



MAKATS V.G.

## FUNCTIONAL-VEGETATIVE DIAGNOSTICS AS A BIOPHYSICAL ISSUE

(INFORMATION 4)

Expert of the highest level of NAS of Ukraine, MD, professor  
(European centre for postgraduate education of doctors of the PO the "Ukrainian national Academy of Sciences")

*These materials are unparalleled and is the intellectual property of developers towards "functional-vegetative diagnosis without using external power sources" (VG Makats, Makats EF, Makats Dm. V., Makats Den.V.). Considered its biophysical characteristics and objectivity in assessing the effectiveness of rehabilitation.*

**Keywords:** Acupuncture therapy, functional diagnostics autonomic, vegetative homeostasis, functional rehabilitation.

*Наведені матеріали не мають аналогів і є інтелектуальною власністю розробників напрямку "Функціонально-вегетативна діагностика без використання зовнішніх джерел струму" (Макац В. Г., Макац Е. Ф., Макац Дм. В., Макац Ден. В.). Розглянуті її біофізичні особливості і об'єктивність при оцінці реабілітаційної ефективності.*

**Ключові слова:** Чжень-цзю терапія, функціонально-вегетативна діагностика, вегетативний гомеостаз, функціональна реабілітація.

*Приведенные материалы не имеют аналогов и является интеллектуальной собственностью разработчиков направления "Функционально-вегетативная диагностика без использования внешних источников тока" (Макац В. Г., Макац Е. Ф., Макац Дм. В., Макац Дэн. В.). Рассмотрены её биофизические особенности и объективность при оценке реабилитационной эффективности.*

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### Introduction

Before we start to discuss the issues of traditional Acupuncture, we need to get acquainted with the technique of vegetative diagnostics, which allowed discovering the previously unknown biophysical phenomena and realities...

Till the recent days, vegetative anamnesis with the usage of questionnaire tables has been generally accepted as the means of integral evaluation of vegetative homeostasis. At the same time, historically preserved detached evaluation of sympathetic and parasympathetic reactions of the basic divisions of vegetative nervous system (VNS) contradicts contemporary ideas of their functional-dependent composition. Additionally, complexity of study of super-segmental and segmental levels of vegetative regulation restricts necessary information for clinicians. It is also necessary to remember about the heterogeneity of sympathetic and parasympathetic reactions, nonlinearity of parameters of vegetative status during the change of activity of one of the divisions of VNS and their dependency on a range of regulating factors. At the same time, it has been defined (Wane 2000; Nozdrachov, 2003), that the indications of instrumental examination of VNS characterize only separate mechanisms of vegetative regulation.

Thus, table methods of vegetative diagnostics are subjective, and instrumental reflect the functional state of separate subsystems of VNS and separate mechanisms of vegetative regulations. That is why, in order to see the full picture we need enormous, simultaneous and complex researches, during which, separate indications lose features of system evaluation of general vegetative homeostasis (VH).

Our elaborated methodology of functional-vegetative diagnostics (FVD) allowed identifying acupunctural channels, and discovers previously unknown human functional-vegetative system. For today, this is the only "electropunctural" diagnostics, results of which are stable and comparable in time. It is grounded on the previously unknown biophysical phenomena, with original standardization and directed at evaluation of functional-vegetative homeostasis: correlation of syndromes of sympathetic (YANG) and parasympathetic (YIN) activity.

We start with the statement, that every electropunctural diagnostics has the right to exist, at least under three conditions:

- 1) presence of testing (diagnostic) signal, power-informational characteristics of which do not exceed biophysical parameters of the system under attention;
- 2) concrete understanding of the functional specifics of the subject and the area of its biophysical influence;
- 3) availability of comparable results of functional diagnostics during repeated (in 5-10-20 min.) examination.

At the same time, we should pay attention to significant mistake of the officially recognized electropuncture technologies, that “condition diagnoses” of a separate organ or separate functional system!

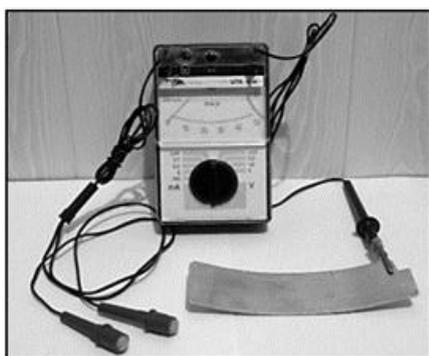
In our case the talk is about dynamic stability of intersystem dependency, i.e. about functional-vegetative homeostasis, forms and measures of its functional deflections. Any other interpretation of received information from representative acupunctural zones leads us from the Eastern metaphysics to the Western one. In other words, contemporary interpretation of the consequences of electropunctural diagnostics is biophysically incorrect.

