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THE INFLUENCE OF SEDATIVE INDUCTOTHERAPY ON APPETITE

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INTRODUCTION

The state of psychological comfort and the feeling of a person's quality of life depend to a large extent on how organically this person perceives his own image in the society. Very often, the perception of one's own image in a person arises under the pressure of an external assessment. This imposed image makes a person strive for some average standards, both in their own appearance and in social behaviour.

Very often, people experience psychological discomfort from their appearance: it seems to them that their body mass is excessive. Especially this discomfort becomes significant when a person learns from doctors about the beginning of alimentary obesity development.

If people find a simple, safe and enjoyable way to reduce their appetite, and this leads to the normalization of their weight, then, as a result, this will increase their self-esteem, which will significantly improve the quality of life of these people. Without mentioning the health benefits and longevity of this person.

The search for such a way to reduce appetite occupies the minds of a large number of researchers. And we, analysing the experience gained at different times at the junction of different fields of knowledge, tried to make our practical and theoretical contribution to solving this global problem. In modern Ukraine, this question is exclusively studied by nutritionists (V.I. Tsypriyan, S. Fus) and pharmacologists (I.S. Chekman, A.P. Viktorov). Unfortunately, there are no studies for this topic in the field of physiology and biophysics in open scientific publications.

The purpose of the article.

The purpose of our study is to investigate the possibility of the influence of our author's method of sedative induction therapy on a decrease in appetite. The method of inductotherapy has a rich history and attention to it, in our opinion, is undeservedly low. Nevertheless, at the present time, when the scientific community has again touched upon the

topic of circadian rhythms, interest in the method of induction therapy again, we believe, should revive.

We set ourselves the goal of finding out on a group of volunteers the possibility of reducing their appetite by external electromagnetic influence in the range of long radio waves, which, in our opinion, takes place in nature constantly at night, at a time when the activity of the human body is minimal due to the sedative circadian rhythm which is dominant at this time.

1. The effect of circadian rhythms on the duration of sleep and the quality of human life

From the very beginning, life on Earth had to adapt to the fact that day is regularly replaced by night, and night is replaced by day. Almost all living things have acquired a special clock mechanism that switches the body from day mode to night mode and vice versa. The most vivid demonstration of how the biological clock works is the alternation of sleep and wakefulness. But the biological clock is not only sleep. It is known that during the day and at night we have different body temperatures, that during day and at night our hearts and blood vessels work differently, that metabolism is subject to daily (or circadian) fluctuations. And the same can be said about other living organisms – about animals and plants, about unicellular and multicellular living beings[1].

Of course, it is worth recalling how much knowledge of the circadian mechanism means for biology, medicine and psychology. Recently, we increasingly hear about the problems which can arise due to broken biological clocks – which is not surprising when you take into account how many things depend on them.

And it’s not just about sleep disturbances; There is evidence that due to problems with circadian rhythms, the likelihood of oncological diseases increases, and that an upset biological clock contributes to the accumulation of excess fat – with all the resulting metabolic problems[2].

The 2017 Nobel Prize in Physiology or Medicine was awarded for the discovery of genes that determine the functioning of a biological clock, an intracellular mechanism that controls cyclic fluctuations in the intensity of various biological processes associated with a change of day and night.

[1] Алякринский Б.С., Степанова С.И. По закону ритма. – М.: Наука, 1985. – 175 с.

[2] Агаджанян Н.Л., Губин Г.Д., и др. Хроноархитектоника биоритмов и среда обитания. М. – Тюмень: изд-во Тюменского гос. ун-та, 1998. 168 с.

Daily or near-daily (circadian) rhythms are present in all living organisms from cyanobacteria to higher animals[3].

It is necessary to understand that any achievement that is awarded such an honorary title is based on the research of its predecessors. The first idea of a biological clock appeared back in the 17th century, when the French astronomer Jean-Jacques de Mairan discovered that the diurnal rhythm of leaf movement in plants occurs even in the dark, it is "programmed" in the plant itself and is not caused by the environment. From this moment, work for the study of the phenomenon began. It was found out that almost all living organisms are able to form cyclic processes with a daily or circadian period. It turned out that in the absence of the main external factor of synchronization – the change of day and night – organisms continue to live in a diurnal rhythm, although the period of this rhythm, depending on individual characteristics, becomes slightly shorter or longer than twenty-four hours[4].

