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FUNCTIONAL-VEGETATIVE LEVELS AS A MEASURE OF MAGNETOTHERAPY (MT) EFFECTIVENESS

(INFORMATION 1)

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These materials, are unique. For the first time the effectiveness of magnetic therapy rehabilitation is measured by its effect on the autonomic level. Shown its focus at different initial conditions functionally vegetative homeostasis. The conclusion about the need for functional and vegetative diagnosis (for V. Makats) before use of physiotherapy factor.

Keywords: magnetic therapy, functional and vegetative diagnosis.

Наведені матеріали не мають аналогів. Вперше реабілітаційна ефективність магнітотерапії оцінюється за її впливом на вегетативні рівні.. Показана його спрямованість при різних початкових станах функціонально-вегетативного гомеостазу. Робиться висновок про необхідність проведення функціонально-вегетативної діагностики (за В.Макацом) перед використання даного фізіотерапевтичного фактора.

Ключові слова: магнітотерапія, функціонально-вегетативна діагностика.

Приведенные материалы не имеют аналогов. Впервые реабилитационная эффективность магнитотерапии оценивается по её влиянию на вегетативные уровни. Показана его направленность при различных начальных состояниях функционально-вегетативного гомеостаза. Делается вывод о необходимости проведения функционально-вегетативной диагностики (по В.Макацу) перед использования данного физиотерапевтического фактора.

Ключевые слова: магнитотерапия, функционально-вегетативная диагностика.

Issue actuality. According to the recommendations of the World Health Organization (WHO), electropunctural diagnostics and "reflexotherapy" must be one of the bases of the rehabilitation medicine (International council WHO, Yerevan, 19.09.03) [1,2,3,4, 5,6,7].

At the same time, WHO emphasizes the necessity of elaboration of the modern biophysical inspection methods for rehabilitation efficiency of physiotherapeutic, physical and sanatorium-and-spa factors [13]; in addition, the discovery, which was made in Ukraine of the previously unknown "Human functional-vegetative system" (HFVS) [9-12, 14-15] has become generally known. It proves the biophysical reality of the "acupunctural channels" of the traditional Zhenjiu therapy (ZhTh), their direct relation to the vegetative homeostasis and requires its place within the systemic physiology, and the revision of contemporary educational and rehabilitational programs.

The research work that has been conducted has no analogs. It is a part of the Program "Two-stage system of functional rehabilitation of vegetative disorders of children, who live in zone of environmental control of Ukraine". This Program is being implemented in accordance with the instructions of the Ukrainian Cabinet of Ministers № 12010/87.

Aim and means of research. The aim of the scientific-research work (ScRW) is to provide functional-vegetative assessment of magnetotherapy (MTh) in the area of child physiotherapeutic rehabilitation. "Functional-vegetative diagnostics" (FVD) according to V.G. Makats [13, 15] was chosen as the inspection method for its therapeutic efficiency. The method has been accepted in the rehabilitation practice by the academic council of the Ministry of Healthcare of Ukraine, and joint session of the republican problem committee (RPC) Pediatrics, Obstetrics and gynecology, Quantum medicine and transfusiolo-

gy, New medical technology and new means of diagnostics, (protocol №1.08-01, 11.09.1994). The technical equipment of FVD is the diagnostic-and-rehabilitation device “BIOTEST-12M” that works without the traditional external sources of power and is recommended by the conclusion of the revision committee “New medical technology and new methods of diagnostics, prevention and rehabilitation” MH Ukraine (protocol № 5, 25.12.1991). The analysis of the experimental data, which was conducted on the basis of the software “Search” (European center of post-graduate education). The validity of the results has been estimated my means of parametric and non-parametric statistics using the computer technology.

During the estimation of gender-age norms and the analysis of the systemic vegetative dependency we used the international acupunctural nomenclature (IAN), which is recommended by WHO (table 1), and the known levels of functional-vegetative homeostasis [13]: PA-s (significant prevalence parasympathetic activity); PA-e (expressed prevalence of parasympathetic activity), FcP (functional compensation of parasympathetic activity); VE (vegetative equilibrium); FcS (functional compensation sympathetic activity); SA-e (expressed prevalence of sym-pathetic activity); SA-s (significant prevalence of sympathetic activity).

Table 1

International nomenclature of acupuncture channels

Traditional channel	IAN *	FN	Traditional channel	IAN *	FN
Lungs	LU	P	Urinary bladder	BL	V
Large intestine	LI	GI	Kidney	KI	R
Stomach	ST	E	Pericardium	PC	MC
Spleen – Pancreas	SP	RP	Triple energizer	TE	TR
Heart	HT	C	Gall bladder	GB	VB
Small intestine	SI	IG	Liver	LR	F

*IAN -International Acupuncture Nomenclature (WHO); FN - its French analogue.

