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THERMAL ENERGY IMBALANCE IN HUMAN ORGANISM. A METHOD OF PREVENTION AND ELIMINATION

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An original method is described to be used for prevention of and compensation for thermal energy imbalance in the human organism. Physical and physiological substantiation is given to observed curative and preventive processes. A basic formal model is suggested for explanation of the therapeutic effect.

The theory of zoning of the organism, which is basic for reflexology, has its own history. At present it cannot be considered complete, but on the contrary, can be thought of as starting anew.

A zone is a small area of the skin and subcutaneous substrate, containing a set of interlinked microstructures (vessels, nerves, cells of connective tissue, etc.) that create a biologically active zone that affects nerve terminals, and it is these terminals that establish a link between the area of the skin and an internal organ. At the points of a zone oxygen absorption can be enhanced or suppressed, electric resistance of the skin can change, pain in palpation can be observed, the structure of the skin can change, enahnced perspiration can start, and local temperature can change.

German physicians F. Soder–Feichtenschlager and M. Weiglhofer [1] work in practical reflexology. They have not only used their knowledge of reflexogenic zones on feet in practice, but also expanded the theoretical notions in this field of knowledge; they described forms of traces that imprint various diseases on feet and specified reflexogenic zones of the foot.

As a result of the effors of K. Piotrowič, a Polish inventor and researcher, the chart of zones of the foot was thoroughly verified, and after analysis of more than 40 000 patients it looks as shown in Fig. 1.

It is impossible to state that this chart is final. The authors of this paper are working to refine it, and it is possible that some more amendments will be made. It should be emphasized that the last chart of the zones that are projections of internal organs is used as an operating scheme in all our research.

It is known that the foot is innervated by long branches of the lumbar and sacral plexuses. The rear part of the foot is innervated by the subcutaneous nerve. On the planta both skin and muscles are innervated by both medial and lateral plantar nerves that are terminal branches of the tibial nerve.

Perspiratory glands and vessels in the feet are innervated by the sympathic nervous system. In the skin of the feet there are sympathic nerve fibers that innervate cutaneous glands and smooth muscles. Sensory nerve terminals lie in epidermis, in the skin itself, and in subcutaneous adipoid layer. In the epidermis tactile bodies and heat, cold, and pain receptors, perspiratory glands, etc., are located and concentrated in large numbers in volar and plantar surfaces of hands and feet, respectively.

Blood is supplied to the foot via the rear artery of the foot, medial and lateral plantar arteries, and terminal branches of the posterior tibial artery.

The lymphatic system is closely connected with the blood-vascular system. Lymphatic surface vessels of lower extremeties start in the dermal lymphatic net and subcutaneous cellular tissue and follow the surface veins.

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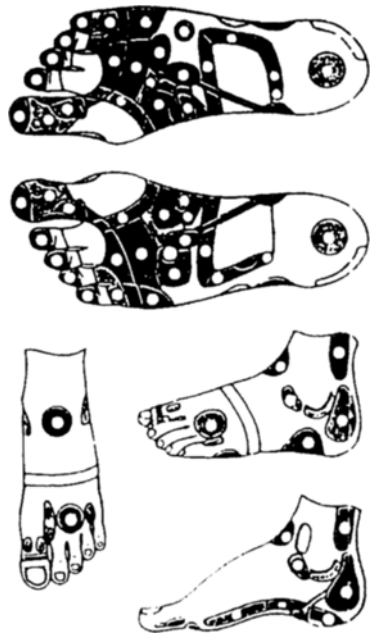

Fig. 1. Chart of reflexogenic zones in feet used by present authors in their practical work (light circles designate zones): a) outer side; b) inner side; c) right foot; d) left foot; e) rear side.

In the feet not only receptors of the organism are located, but also points of functional and energetic links of all energy meridians that perform complicated functions of connecting the human organism with the environment, controlling the blood flow, and transferring energy from internal organs to external parts of the body.

In addition to the already known blood and lymphatic meridians, the energy meridians form an energy system that has interior and exterior meridianal paths in a human body [3].

It is known that in the organism involved in a pathological process temporary energy links can be formed, if the energy balance in the permanent meridians is disturbed [4, 5].

The mechanism of the reflex response in passive bioenergetic massage includes pulse transfer via fibers of the somatic and sympathic nervous systems. In the case of a biothermal energy action with the aid of a screening material, it is probable that reflex responses are induced with participation of many brain structures, involving nervous and humoral mechanisms on the basis of pulses coming from all zones in the foot.