The basic mechanisms of circadian rhythms are known now, but many details remain incomprehensible. For example, how several "hours" coexist in one organism at the same time, how several processes are realized referring to different periods? When experiments were conducted during which people lived in rooms or in a cave without external information about the time of day or night, amazing results were obtained. In the experiment participants, body temperature, secretion of steroid hormones, etc., had a period of about 25 hours. At the same time, the periods of sleep and wakefulness, although on average also stayed around the daily one, for some participants ranged from 15 to 60 hours[5].

The study of circadian rhythms is also important for understanding the functioning of the organism in extreme conditions, for example, in the Arctic, when during the polar day and night the natural factors of synchronization of circadian rhythms disappear. There is convincing data that with a long stay in such an environment, a person experiences significant changes in the circadian rhythms of a number of body functions[6]. Now it is becoming clear that this is one of the factors that affects human health, and when the molecular basis of circadian rhythms is

[3] Тимченко А.Н. Основы биоритмологии: учебно-методическое пособие / А.Н. Тимченко. – Х. : ХНУ имени В.Н. Каразина, 2012. – 148 с.

[4] Доскин В.А., Лаврентьева Н.А. Ритмы жизни. – М.: Медицина, 1991. – 176 с.

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[6] Мошкин М. П. Влияние естественного светового режима на биоритмы полярников // Физиология человека. 1984. Т. 10. № 1. С. 126–129.

known, it is possible to analyse which gene variants are more or less favourable for working in polar conditions[7].

Circadian rhythms affect metabolic processes, the functioning of the immune system and inflammation, blood pressure, body temperature, brain function and much more. The effectiveness of certain drugs and their side effects depend on the time of day. In case of a forced mismatch between the internal clock and the external one, for example, as a result of a latitudinal flight or working on a night shift, various dysfunctions of the body can be observed: disorders of the gastrointestinal tract and the cardiovascular system, depression, and the risk of developing oncological diseases increases[8].

The periods of sleep and wakefulness in humans are replaced with circadian periodicity. In studying the relationship between the frequency of sleep and wakefulness with external stimuli, the change in the duration of the period of these fluctuations in humans were researched. In the absence of such stimuli as light, which allows a person to judge the time of day, the people who participated in the experiment went to bed anyway and woke up at the usual time. Thus, the period of the sleep-wake rhythm did not change and for some time remained equal to 24 hours, however, after a while it increased to 36 hours. When the volunteers returned to normal conditions, the 24 hour cycle was restored. Thus, humans and many other animals have internal clocks that go even in the absence of external signals. One of the most common external signals is light. In humans, receptors located in the retina respond to light and send a signal to the suprachiasmal nucleus. Further signal propagation leads to the production of hormones that regulate the circadian activity of the body. However, at the same time, such organs as the heart, liver, and kidneys have their own "internal clocks" and they can be knocked out of the rhythm established by the suprachiasmatic nucleus. The signal entering the pineal gland causes the synthesis and release into the bloodstream of the sleep-causing neurohormone melatonin (N-acetyl-5-methoxytryptamine). Older people produce less melatonin, which probably explains why older people are more likely to suffer from insomnia. Most researchers believe that the suprachiasmatic nucleus is responsible for circadian rhythms and for

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[8] Тимченко А.Н. Основы биоритмологии: учебно-методическое пособие / А.Н. Тимченко. – Х. : ХНУ имени В.Н. Каразина, 2012. – 148 с.

fluctuations in parameters related to the sleep – wake cycle, such as body temperature, blood pressure, and urine production[9].

Taking into account circadian rhythms helps to understand the mechanisms of exacerbations of chronic diseases. The diagnosis and treatment are often more successful if the doctor understands and considers the role of circadian rhythms in the pathogenesis of diseases. So, in the early morning hours platelet aggregation is accelerated – at the same time, there is the highest probability of myocardial infarction, sudden cardiac death, stroke – the leading causes of death in the United States.

