the movements performed and the temperature, so by using this property, you can work to strengthen certain muscles. Water is more viscous than air, therefore movements in water are more difficult than movements in air.

Of all these principles of hydrotherapy, temperature seems to play a very important role, as cold water causes constriction of blood vessels, stimulating the body and slowing down inflammatory processes, while warm water relaxes the body by dilating blood vessels and enriching circulation in the skin and muscles. Alternating temperatures is therefore a fairly common practice of water therapy.

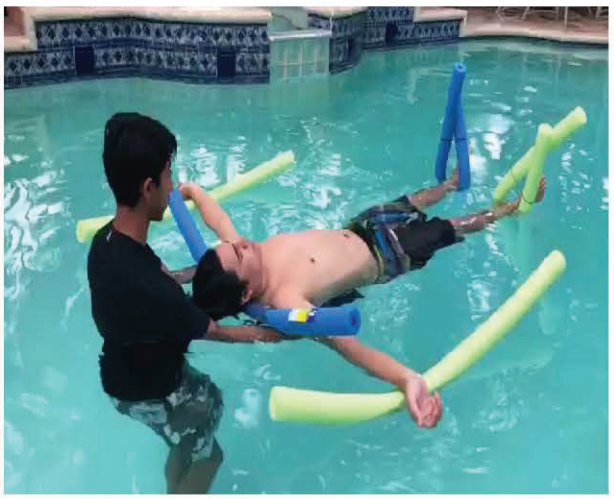
Relative density

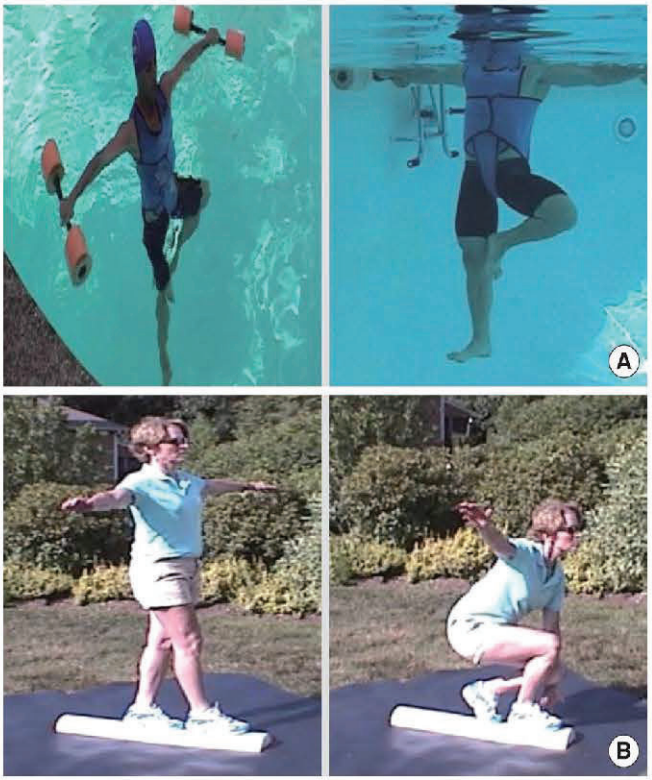












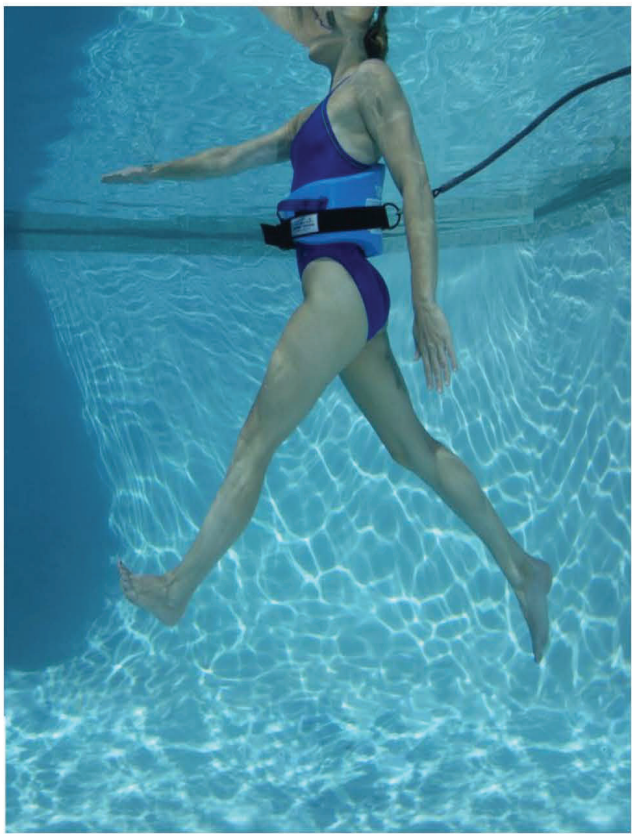
Reynolds theory:

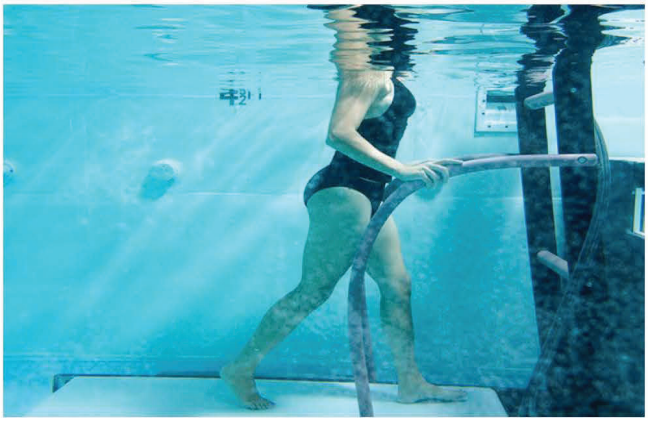
Movement in water can be more difficult when changing from linear to non-directed - turbulent motion.