Technical. A sheet of special reflecting material [2] is applied to the foot. Thus, the energy of foot receptors is not scattered but reflected and appears able to be perceived again by the foot receptors. As was shown by numerous experiments, this retrospective action activates processes of self-regulation and redistribution of the energy evolved by the organism at all levels, namely, molecular, chemical, cellular, and energetic. Conditions are created for more affective synthesis of ATP, an accumulator of biological energy.

The sheet is made of an elastic material that fits the foot well and can be left on the foot for a long time, which creates conditions for the prolonged action of the material on the organism. As the authors' studies have shown, this screening effect of the material is multifunctional, which is exhibited in time.

After some time (in most cases 3 to 15 min), as a result of the foot-screen interaction, a person observes thermal effects in the feet, felt as a burning or a pinprick sensation.

Perception of heat by thermal receptors is not always even but differs in the extent, quality, and homogeneity of distribution over the foot surfaces.

The distributions are often localized in projection zones and correspond to patients' pathological organs. It was confirmed in all cases either by the patient's medical history or his/her own sense of pain and/or discomfort.

For 3 to 12 months five therapeutists followed 2 000 patients who used the screens. Their conditions were recorded every second week. The doctors wrote down the patients' subjective sensations, laboratory tests, ECG, and rheovasograms, the Kirllian effect was also analyzed.

Investigations of 2,000 patients in Belarus and more than 40,000 in the world have shown that this action is perceived by the foot receptors, follows the connecting links, reaches the corresponding parts of the brain, has a multifactor effect on patients, and possesses curative properties.

A theoretical basis for the curative multifactor action of the new method may be the systematic links in the organism mentioned above and conclusions that follow from the formal description of the mechanism of action of the screening sheets given subsequently.

The human organism will be considered as a system consisting of ensembles, phenomena, and materials that are mutually connected by force interactions [6]. In general, a measure of behavior of the entire system is a function of the measure of behavior of all ensembles composing the system:

$$U = F(E_1 E_2 \ldots E_l) . \tag{1}$$

The form of the function is unknown. E is the behavior of a portion of the material or phenomenon in the system. A portion of the behavior of the material is put in correspondence with each portion of the material. It should be noted that the concept of a "phenomenon," for example, a heat phenomenon, is also nonelementary but consists of many characteristics and links.

Further, the entire organism will be considered as a control surface that surrounds imaginarily a certain ensemble. In thermodynamics, this ensemble confined by the control surface is conventionally called a system or a body and everything outside the control surface is referred to as the environment.

In the general case the system may consist of one ensemble, a set of many ensembles, a fragment of an ensemble, material, phenomenon, or behavior.

Various forms of specific and universal actions of the environment on the system are known, such as electric, magnetic, chemical, hydrodynamic, etc. In this case we consider a phenomenon that consists in transfer of a certain heat amount δE through the control surface.

The transfer process itself indicates the presence of a specific action. But work is done simultaneously. Consequently, mass transfer also indicates the presence of a universal action. A transfer process can be detected relatively easily from observation of processes that occur directly on the control surface.

The second form of action is associated with the effect of screening of materials from one another (within the system and between two control surfaces).

The law of screening is the most distinct law [6]. It is characterized by two main processes, namely, heat absorption and release. When heat is released, no energy is dissipated (scattered) in nature, since screened heat can also be absorbed. Everywhere direct and retrospective motion of heat is always observed.

In this case it is exhibited, first, in the interaction of the organism-screening sheet-environment ensemble and second, in the system of organism itself during transfer of the screened heat through it.

In the screened state and after this state was disturbed, the system behaves in different ways, which has a substantial effect on its properties. In many respects the increment in the screening is equivalent to appearance of a new material, effect, and/or behavior in the system.

Having introduced the notions of a control surface, a system, and environment and identified the main form of the action, it is possible to determine what refers to the control surface, and what to the environment.

For example, the energy U always refers to the system since it determines the connection between all elements composing the system. In thermodynamics the energy U is called internal energy.

Unlike the energy U, the amount of the reflected energy δE transferred through the system always refers to the environment since in the process of interaction heat (a heat generating material) in the amount δE is transferred from the environment to the system. This process is accompanied by doing the work dQ.