The results of diagnostic tests depend on the time of day – for example, indicators of blood pressure, temperature, samples with dexamethasone, plasma cortisol level. Few doctors realize how much even the simplest measurements depend on what time they were taken and what condition the patient was in – sleeping or awake.

During the day, the effectiveness and toxicity of medications changes. The effectiveness of chemotherapy and especially the effectiveness of the action of anesthetics, depend on the time of the drug administration.

And finally, the time of day determines the risk of accidents, the cause of which is insurmountable drowsiness. Traffic accidents, errors and industrial accidents most often occur in the second half of the night, when the need for sleep is maximum[10].

Experienced travellers know well the effect of long-haul flights on circadian rhythms. When crossing several time zones, the synchronization of all human circadian rhythms is disrupted. And this violation of biorhythms persists until in the new time zone the cycles come into line with the daylight hours. This usually takes several days[11].

It is the influence of long-distance flights on the well-being of travellers that made us think that, despite the obvious and proven endogenous nature of the dominant circadian rhythms, there is also some external additional “timer” of the circadian rhythm in living organisms. Indeed, light and dark time of the day, in addition to different levels of illumination and different values of the ambient temperature, have other differences too. For example, on the sunny side of the globe, the distance

[9] Тимченко А.Н. Основы биоритмологии: учебно-методическое пособие / А.Н. Тимченко. – Х. : ХНУ имени В.Н. Каразина, 2012. – 148 с.

[10] Тимченко А.Н. Основы биоритмологии: учебно-методическое пособие / А.Н. Тимченко. – Х. : ХНУ имени В.Н. Каразина, 2012. – 148 с.

[11] Доскин В.А., Лаврентьева Н.А. Ритмы жизни. – М.: Медицина, 1991. – 176 с.

from the earth's surface to the ionosphere is about 60 kilometres, and on the night side of the globe, this distance is about 400 kilometres. It is the variation of the distance from the earth's surface to the ionosphere, in our opinion, that can have a significant effect on the interaction between the earth's surface and the ionosphere. Approximately the same thing happens when playing a musical instrument – trombone. As the trombone lengthens, the sound becomes lower. As the trombone is shortened, the sound becomes higher. This happens due to resonance, which directly depends on the length of this musical instrument. By analogy, if the distance between the Earth's surface and the ionosphere changes, then the frequency of the electromagnetic effect should also vary. Since the resonant electrical interaction between the ionosphere and the earth's surface is possible exclusively in an open electrical circuit due to variable electromagnetic effects, the mechanism of this interaction cannot be based on any other effect than the conduction effect of a phonon or electron gas, which has already been successfully described in modern literature[12].

The peculiarity of the reflection of the electromagnetic signal from the Earth's ionosphere is better, the greater is the wavelength of the transmitter. And according to the observations of radio engineers, the most stable radio communication with the effect of reflection of the radio wave from the ionosphere is communication in the long-wave range. But it is precisely in this range that the well-known and thoroughly studied medical equipment used since the end of the 19th century – darsonvalizers – devices for inductotherapy – work. That is, empirically, based on many observations, for more than a hundred years in practice, inductotherapy devices have been used to correct disorders that are almost completely similar to circadian rhythm disorders in people.

Given that the activity of the human body is minimal at night, when the distance from the earth's surface to the ionosphere will be the most significant, we suggested that one should start observing the effect of an external sedative electromagnetic signal on the human body from the very beginning of the long wavelength range. The lower limit of the long wavelength range corresponds to a frequency of 140 kHz. As the distance from the earth's surface to the ionosphere decreases, as the terrain approaches the midday part of the ionosphere by the process of earth

[12] Федорич А.В. Современные способы сохранения и восстановления здоровья. // Актуальні проблеми здоров'язбереження в молодіжному середовищі XXI століття. Тези доповіді. – Київ. – 2013. – С. 9.

rotation, the frequency of interaction between the earth's surface and the ionosphere will increase. It is like in a trombone. It turns out that the stimulating effect on the midday part of the earth's surface will have a frequency which is several times higher[13].