Resistance: The water can also be used as resistance to improve strength of weakened muscles or to help with reconditioning following illness. Coupled with the water's buoyancy, this allows a person to strengthen muscle groups with less joint stress, which cannot be achieved on land.

Turbulence: The turbulence of the water can help improve balance and coordination, which may be impaired after injury or illness.



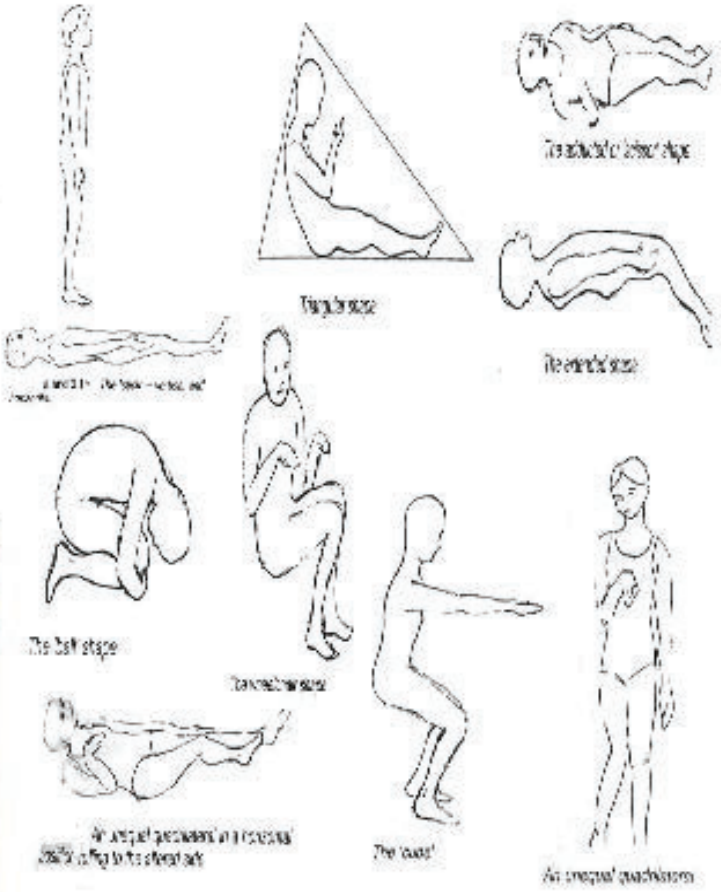






Water adjustment:





Mental adjustment:

- **Restoring the balance:**











Physiological effects of immersion in water

Most responses to water exercise are similar to those resulting from exercise on land. But aerobic energy expenditure during water exercise can increase or decrease depending on the temperature and depth of the water, the type of activity and the speed of the movements.

Also, energy expenditure can be modified by buoyancy, higher viscosity and increased heat conduction.

Because of the hydrostatic pressure that increases venous return, cardiac output and stroke volume will be greater at higher exercise intensities than on land.

Anaerobic metabolism occurs at the beginning of exercise and at higher intensity. The end product of anaerobic metabolism is lactic acid and its accumulation indicates the amount of anaerobic metabolism. At submaximal exercise, intensities between 40% and 80% VO2, there is no difference in blood lactate accumulation in water and on land. But at maximum intensities lactic acid is lower in water. Epinephrine stimulates glycolysis; Due to the decrease in blood epinephrine during water exercise, lower glycogen breaks down and lower lactic acid will accumulate. Lower heart rate and lactic acid during maximal and submaximal exercise in water is due to reduced sympathetic activity and epinephrine.

Psychological effects

Being able to acquire skills that may be difficult or impossible on land and being independent in the water can improve self-confidence and morale that can then be carried over to the field.

Being in the pool with others and participating in the group activity can improve the social aspect and encourage the patient to recover more easily.

Therapeutic effects:

1- Maintaining or improving posture and balance,
2- Reduction of pain and muscle spasm,
3- Maintaining or increasing the range of motion (ROM),
4- Increasing exercise resistance
5- Strengthening the muscles and re-educating the paralyzed muscle
6- Improving circulation
7- General functional improvement

The Bad Ragaz ring method:

It is a therapeutic technique used for relaxation, strengthening, muscle re-education, spinal traction and improving tone.

The patient floats in the water through flotation rings that are placed around the neck, pelvis, knees and ankles. The thermal and hydrodynamic properties of water, in addition to unique weightless exercises, determine excellent results for patients.



The close kinetic chain exercise can be used here; the therapist holds and resists the patient in a "fixed point", for example the feet. The patient will try to move that fixed point and resists the therapist by sliding the buttocks towards the legs. The therapist uses the properties of water for passive, isometric, isotonic and isokinetic exercises.

Indications: patients with weight problems who need to work in a closed kinetic chain and neurological cases.

The Halliwick method:



The Halliwick concept is an approach that can be used with all people but especially with those with physical and/or learning difficulties.