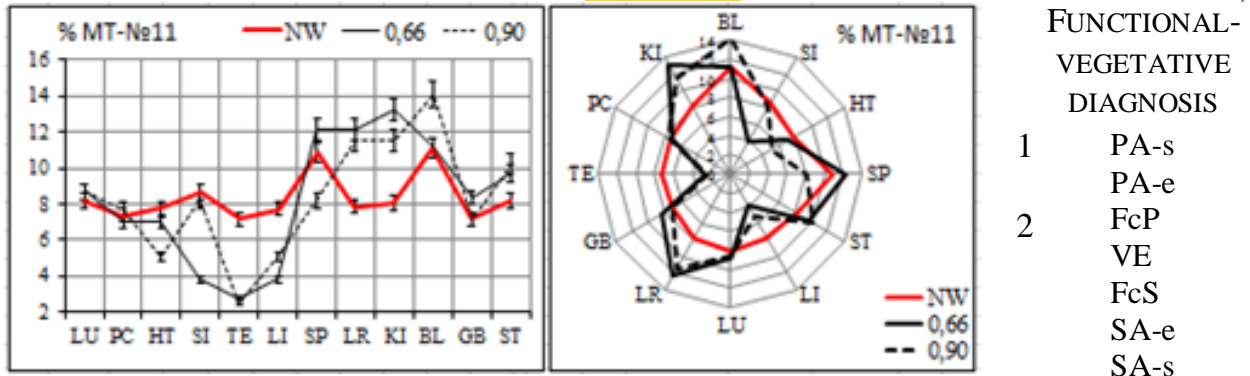
Experimental part. The experiment was conducted during the first half of the day (10:00 – 12:00 military time) involved 42 children of different ages and either gender. Every child underwent two FVD (before and after MTh). Every diagnostic session involved the assessment of the bioelectric activity of the twelve symmetric pairs of functionally active zones (FAZ) on the skin (24 FAZs), in total 2016 testings. During the analysis the attention was paid to the dynamics and the orientation of the leading systems of the first functional complex: BL (controls the sympathetic activity) and SP (controls the parasympathetic activity).

RESULTS AND ANALYSIS

1.Influence of magnetotherapy on the initial vegetative levels of the diseased Children

Under the initial state of **significant prevalence of parasympathetic activity**, MTh, independently from topographical influence, positively influences the vegetative homeostasis, transferring it to the higher level of functional activity – zone of its functional compensation (fig. 1). At the same time, the specific dynamics of the basic systems of the first functional complex is observed: probable excitation of BL (sympathetic orientation) and oppression of SP (parasympathetic orientation). Other functional systems (LU-PC-HT, SI-TE-LI, ST-GB-KI-LR) are in the state of mutually-dependent dynamic-functional compensation...

Observation	The initial state of vegetative homeostasis: significant prevalence parasympathetic activity (%)						
	PA-s	PA-e	FcP	VE	FcS	SA-e	SA-s
By MTh	100						
After MTh	33,3	33,3	33,3				



Note: Here and further the red line is the zone of functional norm. In the column "Functional-vegetative diagnosis (FVD)" 1-before the MTh, 2-after...

Fig. 1

Under the initial state of the **expressed parasympathetic activity**, MTh, independently from the topography of influence, relatively positively influences the vegetative homeostasis, transferring it to the higher vegetative levels – to functional compensation of sympathetic activity (fig. 2). At the same time, we can observe multidirected dynamics of pacemakers of vegetative rhythm (basic systems of the first functional complex BL-SP). Other systems (LU-PC-HT, SI-TE-LI, ST-GB-KI-LR) are in the state of mutually-dependent dynamic-functional compensation...

Observation	The initial state of vegetative homeostasis: expressed prevalence of parasympathetic activity (%)						
	PA-s	PA-e	FcP	VE	FcS	SA-e	SA-s
By MTh		100					
After MTh	14,28	28,57	28,57	14,28	14,28		

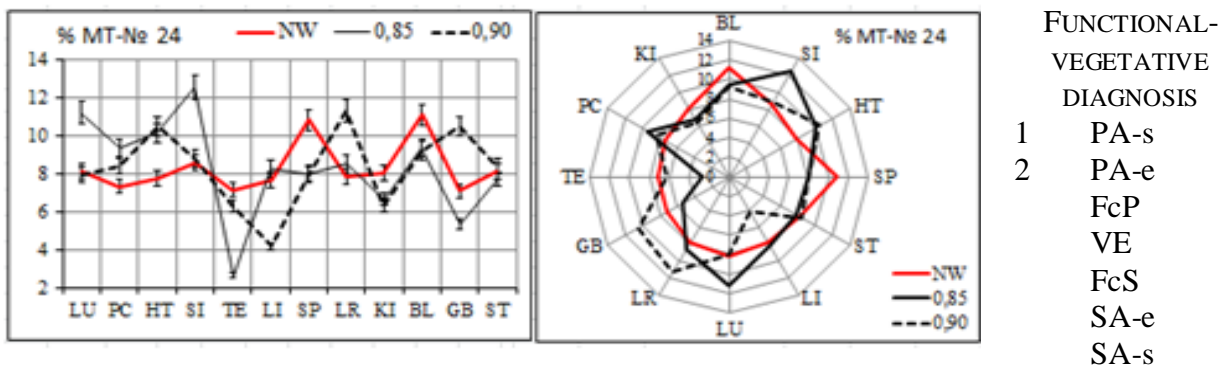
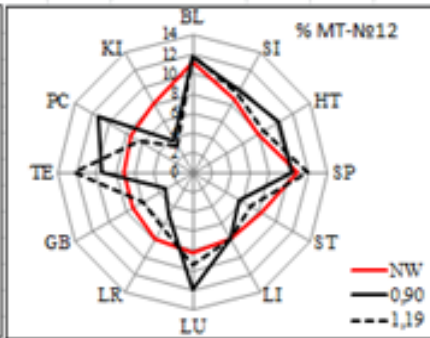
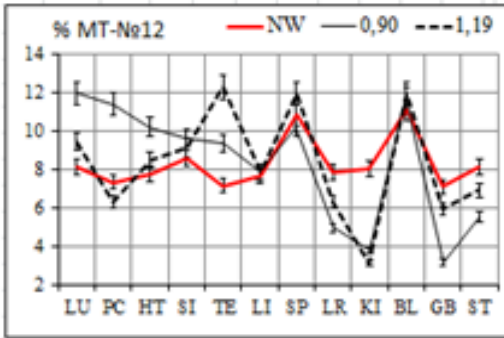