And the last one. It is unreasonable and useless to argue with the developers of various electropunctural modifications (but, it should be admitted, that discovered biophysical realities, today, cannot be correctly described in the frames of classical biophysics and clinical physiology). Anyway, any opponent can individually check and challenge any technology by testing its comparability of repeated results... In such cases, our experience tells us, that it is the best way to omit verbal battles.

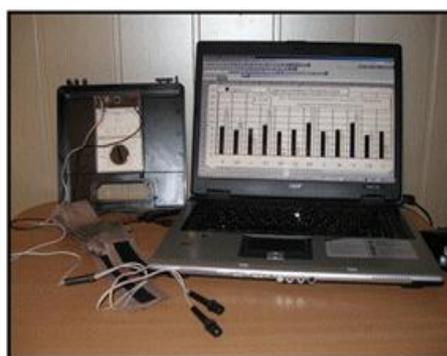
The methodology of functional-vegetative diagnostics (FVD) is described in details in the monographs [1-5], that is why we are going observe only its technical and biophysical peculiarities.

### Technical peculiarities of FVD

**Diagnostic complexes** VITA-01-M and computerized system VITA-01-Biotest (fig. 1) are recommended for use in practical medicine RPC HM of Ukraine “New medical technology and new means for diagnostics, prevention and rehabilitation” (record №5, 25.12.91) and Scientific council of HM of Ukraine (record №1. 08-01, 11.01. 94).



System VITA-01-M



Complex VITA-01-BIOTEST

Fig.1 Equipment for FVD According to V. Makats

Reasonability of functional-vegetative examination of children is confirmed by the program “Two-stage system for rehabilitation of vegetative disorders of children, that live in the zone of ecological control of Ukraine” (executed according to the Assignment of Cabinet of Ministers of Ukraine №1861/4, 4.04.1997 and №12010/87, 01.06.1999).

Systems VITA-01-M do not require metrological standardization because:

- 1) methodology FVD does not require external sources of power;
- 2) voltage of closed individually-diagnostic circuit does not exceed the level of membrane potential (0,03-0,6 V);
- 3) analysis is needed not for absolute values of diagnostic indices, but for relative correlation of the total activity of functional systems *YANG/YIN* groups (syndromes of sympathetic / parasympathetic activity).

**Factor of attention of FVD** is ability of biological systems to generate current into external closed circuit “electrode-donor of electrons (**DE**) – biological object – electrode acceptor of electrons (**AE**)”. At the same time, it should be remembered, that electromagnetic factor of external sources significantly exceed the biophysical level of cellular membranes and condition expected excitation (oppression) of acupunctural zones.

It is incorrect to take the reason as the basis to talk about the functional reliability of results. Additionally, biodynamics of every acupunctural zone has an individual frequency profile, which by mistake is interpreted from “diagnostic” point of view.

**The standardization framework of FVD** is specific. It is related to evaluation of functional-vegetative equilibrium and is conditioned by statistically probable amount of observations (14. 304 examined children of different age and gender groups).

### Methodological peculiarities of FVD

Methodological peculiarities of FVD are conditioned by:

- a) short (3 sec.) contact of paired diagnostic electrode DE with symmetric representative zones and limitation of number of tests from 24 to 12;
- b) wet electrode contact with acupunctural zones (neutralizes vegetative-vascular reactions of skin);
- c) usage for electrode AE of the centralized “basic zone” (navel region, equidistant from the zones of representative contact).

At the same time, the attention of FVD is concentrated on the bioelectrical activity of symmetrical zones-accomplices (tai-yuan, da-ling, shen-men, wan-gu, yang-chi, yang-xi, tai-bai, tai-chong, tai-xi, shu-gu, qiu-xu and chong-yang). Their individual resistance to direct current is equivalent to average resistance of other single-channel zones (J. Nakatani).

The received in mV (mkA) data of FVD is transformed into average values. We determine the overall bioelectric activity of functional systems *YANG* and *YIN* groups, and vegetative coefficient of their interdependency ( $k = \frac{\sum YANG}{\sum YIN}$ ). From the point of view of vegetative homeostasis, the latter points to correlation of sympathetic (*YANG*) and parasympathetic (*YIN*) functional activity.

**Functional-vegetative principles of FVD.** From the biophysical point of view, functional activity of separate acupunctural zones is not a carrier of basic information. However, interrelation *YANG/YIN* syndromes directly shows the prevalence of systemic excitation (sympathetic orientation of functional-vegetative activity), or oppression (parasympathetic orientation of functional-vegetative activity).