This method aims to make them move independently in the water, do water activities and swim. It is based on the belief in the benefits that result from water activities. These benefits include social, physical, recreational, personal, therapeutic aspects.

This involves four basic principles.



The first is mental adaptation - the ability to respond appropriately to different tasks and situations.

Second, restoring balance; by using a specific pattern of movements to restore balance.

Third, inhibition, which is the ability to hold the position.

Finally, the facility for moving in water.

Indications: patients with neurological cases, developmental disorders and patients who cannot walk on land.



WATSU:

It refers to water Shiatsu. This involves the use of massage, joint mobilization, Shiatsu and muscle stretching. It is performed in warm water and done passively. The patient is supported by the therapist's arms in a supine position while lying down. Indications: Pain patients, patients with restricted ROM (range of motion) and hypertonic patients.



Contraindications:

1. Shortness of breath at rest
2. Fever
3. Angina at rest
4. Acute vomiting and diarrhea
5. Medical instability following acute episodes
6. Tuberculosis
7. Uncontrolled heart failure
8. Uncontrolled fecal incontinence
9. Renal failure
10. Known aneurysm

Relative contraindications

1- Irritated skin
2- Poorly controlled epilepsy
3- Open wound
4- Unstable diabetes



Precautions:

1- Behavioral problems
2- Contact lenses
3- Infections
4- Controlled epilepsy
5- Hemophilia
6- Fear of water
7- Hearing aids
8- Hypo or hypertension
9- Pregnancy if the temperature exceeds 35
10-Early kidney disease
11- Sexually transmitted infections
12- Fungal infection

Hydrokinetotherapy

- in trefle pools or swimming pools, movements are much easier
- T0 of water is 35-360 C
- Reduces pain and contractions
- the movements become wider



Broad indications: disorders of the locomotor system (post-traumatic), cardio-vascular, respiratory, neurological

The contraindications are identical to those of hydrothermotherapy: high blood pressure, sphincter disorders, epilepsy, organ decompensation, dermatological, infectious diseases, malignant tumors, infectious, contagious diseases

Hydrokinetotherapy is practiced in pools of variable sizes and shapes, the resistance that the water opposes to the movements being directly proportional to the amount of water in the pool

The advantage is that in water, according to Archimedes' principle, the body loses a part of its weight equal to the volume of water displaced. The movements thus become easier to perform and the recovery of deficient muscle groups is carried out in easier conditions like pregnancy

The basins must be equipped with: a crane for lifting and lowering the patient, mobile pulleys with fastening belts, inclined planes, floats, rubber feet, etc. The following will be carried out:

- Exercises on land, on the edge of the pool, in the water
- Individual exercises, with a partner, in a group
- Individual exercises with helpful objects: rafts, floats, paws, palms, coils, balls, fins, vests
- Exercises with help, with the direct intervention of the physiotherapist, using various objects, exercises with opposition or resistance from the patient or the physiotherapist.

Although the practice of different movements specific to cardio or fitness training in water is not new, the concept of aqua gym appeared quite recently, being used for the first time by the actress Eleonora Vallone in 1984. The history of this sport, however, dates back to antiquity, the therapeutic effects of water being exploited by the Greeks, Assyrians, Babylonians and Egyptians. Originally called GymSwim or GymNuoto, the activity the foundations of which were laid by Vallone emerged as a method of physical recovery, the actress suffering an accident and finding a remedy for her physical problems in water gymnastics. Later, she also founded the first school of aqua gym instructors, in Rome, and exported the concept to Spain.

Water gymnastics or aqua gym is a type of low-impact training that works the whole body, being beneficial both for muscle development and improving cardiovascular endurance.

Depending on the fitness level of the trainees and the training goals, an aqua gym session can focus only on certain muscle groups, in this case including exercises specific to that group, or it can incorporate classic swimming movements and compound exercises, aimed at sculpting the whole body. In general, however, aqua gym sessions are similar to aerobics sessions, except that the activity takes place entirely in water.

Due to the weight exerted by the water, the resistance encountered when performing specific movements is greater, so aqua gym training is more effective than aerobic training in terms of calories burned and effort expended. However, due to the fact that the impact on the joints is reduced, water aerobics sessions are often perceived as less demanding than classic cardio workouts.

Unlike classic swimming sessions, which often require greater muscle strength and increased resistance to exertion, water gymnastics training is recommended even for people with a low fitness level, but who want to improve their physical appearance and to exercise the heart through enjoyable physical activity.

Aqua gym is suitable for children, young people, adults and the elderly, and can be practiced safely by pregnant women and people following physical recovery programs. Since a large part of the body weight is taken up by the water, this type of training puts less stress on the joints than classic cardio or fitness training, so the risk of injury is very low.

Water gymnastics can be practiced even by people who do not have a very good control of swimming technique, with most of the sessions being organized in the shallower areas of the pools. Also, overweight people can practice this type of physical activity to lose weight and tone their muscles, while training their cardiovascular system.

An aqua gym session lasts between 45 and 60 minutes and can burn around 500 calories, although the results vary depending on the exercises practiced, pace, intensity and physical condition of the participants.

As for the benefits of a water aerobics workout, they include not only improved cardiovascular endurance and circulation, but also improved flexibility and coordination and muscle toning. Water gymnastics is also a good stress reliever, relaxing the whole body and inducing a general state of well-being. At the same time, sports are beneficial for eliminating excess fat and reshaping the body.