Fig. 2

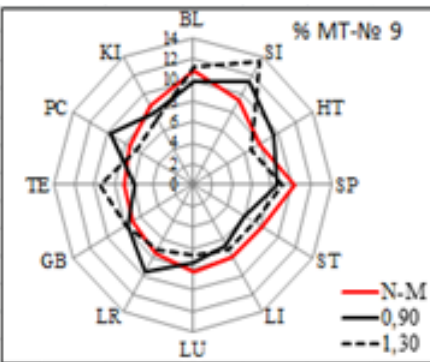
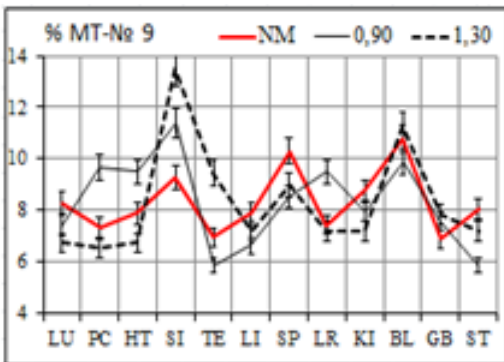
Under the initial state of **functional compensation of parasympathetic activity** (the marginal zone of functional-vegetative norm), MTh, independently from the topography of influence, relatively negatively influences the vegetative homeostasis, transferring 37% of cases to the zone of expressed and significant prevalence of sympathetic activity (fig. 3). At the same time, we can observe multidirected dynamics of the pacemakers of the vegetative rhythm (basic systems of the first functional complex

BL-SP). Other functional complexes (LU-PC-HT, SI-TE-LI, ST-GB-KI-LR) are in the state of mutually-dependent compensation.

Observation	The initial state of vegetative homeostasis: functional compensation of activity						
	PA-s	PA-e	FcP	VE	FcS	SA-e	SA-s
By MT			100				
After MT			37,5	25,0		25,0	12,5



FUNCTIONAL-VEGETATIVE DIAGNOSIS
 PA-s
 PA-e
 1 FcP
 VE
 FcS
 2 SA-e
 SA-s

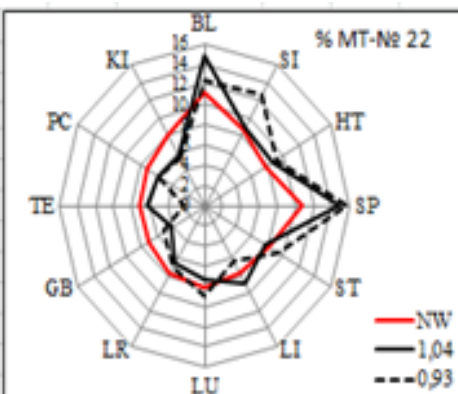
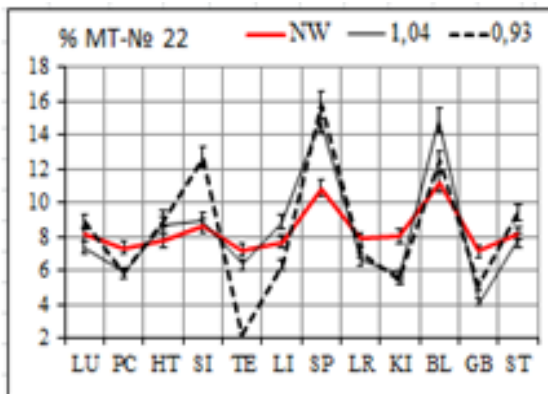


FUNCTIONAL-VEGETATIVE DIAGNOSIS
 PA-s
 PA-e
 1 FcP
 VE
 FcS
 2 SA-e
 SA-s

Fig. 3

Under the initial state of **vegetative equilibrium**, the influence of magnetotherapy is relatively neutral in relation to functional-vegetative homeostasis, which in 70% of cases fluctuates within the frames functional compensation of the sympathetic-parasympathetic activity (fig. 4).

Observation	The initial state of vegetative homeostasis: vegetative equilibrium (%)						
	PA-s	PA-e	FcP	VE	FcS	SA-e	SA-s
By MT				100			
After MT	20,0		20,0	30,0	20,0	10,0	