This conditions the following principles of FVD:

- overall bioelectrical activity of representative zones of group *YANG* is comparable with sympathetic activity, and of group *YIN* – with parasympathetic;
- sympathetic and parasympathetic divisions of VNS at organ level ensure biochemical control over systemic vegetative equilibrium (the latter under ordinary conditions is dynamically stable; disorder of equilibrium is conditioned by prevalence of activity of one

of the divisions of VNS);

- correlation of YANG and YIN syndromes at the biophysical level characterizes the functional vegetative equilibrium, i.e. interdependency of functional excitation and oppression (the latter under ordinary conditions is dynamically stable; disorder of functional equilibrium is conditioned by prevalence of one of syndromes);

- according to functional peculiarities, YANG organs (systems) are active, whereas YIN organs (systems) – accumulative (tranquility) organs;

- dynamically-stable correlation of YANG and YIN syndromes, probably correlates with dynamically-stable functional correlation of sympathetic and parasympathetic activity, i.e. with functional-vegetative equilibrium;

- prevalence of the YANG syndrome over YIN syndrome testifies to disorder of vegetative equilibrium with a prevalence of sympathetic activity;

- prevalence of the YIN syndrome over YANG syndrome testifies to disorder of vegetative equilibrium with a prevalence of parasympathetic activity.

And, the following logical conclusion: Sympathetic and parasympathetic divisions of VNS at organ level act as the executives of functional-informational program of vegetative control. At the same time, the latter is conditioned by vegetative coefficients.

**Vegetative coefficients.** The developed on the mentioned principles vegetative coefficients (**k**) point to a correlation of sympathetic and parasympathetic activity (tab.1). They have been calculated according to the data of examination of 14.304 children and form final functional diagnoses.

Table 1

**ZONE OF ATTENTION OF VEGETATIVE COEFFICIENTS**

VALUE of <b>k</b>	ZONE OF FUNCTIONAL ATTENTION	SYMBOL OF ZONE
to 0,75	syndrome of significant parasympathetic prevalence	PA-s
0,76-0,86	syndrome of significant parasympathetic prevalence;	PA-e
0,87-0,94	zone of functional compensation of parasympathetic activity	FcP
0,95-1,05	zone of functional-vegetative equilibrium	VE
1,06-1,13	zone of functional compensation of sympathetic activity	FcS
1,14-1,26	syndrome of expressed sympathetic prevalence	SA-e
1,26 and >	syndrome of significant sympathetic prevalence	SA-s

**Biophysical peculiarities of FVD**

Now lets us draw your attention to previously unknown biophysical phenomena that ensure stability of FVD. And we start with the following.

**Reality of natural generators of energy** is conditioned by two basic positions.

1. Bioelectrical phenomena (processes of distribution and transport of electric charges) are conditioned by the presence in living tissues of a great number of fixed (charged groups of bio macromolecules) and mobile (free electrons and ions) electric charges.

2. Biological systems are natural generators, able to provide transport of free charge carriers into the artificially created external circuit.

For realization of biological source of energy, only three components are needed: a) biological system (natural generator of energy); b) chemically inert electrode donor of electrons (DE) – supplier of charge carriers into functional systems through acupunctural zones, and acceptor of electrons (AE) – receiver of free charge carriers through acupunc-

tural zones; c) external circuit with device for control, contacting with electrodes DE and AE.

**Source of energy for FVD** is the ability of biological systems to generate weak currents into closed circuit. Thus, diagnostic factor for FVD is directed transport of free charge carriers (electrons), redistribution of which conditions power-informational transformations. This part requires additional explanation, which we will begin with the question whether there is a relation of functionally active zones (FAZ) of skin to biogenic generation of energy.

Research of their functional activity allowed to take a fresh look at this biophysical phenomenon, and giving answers to the question. They *do* have, and even direct relation! What testifies in favor of this?

1) Movement of charge carriers through a biological object (fig. 2b) from electrode DE (+) to electrode AE (-), without violation of known direction from (-) to (+) in the external circuit. If we add external source of power (battery, fig. 2a) to the circuit, then the transport of charges becomes dependent on its polarity and it is streaming through the object according to “physical law” from (-) to (+).

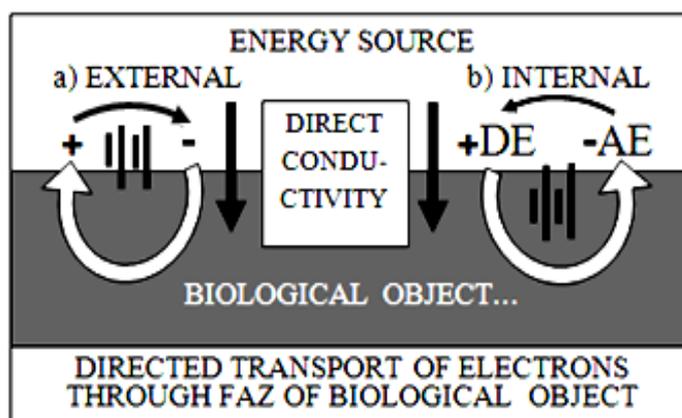


Fig.2 Direction of charge carriers through FAZ

3) In the circuit between two single-channel FAZ bioelectrical activity of the circuit is in 73,4% higher, than during the contact with FAZ of different functional systems.