Some instructors may opt for combination workouts, combining dance, swimming, fitness and aerobics moves. Thus, the water gymnastics sessions can take place on Latin or hip-hop rhythms, in this case the instructor is positioned outside the pool so that the participants can observe the correct way of executing the movements.

Alternating energetic movements with those designed to relax the muscles is beneficial not only for the cardiovascular system, but also for the lymphatic system, water gymnastics improving lymphatic drainage. Also, given the fact that the movements are carried out in water, the body temperature is more easily regulated, avoiding overheating. Thus, although workouts may last longer and be more demanding than aerobics, they will be perceived as energizing rather than tiring.

However, water gymnastics can also be a highly demanding activity, with workouts that may include high-impact activities such as sprinting or weight exercises equivalent to those used in fitness training (2). The aqua gym sessions can successfully replace the training of athletes practicing water football, polo or other such sports, the intensity of the movements can vary depending on the goal pursued.

Unlike "land" workouts, water workouts always target opposing muscle groups due to the weight exerted by the water (5). Thus, even isolation exercises from fitness training become complex exercises in aqua gym sessions – classic bicep curls become, in aqua gym, compound exercises that also train the triceps (5).

Water gymnastics is recommended for people suffering from arthritis, back pain, joint problems, overweight people, cardiac people and pregnant women (5).

Water gymnastics training does not require special equipment, therefore any bathing suit is suitable for this physical activity. However, depending on the type of training performed, it may be useful to wear a swimming helmet and carry a swimming board or water weights (1). Some aqua gyms use sticks and special gloves, others use steppers, but generally additional equipment can be rented.

Hydrotherapy has been used as an adjunct to conventional systems for alleviating the symptoms or pain associated with different problems. For example, women seek non-pharmacologic hydrotherapy as an alternative to medication for management of early postpartum pain which significantly reduced pain with hydrotherapy.

Another study has reported that complementary and alternative therapies can have positive effects against pain in multiple sclerosis patients. An Ai-Chi aquatic exercise program improves pain, disability, spasms, depression, and fatigue in multiple sclerosis patients.

Thus hydrotherapy along with conventional system may improve the outcomes. Hydrotherapy and non-drug interventions were used as first line in management in patient with hip and knee osteoarthritis. It appears that people with knee osteoarthritis are more likely to try conservative non-drug treatments than those with hip osteoarthritis. Another study showed that a superficial heat or cold is one of the first line interventions and was an effective way to manage knee osteoarthritis pain. The level and number of clinical trials in hydrotherapy are now evolving and more effective clinical trials with practically applicable outcomes are now available. The research in hydrotherapy is focusing more on mega trails now. Also most of the cases reported regarding clinical trials involves multi-center, multi-model and huge sample size. Thus the researchers now believe that the effects of hydrotherapy may be considered as an integrative system for better patient care plan.

Quality of life and functional outcomes treated with hydrotherapy

The life-quality and parameters related to better lifestyle in most of the diseases have been improved or enhanced with the alternative system of hydrotherapy. Thus it may be suitable to state that hydrotherapy has been an important role in the overall health and general well-being of the patients.

14. Hydrothermal circuits in Treatment Bases / Spa and Wellness

Caldarium / sudatorium (roman steam bath)

The steam room is a stand-alone multifunctional cabin or built into a masonry room, it is very well waterproofed and thermally insulated, usually covered with mosaic, natural stone or marble in various shapes, colors and textures, the climate of the cabin having temperatures between 42 -48 degrees Celsius, relative humidity of RH = 98-100% created by a steam generator / boiler that introduces hot steam into the sauna cabin.

Aromatic essential oil extracts can be co-injected to give the steam bath an added sensory element.





Turkish hammam

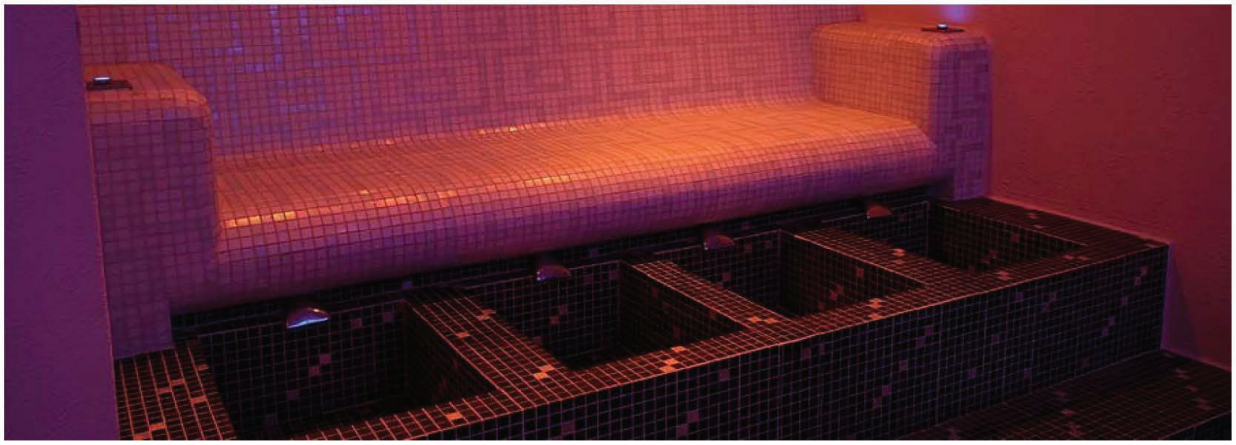
Also known as "Turkish baths" or Moroccan hammams, modern hammams are normally larger than a steam room. Turkish hammams have a traditional "göbek tasi" or literally "belly stone" as their centerpiece.

