Electrostimulation with the devices "VEB-1" and "VEB-2" causes almost identical changes in the parameters of gas-discharge visualization

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Abstract

Introduction. In 2015, a generator for electrotherapy and stimulation oh human nerve centers was created, called “VEB-1”. Preliminary observation of volunteers revealed a modulating effect of a four-day course of electrical stimulation on the parameters of electroencephalogram, metabolism, as well as gas-discharge visualization (GDV). Recently designed device "VEB-2". This report launches a series of articles on a comparative study of the course effects of the devices "VEB-1" and "VEB-2" on the human body. GDV was chosen as the first method.

Material and research methods. The object of observation were 18 volunteers: 11 women aged 29-62 years (Mean±SD: 51±12) without clinical diagnose but with dysfunction of neuro-endocrine-immune complex and metabolism. In the morning registered kirlianogram by the method of GDV by the device of “GDV Chamber”. After the initial testing, an electrical stimulation session was performed with a VEB-1 or a VEB-2 devices/ The next morning after completing the four-day course, retesting was performed. The reference values of the parameters are taken from the database of our laboratory.

Results. The effects of electrical stimulation can be divided into the following networks. First, it is almost complete normalization of the initially increased GDI Area in the frontal projection and Ch3 Energy. Second, it is a normalizing decrease in the initially increased Energy of Ch2 and Ch7 (f). Third, it is a normalizing right-hand shift of more or less pronounced left-sided Asymmetry of Ch1(f) and Ch3(f). These effects should be clearly interpreted as physiologically beneficial. The second set is created by quasi-normal (Ch4A, Ch7Ef) and elevated (SCLf) parameters, which increase after electrical stimulation, the physiological assessment of changes of which we will leave without comment. The third set is formed by initially reduced levels of GDI Entropy in the right and left projections, which continue to decrease after electrical stimulation, as well as quasi-symmetric Ch2f, which is transformed into left-asymmetric. If the decrease in Entropy can still be assessed positively...
then the price change of the latter parameters will wait. The effects on the set of GDV parameters are almost equally pronounced in people of both sexes when using both devices.

**Conclusion.** The use of an additional electrode for direct impact on individual organs in the device "VEB-2" is excessive, it is enough to affect only the nerve plexuses.

**Key words:** devices “VEB-1” and “VEB-2”, electrostimulation, gas-discharge visualization.

In 2015, a generator for electrotherapy and stimulation oh human nerve centers was created, called “VEB-1”. Conceiving and creating device, authors were based on the following provisions. The influence of impulses of a rectangular shape (range 7-18 Hz) made it possible to fix the frequency ranges of each basic nerve node. Low frequency had minimal effects of stimulation on the corresponding nerve node, while high frequency the maximum. For the effective excitation of nerve centers, the frequency beat method is used. It consists in obtaining oscillations with close frequencies. To obtain the effect of the frequency beats are generated by pulses of rectangular shape to two signal channels. The channels differ in frequency, which is the beat frequency. For example, for obtaining a beat frequency 6 Hz, forming pulses in a first channel to a carrier frequency of 30 Hz, a second channel at a frequency of 36 Hz. When the first pulse is formed on both channels with a phase shift of 0°, we obtain an absolute zero current in the output. The generator is assembled on the basis of the patent of Ukraine for utility model 105875 “Portable device for electrotherapy and stimulation” [1]. Its operation is described in [2].

Preliminary observation of volunteers, among whom was also the author, revealed a modulating effect of a four-day course of electrical stimulation on the parameters of electroencephalogram, metabolism, as well as gas-discharge visualization (GDV) [3-8].

Recently designed device "VEB-2". In contrast to the device VEB-1, designed to stimulate nerve centers, the electrostimulator “VEB-2” implemented
an additional channel for input of information impulses into the body, whose task is the local concentration of the field, which is formed by two signal channels to the point and body of the person as close as possible to the organ affected (heart, liver, spleen, right and left kidneys) at frequencies that contribute to the maximum recovery of the organ.

This report launches a series of articles on a comparative study of the course effects of the devices "VEB-1" and "VEB-2" on the human body. GDV was chosen as the first method.