Question: do unknown phenomena of FAZ that have direct meaning for vegetative diagnostics exist?

Yes, and let us observe them!

### Phenomenon of asynchronicity of FAZ or biophysical fractality

We identified five types of temporary symmetrical asynchronicity (fig. 3):

- balanced, when during a certain period, bioelectrical activity of two symmetrical FAZ is practically comparable (fig. 3.1);
- bilateral, when during a certain period, the bioelectrical activity of one of symmetrical FAZ occasionally prevails (fig. 3.2);
- dextral, when during a certain period, the prevalence of bioelectrical activity of right symmetric FAZ is observed (fig. 3.3);
- sinistral, when during a certain period, the prevalence of bioelectrical activity of left symmetric FAZ is observed (fig. 3.4), and
- mixed, when during a certain period, we see the sequence of previous types of symmetric asynchronicity.

At the same time, the phenomenon of symmetrical asynchronicity remains also in paired functional systems (fig.4).

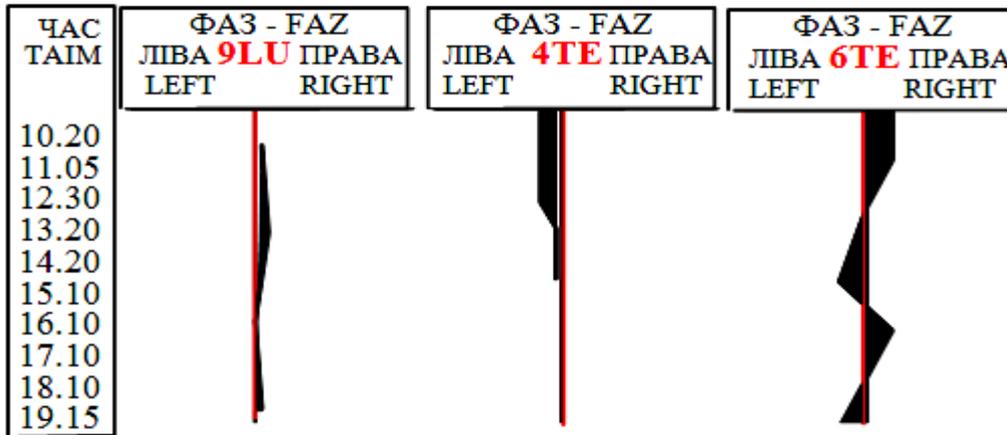


Fig. 3.1

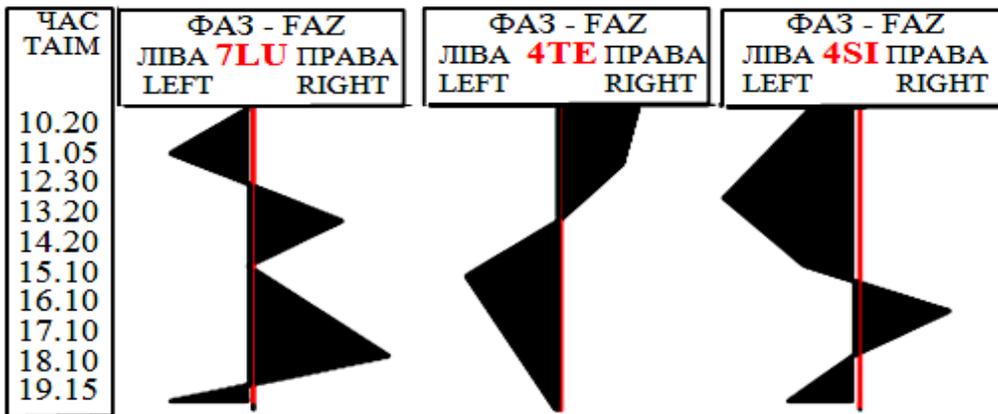


Fig. 3.2



Fig. 3.3



Fig. 3.4

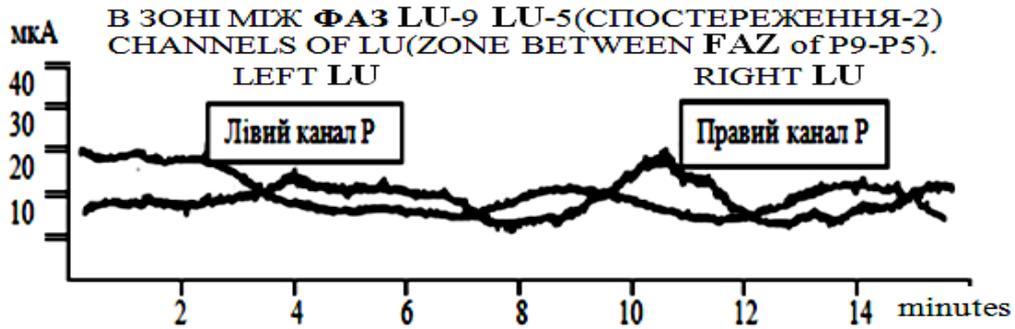


Fig.1.4 Phenomenon of symmetrical asynchronicity of functional systems.