A smaller replica, located in an adjacent room, will allow bathers to receive the soap massage in private. The heated floor, walls and benches heat the room to 40°C to 42°C with possibly (but not essentially) 40% to 60% humidity from an independent steam source. An authentic atmosphere is achieved when the room is finished in traditional Turkish 'Iznik' tiles and Carrara Blanco marble, although dramatic effects have been created in modern hammams using very different finishes.



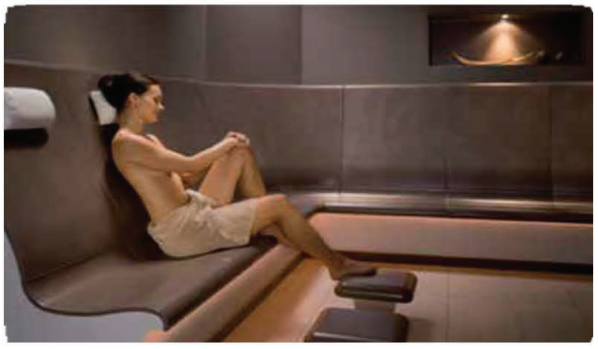


Tylarium (combination of traditional sauna and moderate steam bath)



Laconium

Again a name from Roman times, this is a ceramic hot room with a temperature between 38°C and 42°C where bathers can relax for long periods in comfortable ergonomically designed or individually designed benches, deckchairs or heated seats. The walls, floors and benches are heated to allow heat to penetrate deep into the body, promoting a sense of well-being and relaxation. Aromas can be introduced through a humidifier to enhance this beneficial treatment and maintain a comfortable atmosphere. Heated chaise lounges are often provided in ceramic or stone (or other impermeable finishes) in the quiet spaces in and around the wet areas of the spa, as they are particularly suitable for 'wet' relaxation between thermal treatments / baths.





Tepidarium or Relaxation Spaces

Taking its origins once again from ancient bathing cultures, these areas were known as tepidarii by the Romans; sometimes smaller and more intimate spaces were provided for resting - and even sleeping - and were known as refuges. Equipped with a range of different beds and chaise lounges, these spaces are essential for any spa. When allocating space to a relaxation area, it should be taken into account that after bathing in a sauna for 10 minutes, it will take at least 20 minutes for the bather's body temperature to equalize, which is the only time he / she should return to a warm / warm cabin or pool. Logically, there should be at least as many seats / sunbeds as there are total seats in the cabins and thermal pools.







Foot Spa

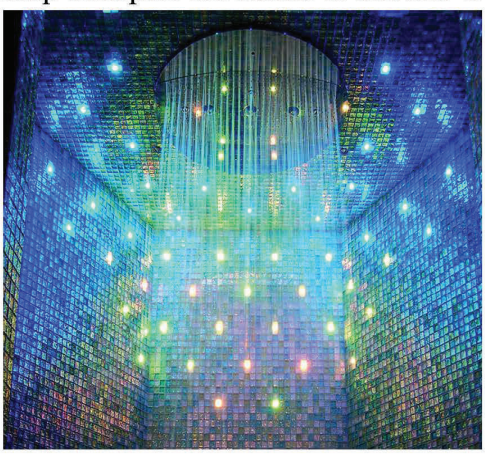
A foot spa is traditionally an area where warm ceramic or mosaic benches provide a place for relaxation and comfort while you bathe your feet in cold or warm (never hot) water. The feet are particularly important in the heating and cooling process of a hydrothermal trip, as the small amount of meat and fat on them, combined with the large number of blood vessels, allow this cooling or heating effect to be carried through the body through through the cooled blood stream.





Experience Shower

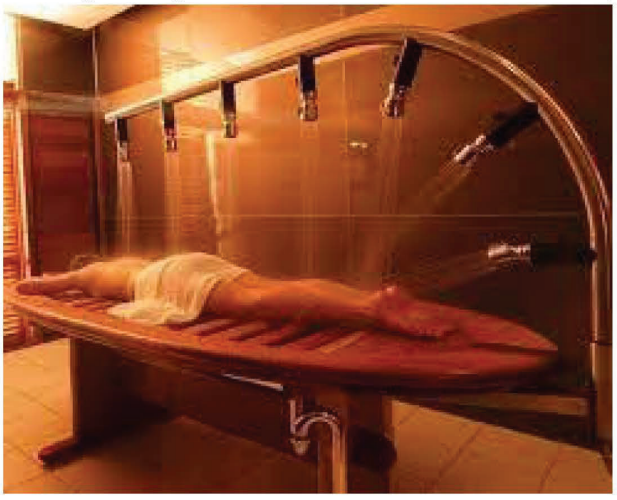
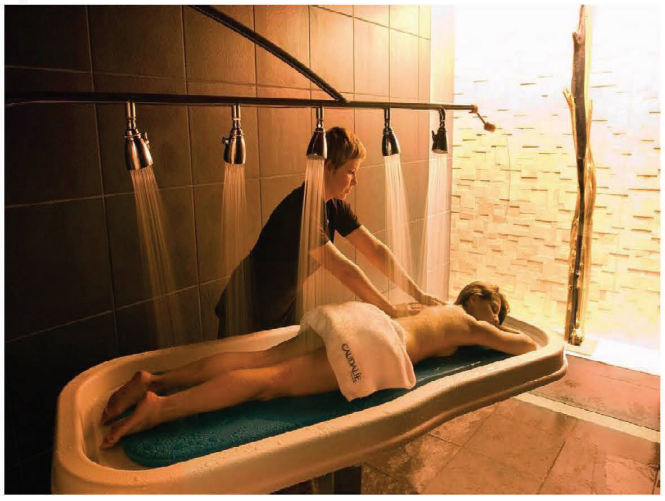
There is a wide variety of showers - cold waterfalls, mists, body jets and dramatic "experience showers" - offering multi-sensory experiences that incorporate smells, sound and visual effects that help transport the bather to another world.