2. The study of the impact on living organisms

Darsonvalization is a therapeutic effect with a high-frequency pulsed current (110 kHz) of 25–30 kV voltage in the form of a series of oscillations of 100 μs duration, followed by a frequency of 50 Hz. This method is named after its creator – the French physiologist and physicist d'Arsonval. In local darsonvalization, the current is supplied through a glass vacuum electrode, moved along the surface of the body powdered with talcum, along the mucous membrane of the oral cavity, hairy part of the head, or through a special electrode inserted into the rectum[14].

Under the influence of darsonvalization, blood vessels expand, blood circulation is activated, tissue nutrition improves. The method is used for varicose veins, for anal fissures, Raynaud's disease, the consequences of frostbite, long-term healing wounds and trophic ulcers, neurodermatitis, accompanied by itching, periodontal disease, chronic gingivitis, neuralgia, as well as cosmetology. Contraindications: malignant neoplasms, fever, bleedings, active pulmonary tuberculosis. For procedures the apparatus "Iskra-1" is used[15].

General darsonvalization, or induction therapy, in which the entire body is affected with an alternating magnetic field that induces weak eddy currents, is not currently used. Presumably, as we consider, for the reason that induction therapy devices are too bulky and require considerable effort to comply with safety requirements.

Darsonvalization is the general name for electrotherapy methods based on the use of an alternating pulse current or a high-frequency electromagnetic field. Local darsonvalization is the darsonvalization, which consists in exposure to individual parts of the patient's body with a weak pulsed alternating current of high frequency and high voltage. General darsonvalization (induction therapy) is the darsonvalization, which

[13] Федорич О. Об'єктивні характеристики параметрів оточуючого середовища, що спричиняють патогенність ландшафту. // П 84 Професійний успіх у контексті стратегії сталого розвитку: освіта, економіка, екологія : [упорядн.: Н.О.Терентьєва ; Л.Г. Горяна]. – Черкаси : Видавець Чабаненко Ю.А., 2018. – С. 321–350.

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[15] Ясногородский В.Г. Электротерапия. – М., 1987. – С. 114.

consists in exposing the whole organism of the patient to a weak, high-frequency pulsed electromagnetic field.

For further study, we used a device of sparing inductance of our own design "Vitalizer" (tm), tuned to sedation (the frequency of the lower boundary of the long wavelength range). The peculiarity of this device is its compactness and insignificant output of high-frequency signal to the environment (to fulfil the requirements of hygienic standards)[16].

The method of sedative induction therapy was invented by us in 2017 on the basis of the known and practiced medicine (physiotherapy) method of general darsonvalisation. The difference between the known method of general darsonvalisation and the innovative method of darsonvalisation lies in the fact that the latter, in contrast to the known method of induction therapy, takes into account the direction and spatial orientation of high-voltage electrical processes occurring in darsonvalisers.

The main effector difference between the torsion darsonvalization method and the known method is significantly stronger than its effect on biological objects. Depending on the orientation of high-voltage processes in space, this effect can be both stimulating and depressing. Previous studies conducted in this direction have shown quite interesting, in our opinion, results. In particular, a correlation of the effect of the torsional darsovalisation method on the elimination of cardiopulmonary failure in elderly dogs was found. In addition to the significant animal health effect, we have received a number of positive side effects for plants growing in the targeted area. The main side effect was that, within a radius of up to 10 meters from our units, which switched on 1 or 2 times a day for 60 minutes, indoor and outdoor plants began to develop much better than they had previously done in normal environments[17].

The main provisions of the "hypothesis of the external electric drive of capillary circulation in plants"[18]:

1. Capillary flow in plants is due to external electrical influences in open electrical circuits.

2. An external electric drive of capillary current in plants is caused by vibration of the high-frequency range (darsonvalizers).

[16] Федорич О.В., Дяченко О.П. Патент України на корисну модель № 132333 «Аппарат щадної індуктотерапії». 25.02.2019 р.

[17] Федорич О.В., Дяченко О.П. Презентація винаходу – апарату дарсонвалізації «Антистрес». // Програма XIX міжнародного «Тижня освіти для дорослих» в Україні: «Життя є освіта». – 2018. – С. 13.