It should be noted, that simultaneous observations of symmetric asynchronicity in pairs of FAZ of different channels disclosed occasion of different types of interrelations (TS=zone of Test-signal feeding fig. 5).

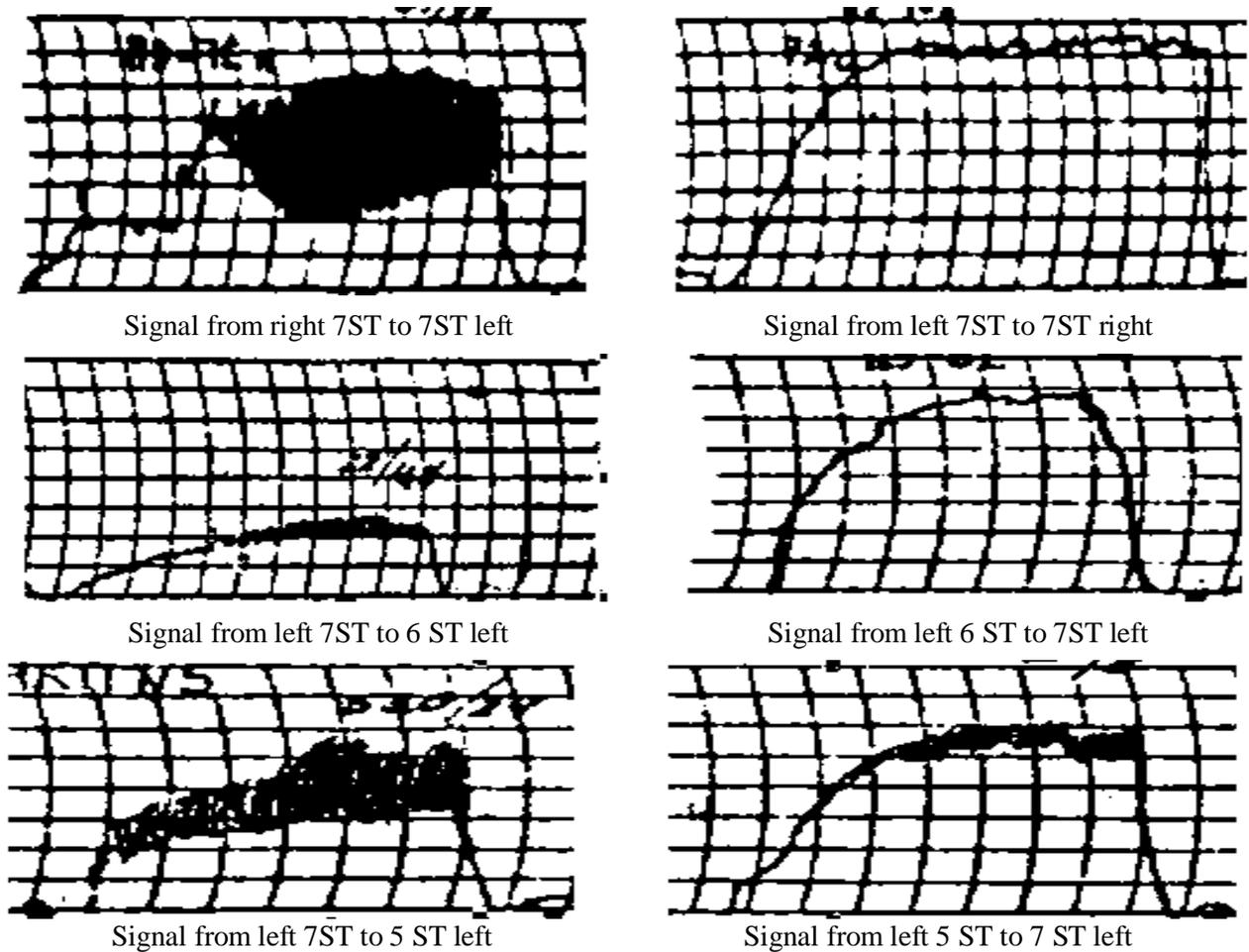


Fig.5 Valvular effect between one-sided FAZ of system ST

#### Phenomenon of total activity of symmetrical FAZ

The phenomenon of total bioelectrical activity of symmetrical FAZ – is one of the basic principles of FVD. It appears in symmetric pairs of FAZ during their simultaneous testing by paired electrode DE with one common output to the controlling device.