Method of GDV (bioelectrography, kirlianography), essence of which consists in registration of photoelectronic emission of skin, induced by high-frequency electromagnetic impulses, allows to estimate integrated psychosomatic state of organism. The first base parameter of GDV is area of gas discharge image (GDI) in Right, Frontal and Left projections registered both with and without polyethylene filter. The second base parameter is a coefficient of shape (ratio of square of length of external contour of GDI toward his area), which characterizes the measure of serration/fractality of external contour. The third base parameter of GDI is entropy, id est measure of chaos. It is considered that GDI, taken off without filter, characterizes the functional changes of organism, and with a filter characterizes organic changes. Program estimates also Energy and Asymmetry of virtual Chakras [9-11].

According to existent ideas, Chakras are power centers, related to the endocrine glands and neural plexus as well as to some organs. In particular, the first Chakra is related to the testicles and sacral plexus, second Chakra to the ovaries, adrenals and kidneys, third Chakra to spleen, liver and solar plexus, fourth Chakra to thymus, heart and cardial plexus, fifth Chakra to thyroid and parathyroid glands, sixth Chakra to pituitary gland and brain, seven Chakra to pineal gland [12].

As the attitude to the GDV method is ambiguous, our laboratory conducted studies that proved its relevance [13-16].
In addition, the response of GDV parameters to the course of use of bioactive water Naftussya [18], the course of rehabilitation by Kozyavkin’s method [19-22], as well as the immediate response to Katas of Kyokushin Karate operator [23] were demonstrated.

**Material and research methods.** The object of observation were 18 volunteers: 11 women aged 33-62 years and 7 men aged 29-62 years (Mean±SD: 51±12) without clinical diagnose but with dysfunction of neuro-endocrine-immune complex and metabolism documented previously [6,7].

In the morning on an empty stomach registered kirlianogram by the method of GDV by the device of “GDV Chamber” (“Biotechprogress”, SPb, RF).

After the initial testing, an electrical stimulation session was performed with a VEB-1 device (for 21 minutes) or a VEB-2 device (for 26 minutes), as well as for three consecutive days. The next morning after completing the four-day course, retesting was performed. The reference values of the parameters are taken from the database of our laboratory.

**Results and discussion.** At the first stage of the analysis of the results, profiles of GDV parameters were constructed before and after the course of electrical stimulation by both devices.

As you can see (Fig. 1), electrical stimulation causes a significant reduction in the area of the gas-discharge image (GDI) taken without a filter in frontal and left projections.
The entropy of GDI decreases most noticeably in the left projection and, to a lesser extent, in the right (Fig. 2).
Instead, the response to electrical stimulation of the GDI form appears visually insignificant (Fig. 3).

Now consider the effect of electrical stimulation on the energy of the virtual chakras, calculated by the program based on the GDV parameters of the skin of ten fingers. There is a significant decrease in the energy of the second, third, fifth, sixth and seventh chakras under the conditions of registration without a filter, as well as an increase in the energy of the seventh chakra during its registration with a filter (Fig. 4).
The motley picture of reactions to electrostimulation of symmetry of chakras is revealed (Fig. 5). In particular, the left (negative) asymmetry of the first chakra (f) is almost completely leveled.

![Graph showing asymmetry of chakras before and after treatment](image)

**Fig. 5.** Profiles of the Asymmetry of the virtual Chakras taken without the filter and with the filter (f) in the right (R), frontal (F) and left (L) projections before and after a four-day course of electrostimulation by the VEB-1 and VEB-2 devices.

Instead, the initially symmetrical second chakra becomes asymmetrical, with displacements occurring in opposite directions under different conditions of registration. The right-hand asymmetric shift is detected for the third (f) and fourth chakras.

To determine which changes in GDV parameters are characteristic of the effects of electrical stimulation, a procedure of discriminant analysis [24] using the forward stepwise method was performed. The program "Statistica 8.0" included 9 parameters in the model. Also noteworthy are three other parameters that turned out to be outside the discriminant model despite statistically significant changes (Tables 1 and 2).