Vichy Shower

A Vichy shower is a horizontal series of shower heads that form a "rain bar" above a waterproof, cushioned table that has lateral drainage for all excess water. This is a therapist-controlled water massage designed to increase blood circulation, hydrate the skin and soothe/relax muscles.

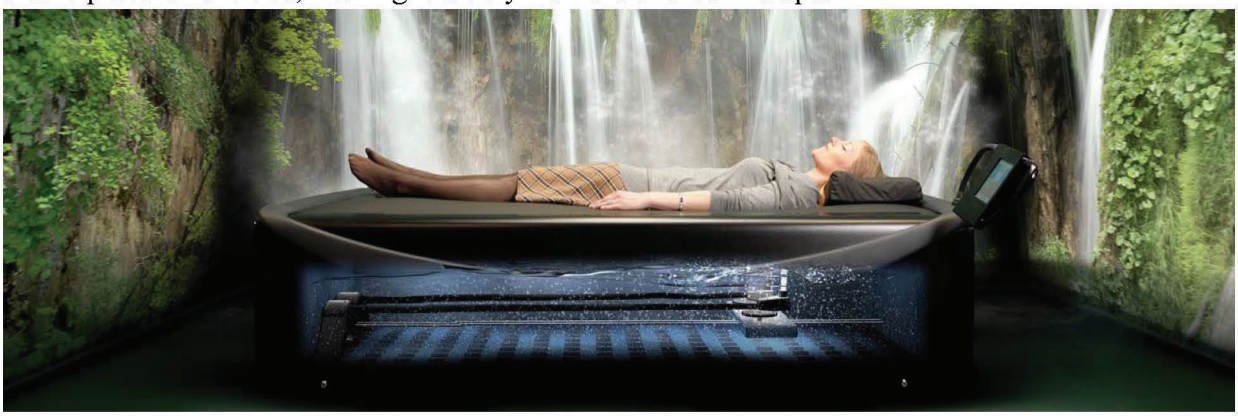



Hydrotherapy tubs. Individual hydrotherapy tubs offer a unique sensation of warmth, buoyancy and hydromassage. Jets can be positioned to stimulate and relax trigger points in the body. High-quality units will massage areas of the body, starting from the feet and working towards the upper body, and will have automatic programs with different focuses and varying pressures. Aromatherapy oil can be added to baths to enhance the bather's relaxation and engage the other senses. Skin soothing products are often used. The natural healing power of mineral water or sea water can increase their effectiveness.



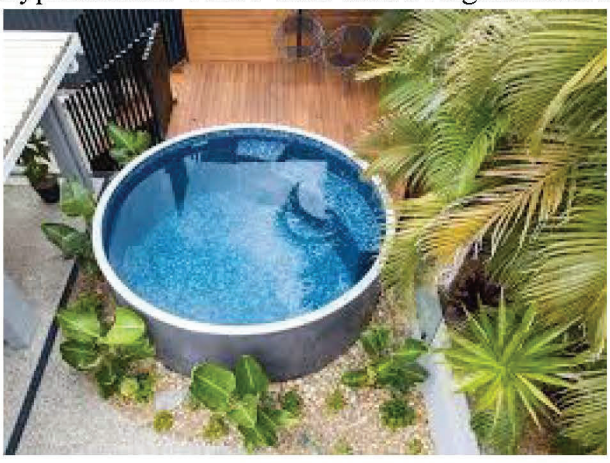


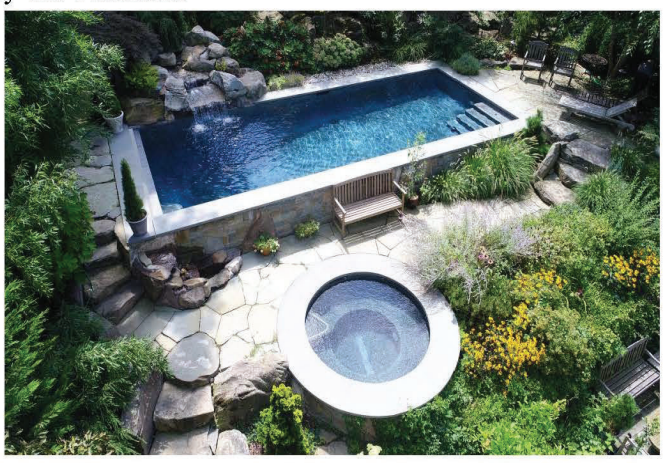
Dry floating beds - provide a sense of weightlessness and are used in conjunction with a body wrap and often include soft hydromassage features. Because the unit can be stable, manual massages can also take place on the bed, making it a very flexible choice in a spa.