[18] Федорич О.В., Дяченко О.П. Презентація винаходу – апарату дарсонвалізації «Антистрес». // Програма XIX міжнародного «Тижня освіти для дорослих» в Україні: «Життя є освіта». – 2018. – С. 13.

3. Vibration of electricity in the environment affects all cellular, molecular and submolecular structures (ions) that have an electric charge and makes them oscillate.

4. The capillary flow in plants becomes directional due to the presence of valves in the capillaries of the plants. Valves (as in an electric pump) give a linear direction to the vibratory movement of the fluid.

5. The stronger such an electric external drive is, the better the plants develop (equatorial zone, tropics, subtropics).

6. The weaker is the electrical external drive of capillary flow in plants, the worse will be the development of plants (polar latitudes, orbital space stations).

7. Natural processes on the external electric drive of capillary flows in plants can be simulated by technical devices.

8. Thanks to specially created technical devices, it is possible to improve significantly the performance of greenhouse crop complexes located in temperate or polar latitudes, as well as at space stations. It is theoretically possible to bring the productivity of greenhouses to the one possible only in tropical latitudes.

9. The external electric drive of capillary flows in plants, in our opinion, makes it possible to operate a natural "air conditioner" – a mechanism for cooling the topsoil in forests. The root system of the trees thanks to the external electric drive absorbs a lot of water, and the relative dilution of moisture around the roots (due to the pumping of water around the root system of the plants) creates a cooling effect (by the principle of air conditioning). Understanding these processes makes one think that global warming of the planet is mainly due to the deforestation of tropical vegetation.

Such devices in all versions increase the intensity of capillary flows in all forms of life, have a very powerful effect on the cardiovascular system (analeptic) and, due to increased drainage functions of the body, increase the intensity of specific and non-specific factors of the body's defence.

Subjectively, the influence of the apparatus is determined by the similarity of the feeling of being in tropical or subtropical latitudes. The mood and well-being increase. Plants within the radius of exposure of the apparatus develop as they do in the tropics.

In addition, our innovative method of induction therapy eliminates the massive metal (copper) cell in which a traditional induction therapy session

is performed. This circumstance makes it possible to use inductive therapy without the need for special stationary and very expensive equipment. Also, our equipment consumes far less electricity for its operation.

The sparing inductotherapy device "Vitalizer" (tm).

Previously, we have had a fairly successful experience in using a sparing inductotherapy device to produce a stimulating effect. The presentation of our device at the "Sikorskyi Challenge" All-Ukrainian Start-up Competition brought us the diploma of the winner of this competition. The device artificially causes in the environment effects similar to the same natural processes in tropical and subtropical latitudes:

- it has a strong calming and harmonizing effect on emotional state;
- it significantly increases capillary circulation, which promotes the elimination of toxins and latent infections, adds stamina, eliminates trophic disorders;
- removes auto-toxins from tissue depots, leading to autoimmunization against own toxins and memory molecules of past diseases;
- It normalizes blood glucose levels (in a few weeks) by cleansing the insulin receptors from the protein "lute".

The range of action of the device when exposed to emotional state is 5–7 meters. Such devices in all variants of performance increase the intensity of capillary flows in all life forms have a very powerful effect on the cardiovascular system (analeptic) and by enhancing the drainage functions of the body increase the intensity of specific and nonspecific factors of body protection. The subjective influence of the device is determined by a sensation similar to being in tropical or subtropical latitudes. Mood and well-being increase[19].

The devices are limited in their power of influence. They consume no more than 60 watts from the power supply network. And the power of their radiation does not exceed 20 watts. The range of coverage of such devices is about 8 m[20].

The stimulus device was tuned to the middle of the long wave range of radio waves. We tuned the device for sedation to the lower limit of the

[19] Энергоиммунология и ее практическое применение в теории медицины, гомеопатии и биоэнергетики [Текст] / В.Н. Федорич, А.В. Гаевская, А.В. Федорич [и др.]. – Ужгород : Патент, 2011. – 232 с.

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long wavelength range. The power of energy of our devices does not exceed hygienic norms (10 μW / cm²) at a distance of more than half a meter from the body of the device.