FUNCTIONAL-VEGETATIVE DIAGNOSIS
 PA-s
 PA-e
 2 FcP
 1 VE
 FcS
 SA-e
 SA-s

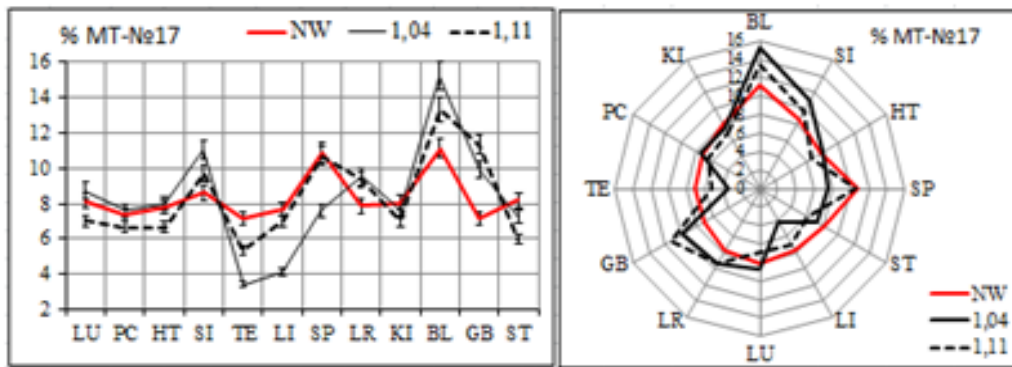
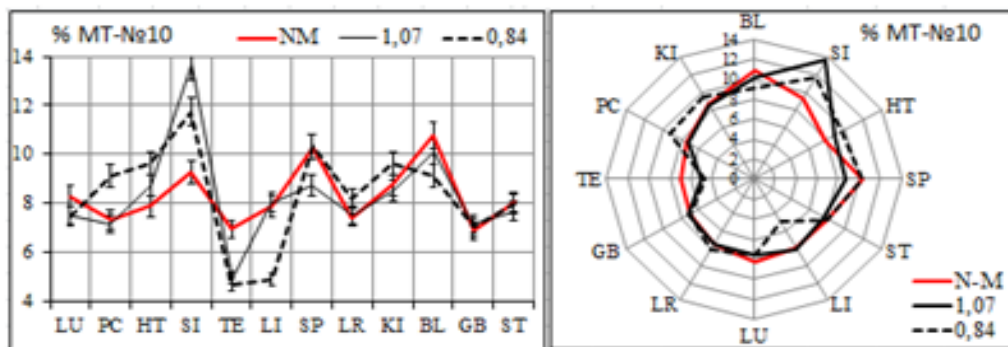


Fig. 4.

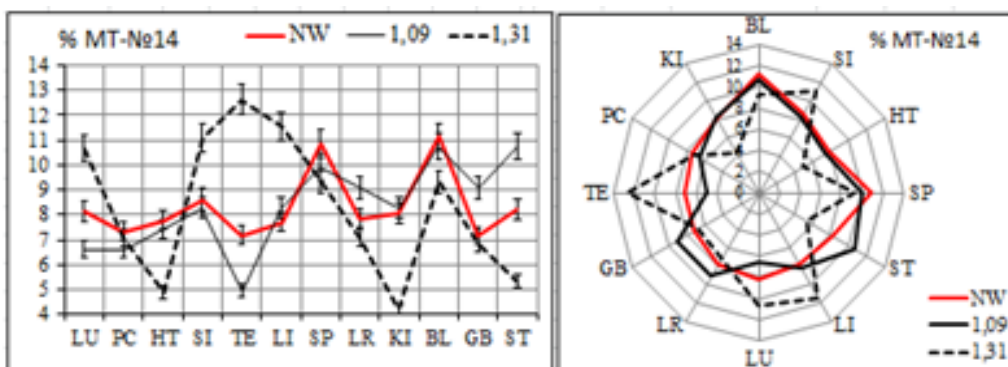
At the same time, we are concerned about the 10% of cases that indicated the development of the expressed prevalence of sympathetic activity and multidirected dynamics of the pacemakers of the vegetative rhythm (basic systems of the first functional complex BL-SP). Other functional complexes (LU-PC-HT, SI-TE-LI, ST-GB-KI-LR) are in the state of mutually-dependent compensation...

Under the initial state of **functional compensation of sympathetic activity**, the influence of magnetotherapy, independently from the topography of influence, is relatively negative in relation to the functional-vegetative homeostasis, that is indicated by the 25% of cases of its worsening: 12,5% - transition to the level of the expressed parasympathetic activity and 12,5% - to the level of significant sympathetic activity (fig. 5).

Observation	The initial state of vegetative homeostasis: functional compensation sympathetic activity (%)						
	PA-s	PA-e	FcP	VE	FcS	SA-e	SA-s
By MT					100		
After MT		2,5	12,5	50,0	12,5		12,5



FUNCTIONAL-VEGETATIVE DIAGNOSIS
PA-s
1 PA-e
FcP
VE
2 FcS
SA-e
SA-s



FUNCTIONAL-VEGETATIVE DIAGNOSIS
PA-s
PA-e
FcP
VE
1 FcS
SA-e
2 SA-s

Fig. 5

At the same time, we can observe multidirectional dynamics of the basic systems of the first functional complex SP-BL (spleen-pancreas-urinary bladder). Other functional complexes (LU-PC-HT, SI-TE-LI, ST-GB-KI-LR) are in the state of mutually-dependent compensation...

Under the initial state of the **expressed and significant prevalence of sympathetic activity**, the influence of magnetotherapy, independently from the topography of influence, negatively influences the vegetative homeostasis, increasing the level of its significant prevalence (fig. 6). At the same time, we can observe specific ("zero") activity of the leading pacemakers of the vegetative rhythm (basic systems of the first functional complex) - BL (sympathetic activity) and SP (parasympathetic activity). Other functional systems (LU-PC-HT, SI-TE-LI, ST-GB-KI-LR) are in the state of mutually-dependent dynamic-functional compensation.