Thus, for example, triple (during 15-20 minutes) testing of right and left symmetrical FAZ is likely to indicate different values of symmetrical asynchrony. At the same time, if right FAZ will show, for instance, decreasing wave (15-10-5 mcA), then its left analogue, on the contrary, will show the rising wave (provisionally opposite values 5-10-15 mcA; fig. 6, fig. 7; table 2).

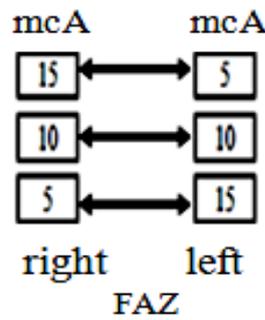


Fig.6

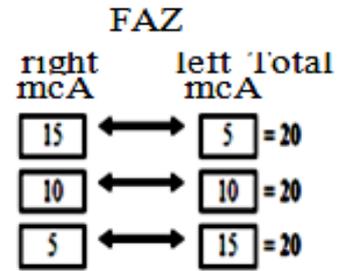


Fig.7

Table 2

Individual and total bioelectrical activity of symmetrical FAZ (in mcA)

СТОРОНА SIDE	ІНДИВІДУАЛЬНА І СУМАРНА АКТИВНІСТЬ СИМЕТРИЧНИХ ФАЗ INDIVIDUAL AND TOTAL ACTIVITY OF SYMMETRIC FAZ											
	BL	SP	LI	TE	SI	LU	PC	HT	ST	KI	GB	LR
<i>СПОСТЕРЕЖЕННЯ - SUPERVISION 12.10.2005 (№1)</i>												
ЛІВА - LEFT	1,6	4,4	15	5,0	7,0	0,3	1,0	3,9	2,6	9,0	9,5	1,8
ПРАВА-RIGHT	5,2	3,0	10	5,0	12,0	1,4	12,5	3,0	6,0	11,0	0,8	1,4
Σ	6,8	7,4	24,5	10,0	19,0	1,7	29,5	7,0	8,6	20,0	10,1	3,2
<i>СПОСТЕРЕЖЕННЯ - SUPERVISION 12.10.2005 (№2)</i>												
ЛІВА - LEFT	7,4	10	3,8	2,8	8,5	7,0	6,3	4,0	5,2	2,6	3,5	6,0
ПРАВА-RIGHT	4,2	6,8	6,5	3,3	4,0	7,0	10,5	7,2	2,6	2,0	7,4	3,5
Σ	11,6	16,8	10,3	6,1	12,5	14,0	17,0	11,2	7,8	4,6	11,0	9,5
<i>СПОСТЕРЕЖЕННЯ - SUPERVISION 12.10.2005 (№3)</i>												
ЛІВА - LEFT	1,0	0,9	6,0	0,5	0,8	0,9	0,8	2,5	3,0	3,3	0,8	2,6
ПРАВА-RIGHT	0,7	0,7	6,3	1,5	1,6	0,3	0,5	0,5	1,7	1,6	0,5	2,2
Σ	1,7	1,6	12,0	2,0	2,4	1,2	1,3	3,0	4,7	5,0	1,3	4,8

If two symmetrical FAZs are simultaneously tested with special electrode DE with one common output to gaging unit, we will get stable total results 20-20-20 mcA (fig. 7, tab. 2). At the same time, discrete regularity of the discovered phenomenon should be noted. And, though the latter has no biophysical explanation, its usage in practice of functional-vegetative diagnostics has significant value: for the first time we get stable in time data and twice reduce the number of testings (instead of 24 FAZ, we control total activity of 12 symmetrical pairs).

**Phenomenon of functionally directed transport of charge carriers**

The phenomenon of energy direction between single-channel FAZ in the system Lungs (LU), biophysically supports the canonical statement of its centrifugal character.

It has been established, that traditionally centrifugal, or artificially centripetal direction of charge carriers increases significantly under conditions of concurrency of hypothetical and initiated directions. Phenomenon testifies to the reality of valvular mechanism, in other words, to the natural centrifugal activity of the mentioned system (fig. 8).

Phenomenon of directed transport is also detected during the usage of electrode pair DE-AE. Here maximal conductivity was during the position of electrode DE on FAZ LU<sup>3</sup> and AE – in turns from LU<sup>4</sup> to LU<sup>11</sup>. At the same time, it should be noted, that study of valvular-channel effects has a significant perspective (our works should be viewed as a

methodological aspect of the problem). Thus, doors for people with inquiring nature are open.