Plunge Pool

The traditional cold water pools come from the Romans who realized that the rush of blood, caused by the contraction of the blood vessels, which had previously expanded in the hot rooms, was a particularly invigorating experience. This practice is now accepted as a beneficial way to increase blood flow and can help naturally lower cholesterol levels in the arteries and relieve hypertension. These were called Frigidariums by the Romans.





Snow Room / Snow Cabin / Snow Cave

There can be nothing more exhilarating than going from a traditional sauna to a landscape covered with a fresh fall of real snow to cool your body with. Operating at -10°C to 0°C, these chambers are becoming features in some modern day spas as we slowly but surely retrace our steps to provide ever more authentic experiences closer to the origins of treatments on which we all want now.



Ice fountains

An ice well is often found inside a snow chamber. Powdered snow can be applied selectively to cool the extremities of the body, such as the legs and arms. Very cold snow reaches temperatures below 0 °C and the process of rubbing the snow on the arms and legs helps to cool in these areas.





Japanese Spa

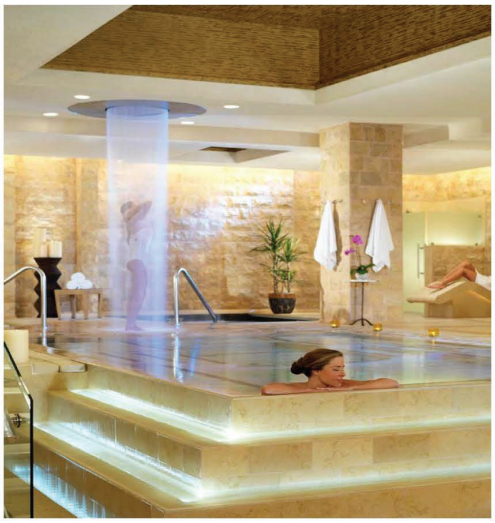
Japan is known for its extensive bathing culture; the Japanese onsen being well known. The Japanese bath (or sentō) was an essential part of Japanese culture. There is not much difference between a sento and an onsen. Sentos are Japanese public baths with artificially heated water. An onsen is a natural hot spring formed underground. The water is heated by geothermal energy.





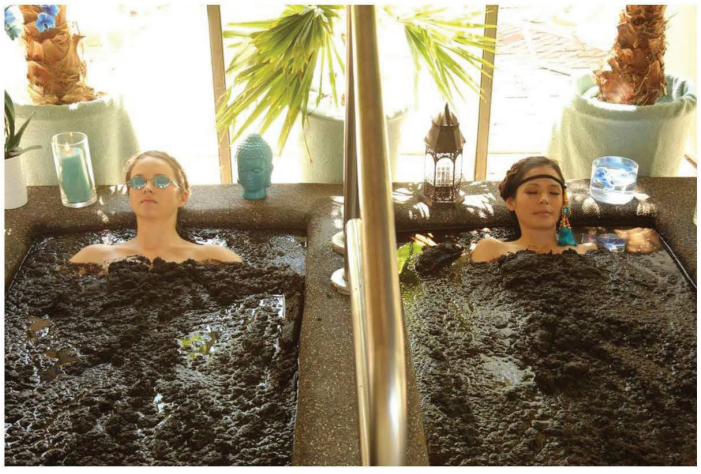
Roman Baths, Caesar's Palace, Las Vegas, Nevada, U.S.

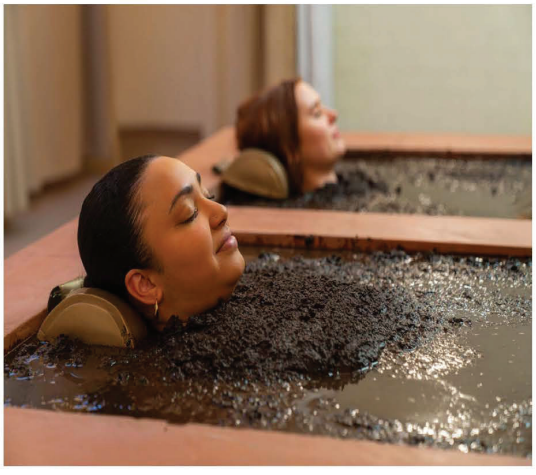
In the modern world, public bathing has evolved from being a necessity (ie the only way to cleanse the masses) to a ritual (and often a private one) that not only helps purify the body, but also one that gives us a chance to we take a break from our busy, stressful lifestyles - allowing for complete and utter relaxation.





Mud treatments originated thousands of years ago as a medicinal and beauty ritual - depending on the minerals inherent in the mud, these baths can cleanse, exfoliate, absorb toxins, increase circulation and soften the skin. The bather can either be completely immersed in the mud, or the mud can be applied by a therapist or bathing partner.





Vitality Pool

A vitality pool is the generic name for what people commonly refer to as a "Jacuzzi" (the brand name that has become synonymous with jetted pools). Vitality pools offer a mini-hydrotherapy experience and are typically used where space will not allow for the inclusion of a full-sized hydrotherapy pool. These pools typically operate between 35°C and 38°C and will have pressurized air and water features.





Kneipp therapy was founded in the 19th century by Sebastian Kneipp, a Bavarian parish priest who was sick with tuberculosis and developed this "water cure" to cure himself. Kneipp therapy does not always take place in a swimming pool - in fact hot and cold compresses can be used - but swimming pools are the most common. Kneipp walking uses a mixture of hot and cold water actions (walking through water) to stimulate blood circulation. The pebbles on the bottom of the river / footbridge massage the feet, and the alternation of hot and cold baths stimulates the circulation of all parts of the body. There are two walks used - the bather begins by stepping into hot water and then into cold water.