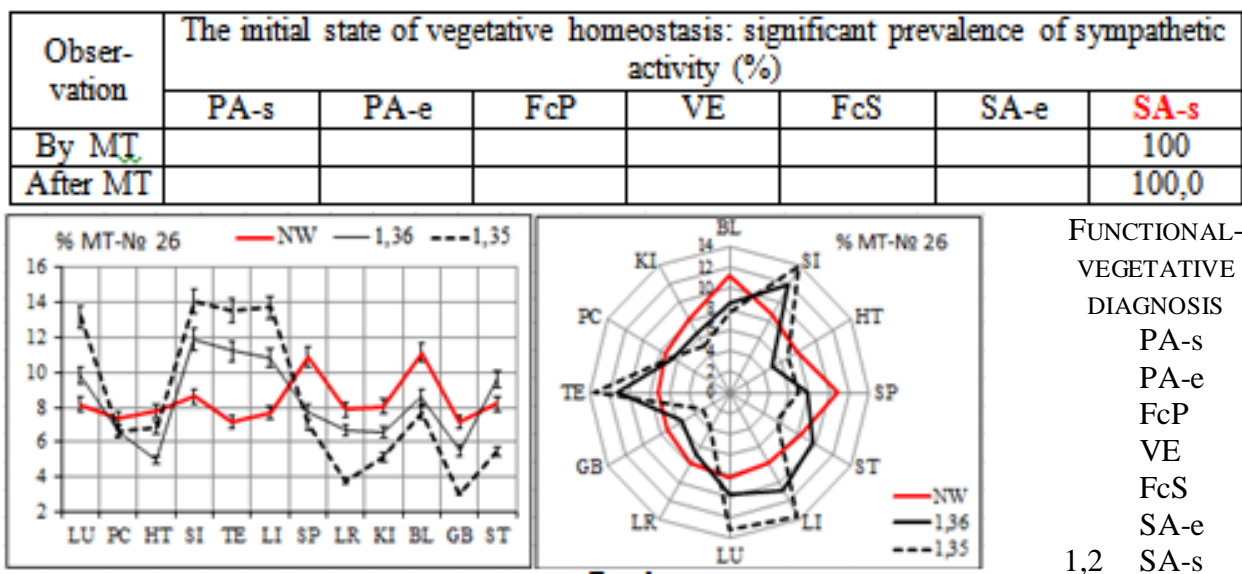


Fig. 6.

Conclusions

1) Magnetotherapy modulates sympathetic orientation (all groups under experiment indicated that MTh conditioned the transformation of vegetative homeostasis from PAs to SAs).

2) The initial levels of functional-vegetative activity require attention: under the initial PAs the influence of MTh is positive; under the initial PAe the influence of MTh is relatively positive; under the initial FcP the influence of MTh is relatively negative; under the initial VE the influence of MTh is relatively neutral; under the initial FcS the influence of MTh is relatively negative; under the initial PAe and PAs the influence of MTh is negative.

3) Functional-vegetative diagnostics (according to V.G. Makats) should be performed before the usage of MTh. It should be remembered that the positive dynamics of therapeutic pathology depends on the normalization of functional-vegetative homeostasis.

4) It is interesting to notice the multidirectional activity of the systems of the first complex BL-SP (sympathetic – parasympathetic activity), which points to the functional readiness of the child organism for the opposite response to the influence of magnetotherapy.

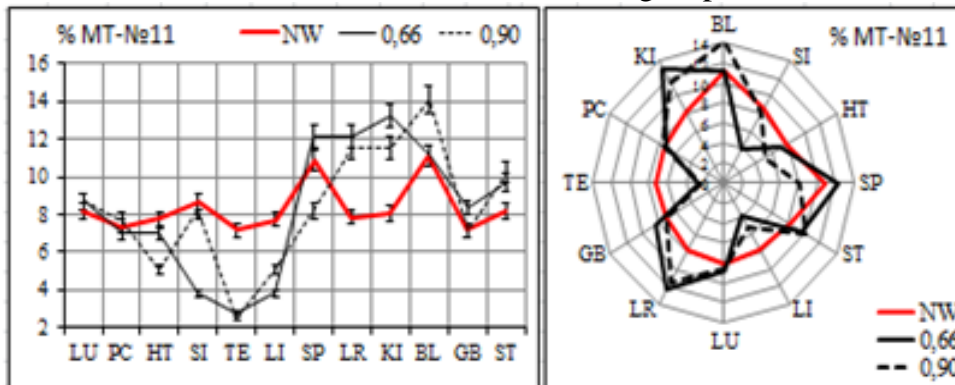
2. Gender peculiarities of magnetotherapy influence on the vegetative levels

The conducted analysis (see experimental materials) testifies to the absence of gender peculiarities of functional-vegetative responses to the influence of magnetotherapy under the conditions of the physiotherapeutic in-patient department of Vinnytsia regional child clinical hospital. Under all conditions of the study the rehabilitational factor causes a normalizing effect only under initial levels of parasympathetic prevalence, or sympathetic activity of functional homeostasis. On the other levels of vegetative disorders MTh conditions activation of functional-vegetative system in the direction of significant prevalence of sympathetic activity (fig. 7-13).