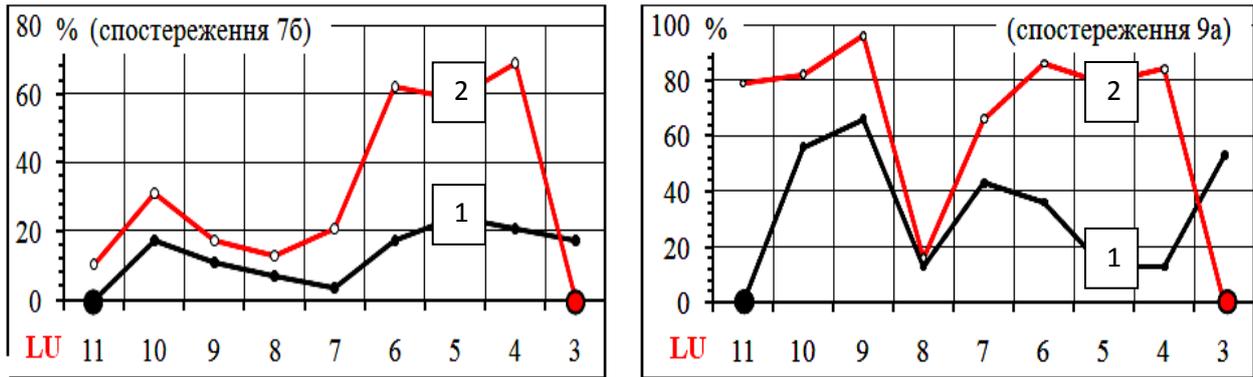


Fig.8 Centripetal (1) and centrifugal (2) electro conductivity of the channel LU

**Phenomenon of systemic dependency on activity of channels BL-SP**

Specifics of influence of the channels BL-SP on directed activity of other systems has been identified: their excitation conditions oppression of other channels (and vice versa) and conditions value of posture during FVD (fig.9, example of BL).

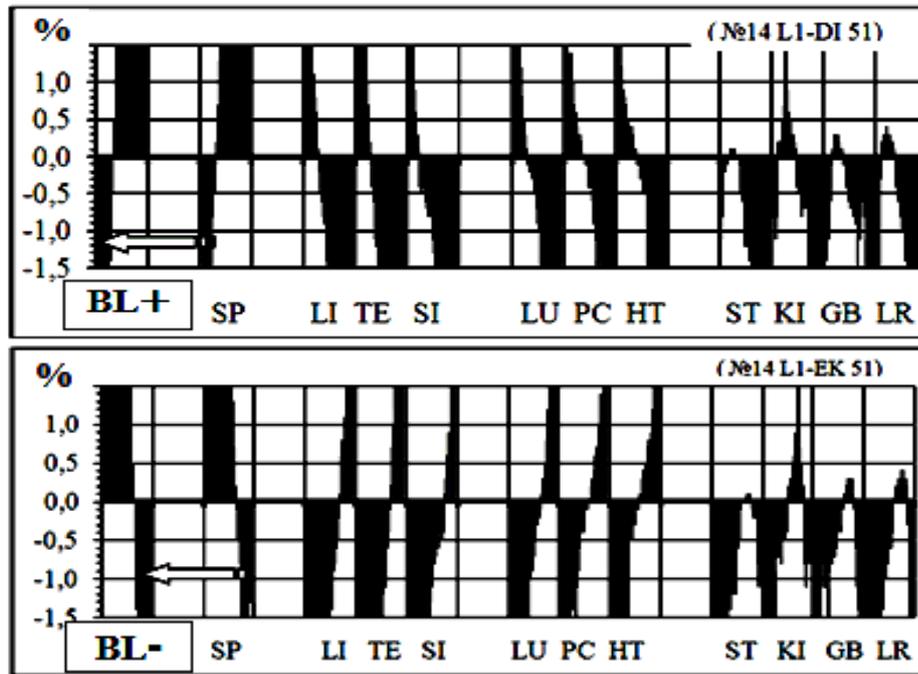


Fig.9 Systemic reactions on excitation and the oppression of BL

**Phenomenon of posture. Ortho- and clinostatics for FVD**

According to our data in 73,2% cases change of posture from orthostatics (standing - ↑) to clinostatics (lying - →) conditions direction of vegetative homeostasis to parasympathetic activity. At the same time, change of body position is accompanied with the increment in the activity of BL-SP, which conditions prevailed oppression of other channels. Change of posture from clinostatics to orthostatics, on the contrary, conditions oppression of BL-SP and prevailed excitation of other channels (fig.10).

The discovered phenomenon of posture became an argument in favor of standing position while conducting FVD. Taking into account, that nearly all functional diagnostics

(ECG, EEG and others) are conducted in clinostatic position, consequences must be, at least, taken into consideration...