The effects of electrical stimulation can be divided into the following networks. First, it is almost complete normalization of the initially increased GDI Area in the frontal projection and Ch3 Energy. Second, it is a normalizing decrease in the initially increased Energy of Ch2 and Ch7 (f). Third, it is a normalizing right-hand shift of more or less pronounced left-sided Asymmetry.
of Ch1(f) and Ch3(f). These effects should be clearly interpreted as physiologically beneficial. The second set is created by quasi-normal (Ch4A, Ch7Ef) and elevated (SCLf) parameters, which increase after electrical stimulation, the physiological assessment of changes of which we will leave without comment. The third set is formed by initially reduced levels of GDI Entropy in the right and left projections, which continue to decrease after electrical stimulation, as well as quasi-symmetric Ch2f, which is transformed into left-asymmetric. If the decrease in Entropy can still be assessed positively [17], then the price change of the latter parameters will wait.
Table 1. Discriminant Function Analysis Summary

Step 9, N of vars in model: 9; Grouping: Before & After electrostimulation
Wilks' Lambda: 0.403; approx. F(9,3) = 4.3; p = 0.002

| Variables currently in the model | Average value | Wilks' statistics parameters |
|----------------------------------|---------------|-------------------------------|
|                                  | Refer (36)    | Before (18)                  | After (18) | Wilks' A | Partial A | F-remove | p-level | Tolerance |
| Area GDI Frontal, kpixels        | 24.9          | 26.2                         | 25.0       | 0.471    | 0.856     | 4.37     | 0.046   | 0.121     |
|                                  | 0.6           | 1.2                          | 1.0        |          |           |          |         |           |
| Chakra 2 Energy                  | -0.07         | 0.13                         | -0.01      | 0.568    | 0.709     | 10.65    | 0.003   | 0.075     |
|                                  | 0.05          | 0.11                         | 0.10       |          |           |          |         |           |
| Chakra 3 Asymmetry (f)           | 0.01          | -0.05                        | 0.04       | 0.449    | 0.897     | 2.98     | 0.096   | 0.571     |
|                                  | 0.03          | 0.04                         | 0.03       |          |           |          |         |           |
| Chakra 4 Asymmetry               | 0.03          | -0.05                        | 0.10       | 0.425    | 0.948     | 1.44     | 0.241   | 0.591     |
|                                  | 0.05          | 0.09                         | 0.09       |          |           |          |         |           |
| Chakra 7 Energy (f)              | 0.02          | 0.07                         | 0.11       | 0.753    | 0.535     | 22.59    | 0.0001  | 0.111     |
|                                  | 0.03          | 0.07                         | 0.05       |          |           |          |         |           |
| GDI Shape Coefficient Left (f)   | 11.5          | 13.0                         | 13.6       | 0.483    | 0.835     | 5.16     | 0.032   | 0.268     |
|                                  | 0.1           | 0.3                          | 0.3        |          |           |          |         |           |
| Entropy of GDI Right             | 3.85          | 3.80                         | 3.76       | 0.403    | 0.999     | 0.02     | 0.900   | 0.723     |
|                                  | 0.02          | 0.02                         | 0.03       |          |           |          |         |           |
| Entropy of GDI Left              | 3.93          | 3.82                         | 3.74       | 0.492    | 0.818     | 5.77     | 0.024   | 0.529     |
|                                  | 0.02          | 0.01                         | 0.04       |          |           |          |         |           |
| Chakra 2 Asymmetry (f)           | 0.02          | -0.04                        | -0.14      | 0.512    | 0.786     | 7.07     | 0.013   | 0.680     |
|                                  | 0.04          | 0.06                         | 0.06       |          |           |          |         |           |

| Variables currently not in the model | Average value | Wilks' statistics parameters |
|--------------------------------------|---------------|-------------------------------|
|                                      |               |                               |             | Wilks' A | Partial A | F to enter | p-level | Tolerance |
| Chakra 3 Energy                      | -0.09         | 0.03                          | -0.07       | 0.400    | 0.994     | 0.15      | 0.705   | 0.203     |
|                                      | 0.05          | 0.14                          | 0.08       |          |           |           |         |           |
| Chakra 7 Energy                      | -0.11         | 0.08                          | -0.03       | 0.389    | 0.966     | 0.87      | 0.359   | 0.058     |
|                                      | 0.04          | 0.10                          | 0.08       |          |           |           |         |           |
| Chakra 1 Asymmetry (f)              | -0.01         | -0.17                         | -0.07       | 0.390    | 0.968     | 0.82      | 0.375   | 0.522     |
|                                      | 0.03          | 0.07                          | 0.04       |          |           |           |         |           |