Elderly people feel more comfortable when they receive sessions with the "Vitalizer" device at least twice a day. They feel much better and complain less about pain. We explain these effects by optimizing capillary circulation. The effect of improving the condition in patients with diabetes is interesting. The relief comes after 4 weeks of daily procedures and continues until the patient at least a couple of times a week conducts sessions with the "Vitalizer" device. We explain these effects by cleaning the membrane structures of the macro-boundary layer from the amyloid "lute" on its surface. Likewise, the cleaning of membrane structures causes effects similar to those of homeopathic treatment: improvement after a short-term exacerbation[21].

In all cases, the instrument was switched on for 60 minutes twice a week. The distance between the volunteers and the instrument was 2 – 3 – 4 meters.

3. Investigation of the device influence on appetite

A group of students of V.I. Vernadskyi Taurida National University, consisting of 15 young people, voluntarily participated in the trial of the device for sedation inductotherapy.

During the facultative classes with the teacher, students participating in the experiment received a session of sedative inductotherapy. During the sessions of inductotherapy, the participants of the experiment were asked to note their emotional state and overall well-being.

The experiment lasted three calendar months. In total, participants who took part in the experiment received 27 sessions of sedative induction therapy. In this group for three months twice a week for an hour the device was switched on for sedation inductotherapy. The device was about 3 meters away from volunteers. That is, the existing hygienic standard of microwave load (10 μW / cm²) was not violated.

All the participants in the experiment carried out control weights to determine their body weight. Twice a week, in the morning on an empty

[21] Федорич О.В., Дяченко О.П. Презентація винаходу – апарату дарсонвалізації «Антистрес». // Програма XIX міжнародного «Тижня освіти для дорослих» в Україні: «Життя є освіта». – 2018. – С. 13.

stomach, they carried out control measurements of their body weight on the same stationary medical mechanical scales RP-150MG.

A description of the emotional and objective state of the group of people taking part in the experiment, depending on the conducted inductotherapy session, is given in the table:

Before the experiment, all volunteers were examined by a doctor and passed general blood and urine tests for the purity and safety of the experiment. After the completion of the experiment, the same examinations and analyses were repeated. The repeated studies did not reveal deterioration in the health of the experiment participants. During the experiment, all its participants led their usual way of life and did not change their diet and taste preferences. Some participants in the experiment (9 persons) noted that they had become less susceptible to respiratory diseases – characteristic of the demi-season, in which our experiment ended. And 12 participants in the experiment noticed that they became noticeably calmer and more balanced.

Over the three months of this experiment, the volunteers lost an average two kilograms and two hundred grams of weight. At the same time, 12 out of 15 volunteers noted a significant sedative effect of the apparatus for sedative inductotherapy. This sedative effect manifested itself in volunteers simultaneously after 9 weeks of the test exposure.

CONCLUSIONS

The results received by us clearly indicate that the circadian rhythms of a person do not depend only on the level of sunlight and ambient temperature.

Bionic imitation of the natural interaction between the Earth's surface and the ionosphere at night led to a pronounced sedative effect, which was also objectively confirmed by a decrease in the weight of all the participants in our experiment.

The main conclusion of our experiment is that the imitation of the natural interaction between the Earth's surface and the ionosphere, characteristic of the night-time distance between the Earth's surface and the ionosphere, carried out in the daytime for a group of volunteers, leads to a significant sedative effect.

Such a sedative effect can be effective to reduce appetite and gradually normalize excess body weight. And the mechanism of this effect

is also directly related to the external biospheric mechanism of influence on the endogenous mechanism of human circadian rhythms.

SUMMARY

As a result of studying the effect of sedative induction therapy on the appetite of a group of volunteers, it was found that this method allowed reducing the body weight of the people who participated in the experiment, without changing their lifestyle, eating habits and preferences.

Such a reflex effect of the sedative inductotherapy method on the appetite of the participants in the experiment is most likely due to the fact that the equipment for the implementation of the sedative inductotherapy method imitates natural electromagnetic phenomena and processes that affect the regulation of human circadian rhythms.

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