The work is done by the environment on the system, so dQ also refers to the environment. It should be noted that the positive work dQ (of the environment on the system) and the positive gain (increase) of the energy dU of the system always correspond to the positive gain dE (heat transfer from the environment to the system)

$$dU = dQ = PdE , \tag{2}$$

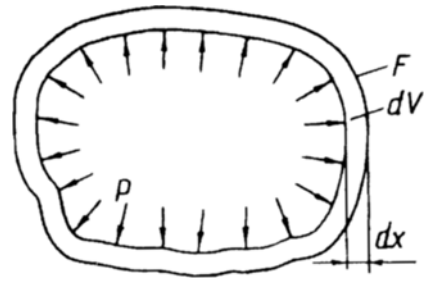

Fig. 2. Pressure-induced changes in parameters of the system.

where P is the force, a qualitative measure that characterizes the intensity of the action. The left-hand side of the equation refers to the system, and the right-hand side to the environment. The quantity dU is a total differential, an infinitesimal change, or an infinitesimal difference (the difference in the energies between two states of the system is meant). The quantity dE is also a total differential, called extensor. It defines the amount of heat transferred through the control surface. As the amount of heat changes, the extensor changes too.

On the contrary, dQ is not a differential since work is not a change in something, but simply an infinitesimal quantity. The quantity and quality of the work done can only be inferred from indirect signs such as changes in the energy of the system or changes in the extensor.

It can be seen that as a result of the interaction of the organism-screening sheet-environment ensemble the organism obtains the additional energy dU. Heat transfer from the environment to the system creates conditions for work to be performed by the environment on the system and facilitates an increase in the internal energy of the system. Further, the law of screening acts in the system itself: the increased energy of the system is not dissipated but screened by internal subsystems. The processes of absorption and release of heat transferred inside the system, typical of screening, follow the law of screening [6]. For example, a process observed inside the system can be described as follows.

The thermodynamic formula describing the mechanical work performed in terms of changes in the volume and pressure of the system is known:

$$dQ = pdV. \tag{3}$$

where p is the pressure.

In Fig. 2 a system is shown that has changed its volume by dV due to the action of the pressure. The control surface area is S.

We find

$$dQ = P_x dx = pFdV/S = pdV = dQ.$$

The pressure p uniformly distributed over the area S expressed in terms of the force F and increment in the volume dV based on the area give the displacement dx of the control surface.

Thus, heat transfer can affect characteristics of the external volume of the system, decreasing or increasing them, which we observed in reality.

If the system is understood as vessels depicted in Fig. 2, then the work done in transfer of heat from the environment to the system can affect the area of the vessels, dilatating or constricting them, i.e., correcting the volume of the vessels and the pressure on them. This effect is observed in practice: the vessel flow and pressure are controlled.

This is the first characteristic of the model considered.

The second characteristic of the model is determination of the motion of heat within this ensemble not only in terms of characteristics external to the system, but also in terms of internal characteristics of the system itself. The subsequent publication will be devoted to this problem.

The mechanism of heat transfer just formulated can be an operating formal model of curative and preventive actions that take place in the human-sheet ensemble studied at the level of the entire human organism for which the sheet is a screen.

The model suggested in the present article is subject to further development and extension. In reality, this possible mechanism is multiparametric and multilevel, but the model considered is basic.

The main conclusions of the present work is that an original method is described, which is used to prevent and eliminate thermal energy imbalance in the organism with the aid of a special material applied to feet.

The physical essence of the healing effect of this new method can be considered from different points of view: as a problem of noninvasive action and stimulation of the organism functions with the method of passive bioenergetic massage, as a problem within global theoretical and practical problems of real thermodynamics that considers categories of universal and peripheral, interactions at the phase interface, and the various control surfaces, as a problem of changes in the state and transfer processes in the system, and as the most advanced approach to formulation of laws and processes of screening.

Numerous practical investigations of this phenomenon in normal people and in patients allow some important theoretical conclusions:

1. When transfered to or from the organism, the reflected heat of the organism changes the state of the organism conjugated with it.

2. The screened heat of the organism is able to affect selectively the quality and activity of the organism's behavior, being concentrated or focused on parameters of the organism condition.

3. This selective concentration affects the general thermal conditions of the organism. The temperatures of the lower part of the body (the lower extremeties) and its upper part equalize, which equalizes the blood flow in the vessels.

4. A broad spectrum of improvements of the conditions of serious patients, whose feet were subjected to the method of reflected heat energy of their organism, suggests that most of diseases can be explained by the presence of noncompensated heat in ensembles of the organism (organs) or between the organism and the environment.

The present conclusions agree well with the laws of real thermodynamics [6] and are confirmed by practical statistics.

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