Note. In each column, the top row is the average, the bottom row is the standard error.
Table 2. Summary of Stepwise Analysis (Variables ranked by criterion Lambda)

| Variables currently in the model | F to enter | p-level | Lambda | F-value | p-level |
|----------------------------------|------------|---------|--------|---------|---------|
| Chakra 3 Asymmetry (f)           | 2,49       | 0,124   | 0,932  | 2,49    | 0,124   |
| Chakra 7 Energy (f)              | 1,66       | 0,207   | 0,887  | 2,10    | 0,139   |
| Chakra 2 Energy                  | 7,32       | 0,011   | 0,722  | 4,11    | 0,014   |
| Entropy of GDI Right             | 3,19       | 0,084   | 0,655  | 4,09    | 0,009   |
| Area GDI Frontal, kpixels        | 1,99       | 0,169   | 0,614  | 3,77    | 0,009   |
| Chakra 2 Asymmetry (f)           | 3,53       | 0,070   | 0,547  | 4,00    | 0,005   |
| GDI Shape Coefficient Left (f)   | 2,76       | 0,108   | 0,498  | 4,03    | 0,004   |
| Entropy GDI Left                 | 4,64       | 0,040   | 0,425  | 4,56    | 0,001   |
| Chakra 4 Asymmetry               | 1,44       | 0,241   | 0,403  | 4,28    | 0,002   |

\( r^* = 0.773; \text{ Wilks' } \Lambda = 0.403; \chi^2(9) = 26.8; p = 0.0015 \)

Information about the GDV parameters is condensed in the canonical discriminant root, which correlates with some of them positively, and with others negatively (Table 3). The same table shows the Raw Coefficients and Constant for discriminant variables, based on which as well as on the individual values of the parameters of the GDV, the individual values of the canonical root before and after electrostimulation course were calculated.
The striking changes in GDV are documented by calculating the square of the Mahalanobis distance between the recognition parameters before and after the course of electrostimulation: \( D^2_M = 5.93 \) (\( F=4.28; \ p=0.0017 \)).

At the final stage of the analysis, the mean values of the canonical discriminant root were calculated separately for women and men who underwent electrical stimulation with "VEB-1" or "VEB-2" devices.

As you can see (Fig. 6), the effects on the set of GDV parameters are almost equally pronounced in people of both sexes when using both devices.
Fig. 6. Average values (Mean±SE) of the canonical discriminant root before and after four-day electrostimulation course with the devices "VEB-1" and "VEB-2" at females (F) and males (M).

It seems that the use of an additional electrode for direct impact on individual organs in the device "VEB-2" is excessive, it is enough to affect only the nerve plexuses (or Chakras?).

Selected 9 parameters can be used to identify initial or final status a particular volunteer. This is achieved through the calculation of classification functions on the basis of the obtained Coefficients and Constants (Table 4).

Table 4. Coefficients and Constants for Classification Functions

| Variables currently in the model | Before   | After   |
|----------------------------------|----------|---------|
| Chakra 3 Asymmetry (f)           | -13,90   | -5,700  |
| Chakra 7 Energy (f)              | 120,7    | 145,2   |
| Chakra 2 Energy                  | -110,5   | -124,6  |
| Entropy of GDI Right             | 296,3    | 295,5   |
| Area GDI Frontal, kpixels        | 15,80    | 16,51   |
| Chakra 2 Asymmetry (f)           | -14,15   | -20,91  |
| GDI Shape Coefficient Left (f)   | 33,87    | 35,66   |
| Entropy GDI Left                 | 75,58    | 64,02   |
| Chakra 4 Asymmetry               | -46,17   | -43,80  |
| Constants                        | -1135,2  | -1133,2 |
The accuracy of classification is very high (Table 5).

**Table 5. Classification Matrix**

|         | Percent correct | Before | After |
|---------|-----------------|--------|-------|
| Before  | 94.4            | 17     | 1     |
| After   | 88.9            | 2      | 16    |
| Total   | 91.7            | 19     | 17    |

According to the expectations based on the results of previous studies of our laboratory, the detected changes in GDV parameters are accompanied by changes in parameters of HRV, EEG, acupuncture, immunity and metabolism, which will be published in future articles.

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**ACCORDANCE TO ETHICS STANDARDS**

Tests in volunteers are conducted in accordance with positions of Helsinki Declaration 1975, revised and complemented in 2002, and directive of National Committee on ethics of scientific researches. During realization of tests from all participants the informed consent is got and used all measures for providing of anonymity of participants.

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