Under initial significant prevalence of parasympathetic activity (Fig. 7)

№	Female group (%)							Male group (%)						
	PA _s	PA _e	FcP	VE	FcS	SA _e	SA _s	PA _s	PA _e	FcP	VE	FcS	SA _e	SA _s
1	100							100						
2			100						50		50			

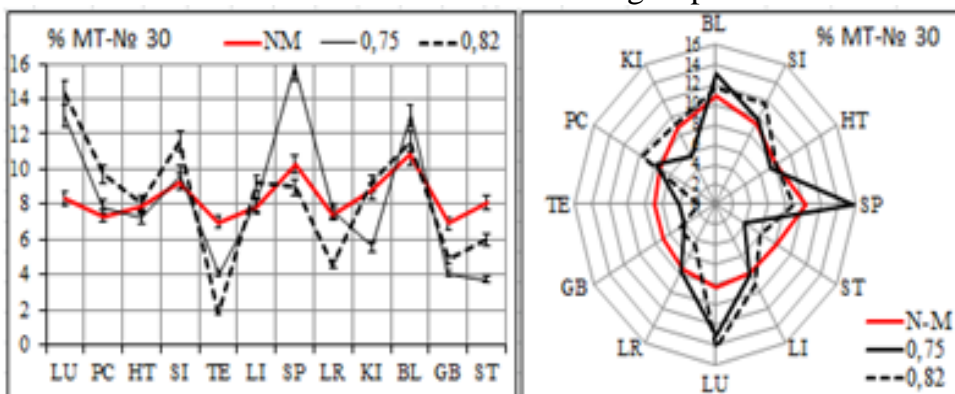
Female group



FUNCTIONAL-VEGETATIVE DIAGNOSIS

- 1 PA-s
- PA-e
- 2 FcP
- VE
- FcS
- SA-e
- SA-s

Male group



FUNCTIONAL-VEGETATIVE DIAGNOSIS

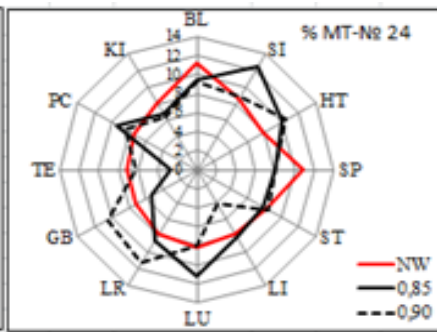
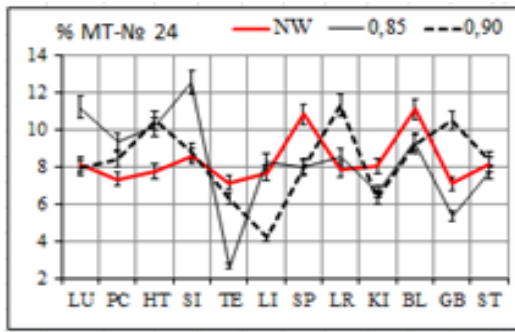
- 1 PA-s
- 2 PA-e
- FcP
- VE
- FcS
- SA-e
- SA-s

Fig. 7

Under the initial expressed prevalence of parasympathetic activity (fig. 8)

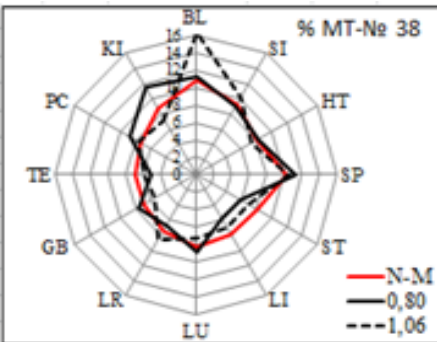
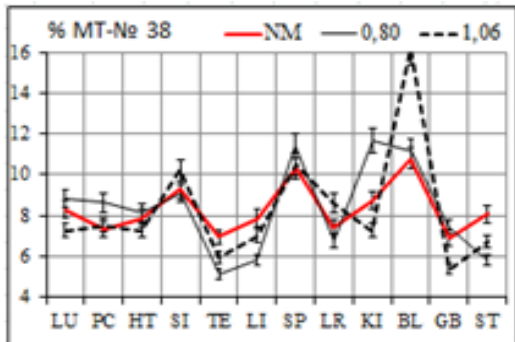
№	Female group (%)							Male group (%)						
	PA _s	PA _e	FcP	VE	FcS	SA _e	SA _s	PA _s	PA _e	FcP	VE	FcS	SA _e	SA _s
1		100							100					
2			100					20	20	20	20	20		

Female group



FUNCTIONAL-VEGETATIVE DIAGNOSIS
 PA-s
 1 PA-e
 2 FcP
 VE
 FcS
 SA-e
 SA-s

Male group



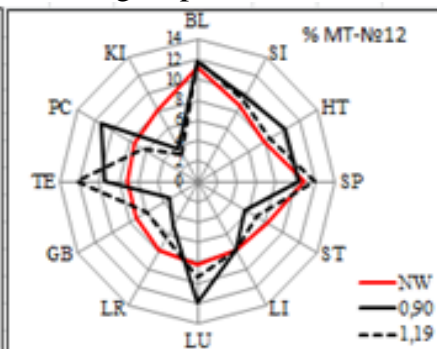
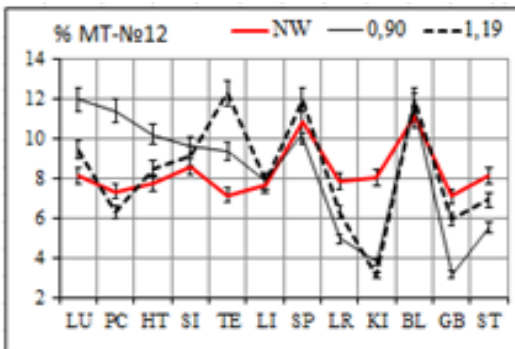
FUNCTIONAL-VEGETATIVE DIAGNOSIS
 PA-s
 1 PA-e
 FcP
 VE
 2 FcS
 SA-e
 SA-s