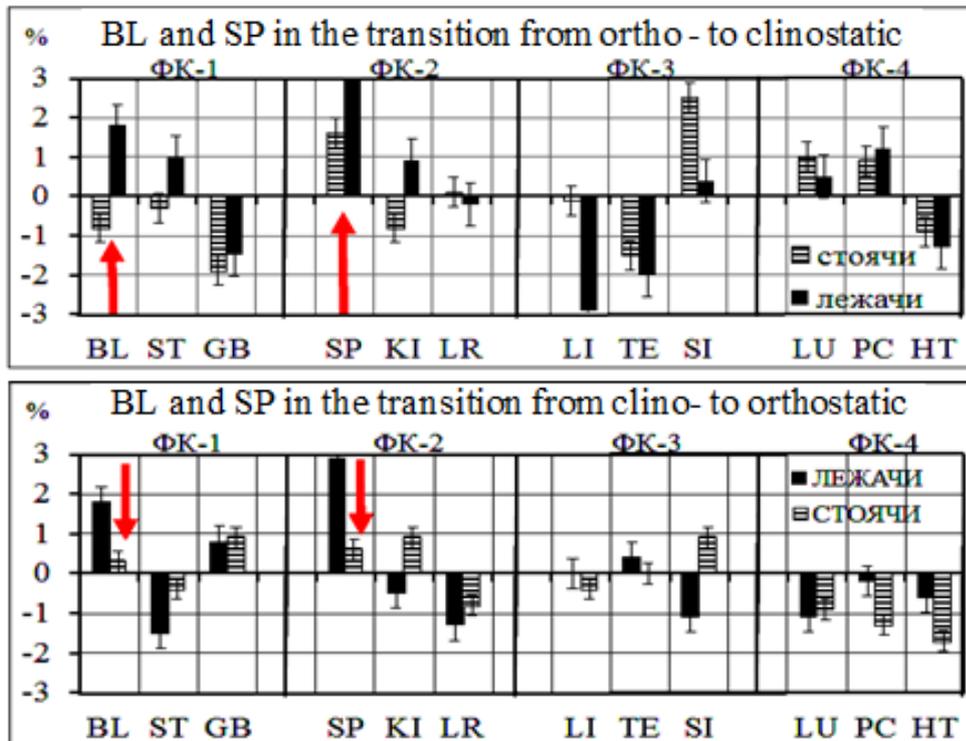


Fig.10 Activity of BL-SP during ortho- and clinostatics (phenomenon of posture). Change from ortho- to clinostatics (1), from clino- to orthostatics (2).

More detailed analysis of the discovered phenomenon has testified, that functionally-parasympathetic direction is controlled by functional system BL (increment in activity is accompanied with the decrease of parasympathetic tension and vice versa).

### Gender-age peculiarities of vegetative standards

The most important problem of every diagnostic technology is related to the credibility of its standardization framework, which for every gender-age group must have specific average-statistical and regional indices. As for FVD, here the situation is very specific. The thing is that under any condition functionally-vegetative homeostasis is automatically directed to maintain its own dynamic stability (within the frames of "functional compensation of PA – vegetative equilibrium – and functional compensation of SA"). Over-running of these frames causes vegetative disorders of various levels.

Standardization base is elaborated according to sufficient number of observations (8,416 girls and 5,875 boys of various age-gender groups). At the same time, 2,208 of practically healthy children with initial state of vegetative equilibrium ( $k=0, 95-1,05$ ) were selected for observations in the standard group.

We accentuate attention on this, because some gender-age peculiarities of system activity that were detected, do not affect the final result!

The received results testify to high identity of received values of variational range and average error of arithmetic mean value. Practically, we haven't found any attention worthy deviation in every gender-age groups [female (Д), male (X) and mixed by gender and age (MGA)]. Let us observe the diagrams of various gender-age groups.

### General conclusions to pay attention to

Specific peculiarities of functional vegetative diagnostics (FVD) according to Makats

V. are:

- 1) Absence of external sources of power;
- 2) The biophysical relation of diagnostic signals, that do not exceed the levels of membrane potentials (0,03-0,6 V);
- 3) Reality of technological, methodological and biophysical peculiarities FVD;
- 4) Usage of previously unknown phenomena of asynchronicity and total activity of symmetrical functionally active zones (FAZ);
- 5) The main focus of the diagnostics are the levels of vegetative homeostasis and their functional duration;
- 6) Possibility to receive stable diagnostic results during repeated examinations;
- 7) Availability of authentic standardization framework;
- 8) Absence of analogues of FVD, conditioned by discovery of previously unknown functional-vegetative system;
- 9) Biophysical alternative to traditional pulse diagnostics...

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