Thermae (baths) / Swimming pools



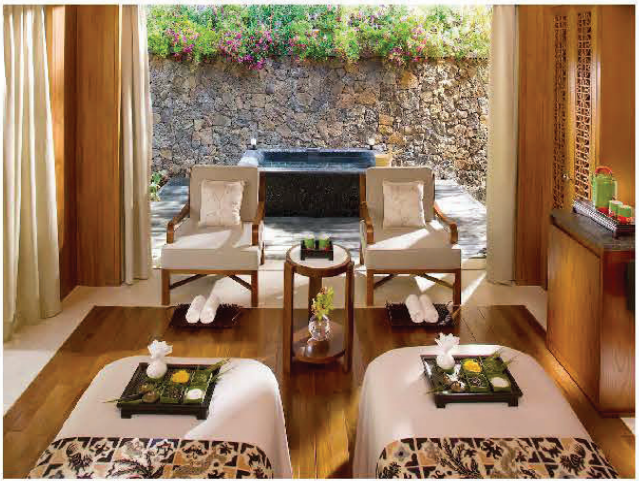
Treatment rooms should be designed for multiple use and allow space for the therapist to maneuver around the treatment tables.





Spa suites are often designed to provide the perfect environment for couples' treatments





BIBLIOGRAPHY

1. Constantin Munteanu, Mariana Rotariu, Mihaela-Iustina Condurache – Balneoclimatologie, Editura Universității „Grigore T. Popa" Iași, 2021
2. Constantin Munteanu, Gabriela Dogaru - Bioclimatologie: Bioclimatologie umana, Bucureşti : Editura Balneară, 2020, ISBN 978-606-8705-18
3. Teleki N., Munteanu L., Bibicioiu S. (2004) – *România Balneara*, Ghid pentru medicii de familie şi pentru medicii specialişti, Bucureşti,
4. Constantin Munteanu - *Nămolul terapeutic* - Bucureşti : Editura Balneară, 2012, ISBN 978-606-93159-1-0
5. Constantin Munteanu - *Balneoterapia* - Bucureşti : Editura Balneară, 2013, ISBN 978-606-93550-4-6
6. Constantin Munteanu - *Hidratarea* - Bucureşti : Editura Balneară, 2013, ISBN 978-606-93550-2-2
7. Constantin Munteanu, Mioara Dumitrascu – Hidrotherapy - Balneo Research Journal. 2012;3(1):23-27 Full Text DOI 10.12680/balneo.2012.1027
8. Constantin Munteanu - *Talasoterapie : „Marea te cheamă la ea" Balneologie* - Bucureşti : Editura Balneară, 2020, ISBN 978-606-8705-15-6
9. Yadav R, Karmakar N, Satapathy T and Roy A: An evidence based new insight into treatment of diseases by hydrotherapy. Int J Pharm Sci & Res 2019; 10(1): 57-69. doi: 10.13040/IJPSR.0975-8232.10(1).57-69.
10. Sameera M Almassmoum, Eman A Balahmar, Shoroug T Almutairi, Goot S Albuainain,1 Rizwan Ahmad, Atta Abbas Naqvi - Current clinical status of hydrotherapy; an evidence based retrospective six-years (2012-2017) systemic review, Bali Medical Journal (*Bali Med J*) 2018, Volume 7, Number 3: 578-586, P-ISSN.2089-1180, E-ISSN.2302-2914
11. Cassandra Cavanah - Guide to Hydrothermal Spa & Wellness Development Standards, Second Edition 10/2016 by Global Wellness Institute, ISBN 978-0-578-17820-2
12. Barbara J. Behrens, Holly Beinert - Physical agents : theory and practice, Third edition, ISBN 978-0-8036-3816-7
13. Isomäki H. The sauna and rheumatic diseases. Ann Clin Res. 1988;20(4):271-275.
14. Hannuksela M, Väänänen A. The sauna, skin and skin diseases. Ann Clin Res. 1988;20(4):276-278.
15. Anne Williams - SPA BODYWORK, A Guide for Massage Therapists, 2nd edition 2015, Wolters Kluwer /Lippincott & Williams, ISBN: 9781451176780
16. A Mooventhan and L Nivethitha - Scientific EvidenceBased Effects of Hydrotherapy on Various Systems of the Body, N Am J Med Sci. 2014 May; 6(5): 199–209, doi: 10.4103/19472714.132935
17. Jon Wardle - Hydrotherapy: a forgotten Australian therapeutic modality, Australian Journal of Medical Herbalism 2013 25(1)
18. Jiyeon An, Insook Lee and Yunjeong Yi - The Thermal Effects ofWater Immersion on Health Outcomes: An Integrative Review, Int. J. Environ. Res. Public Health 2019, 16, 1280; doi:10.3390/ijerph16071280
19. MARIA GABRIELLA CERAVOLO, NICOLAS CHRISTODOULOU, Editors – PHYSICAL and REHABILITATION MEDICINE for Medical Students, ISBN 978-88-7051-636-4 - Digital edition
20. Jane Crebbin-Bailey, John Harcup, John Harrington - The Spa Book: The Official Guide to Spa Therapy, ISBN 1-86152-917-1, Cengage 2005