Fig. 8

Under the initial functional compensation of parasympathetic activity (fig. 9)

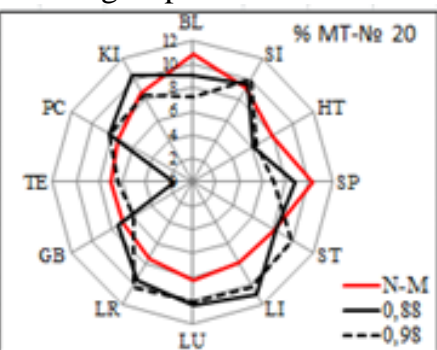
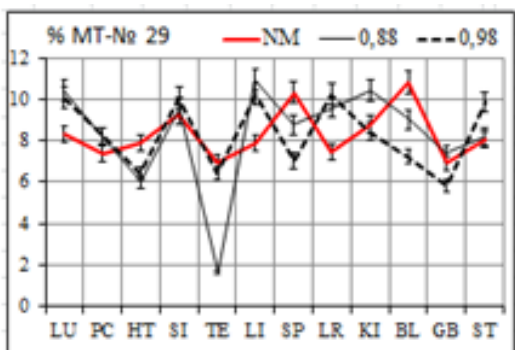
№	Female group (%)						Male group (%)							
	PA _s	PA _e	FcP	VE	FcS	SA _e	SA _s	PA _s	PA _e	FcP	VE	FcS	SA _e	SA _s
1			100							100				
2						100				42,8	42,8			14,3

Female group



FUNCTIONAL-VEGETATIVE DIAGNOSIS
 PA-s
 PA-e
 1 FcP
 VE
 FcS
 2 SA-e
 SA-s

Male group



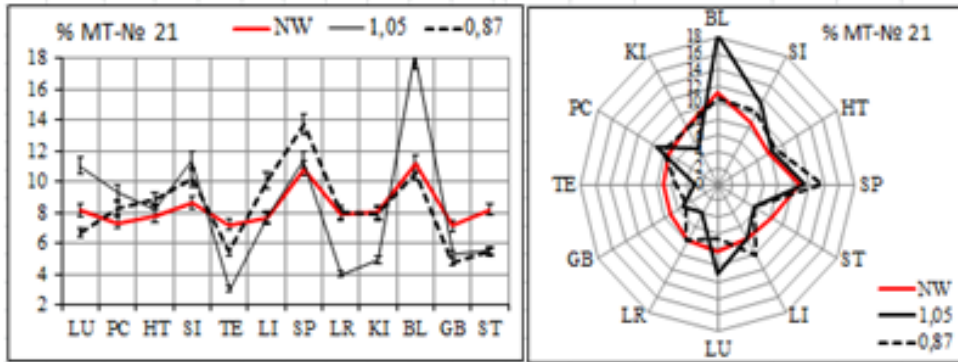
FUNCTIONAL-VEGETATIVE DIAGNOSIS
 PA-s
 PA-e
 1 FcP
 2 VE
 FcS
 SA-e
 SA-s

Fig. 9

Under the initial vegetative equilibrium (fig. 10)

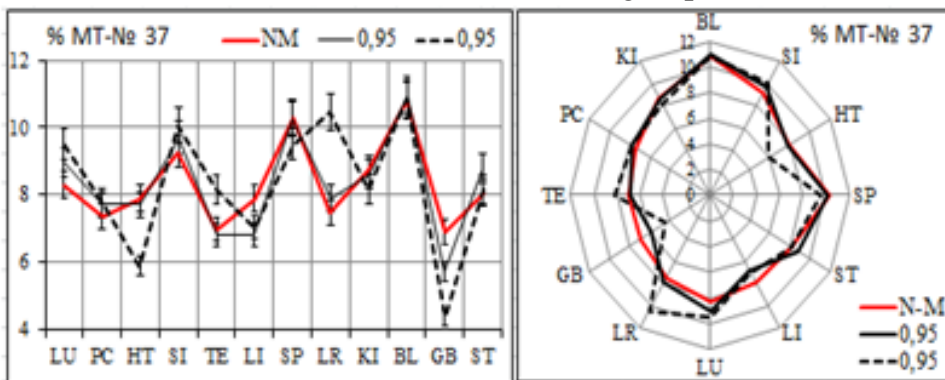
№	Female group (%)						Male group (%)							
	PA _s	PA _e	FcP	VE	FcS	SA _e	SA _s	PA _s	PA _e	FcP	VE	FcS	SA _e	SA _s
1				100							100			
2			50	25	25			40			60			

Female group



FUNCTIONAL-VEGETATIVE DIAGNOSIS
 PA-s
 PA-e
 1 FcP
 2 VE
 FcS
 SA-e
 SA-s

Male group



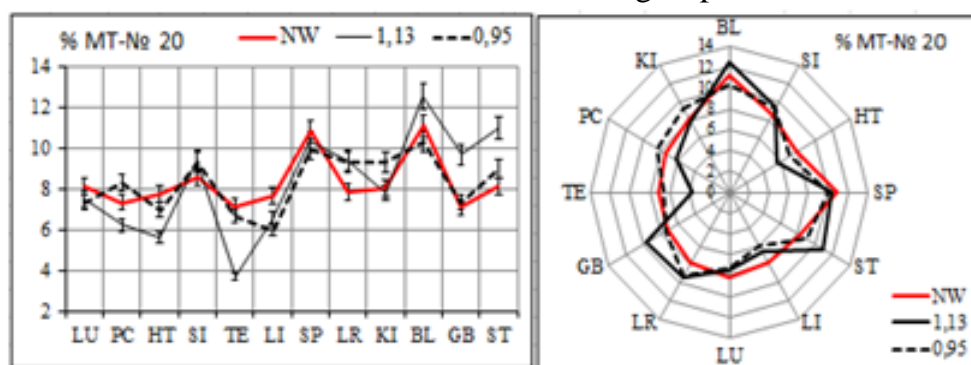
FUNCTIONAL-VEGETATIVE DIAGNOSIS
 PA-s
 PA-e
 FcP
 1,2 VE
 FcS
 SA-e
 SA-s

Fig. 10

Under the initial functional compensation of the sympathetic activity (fig. 11)

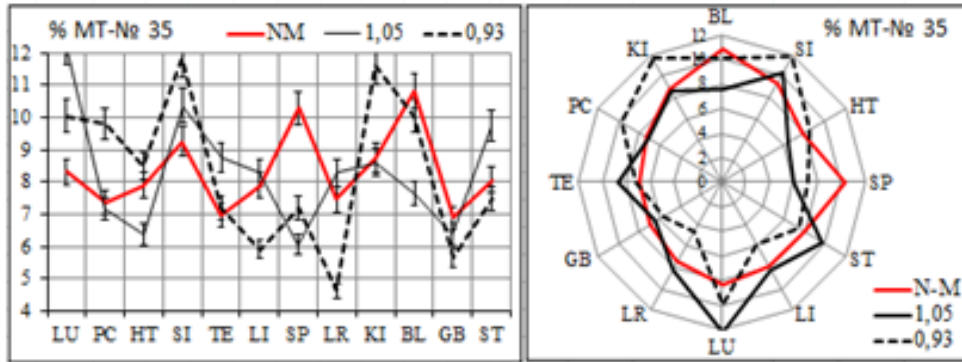
№	Female group (%)						Male group (%)							
	PA _s	PA _e	FcP	VE	FcS	SA _e	SA _s	PA _s	PA _e	FcP	VE	FcS	SA _e	SA _s
1					100							100		
2			66,6	16,6			16,6	50	50					

Female group



FUNCTIONAL-VEGETATIVE DIAGNOSIS
 PA-s
 PA-e
 FcP
 1 VE
 2 FcS
 SA-e
 SA-s

Male group



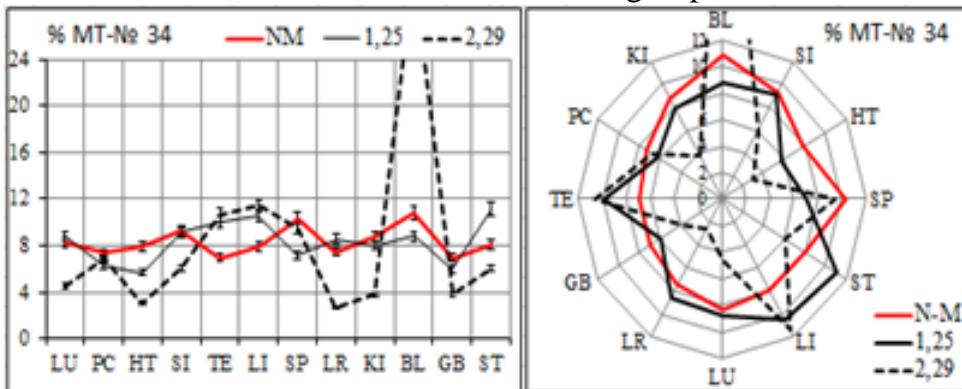
FUNCTIONAL-VEGETATIVE DIAGNOSIS
 PA-s
 PA-e
 1 FcP
 VE
 2 FcS
 SA-e
 SA-s

Fig. 11

Under the initial expressed prevalence of the sympathetic activity (fig. 12)

№	Female group (%)						Male group (%)							
	PA _s	PA _e	FcP	VE	FcS	SA _e	SA _s	PA _s	PA _e	FcP	VE	FcS	SA _e	SA _s
1						100							100	
2												25	50	25

Male group



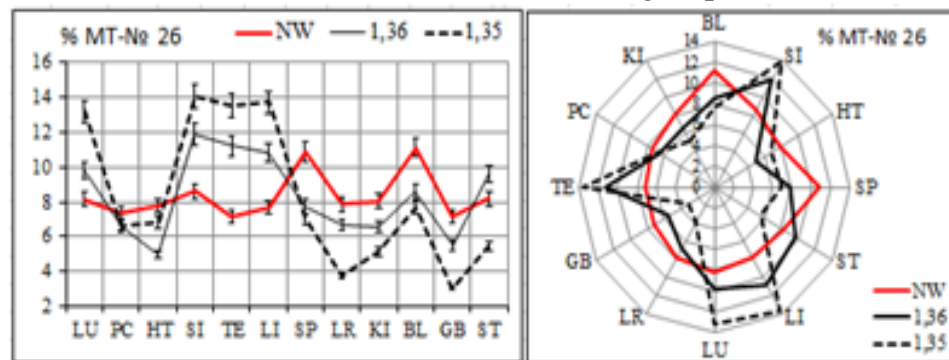
FUNCTIONAL-VEGETATIVE DIAGNOSIS
 PA-s
 PA-e
 FcP
 VE
 FcS
 1 SA-e
 2 SA-s

Fig. 12

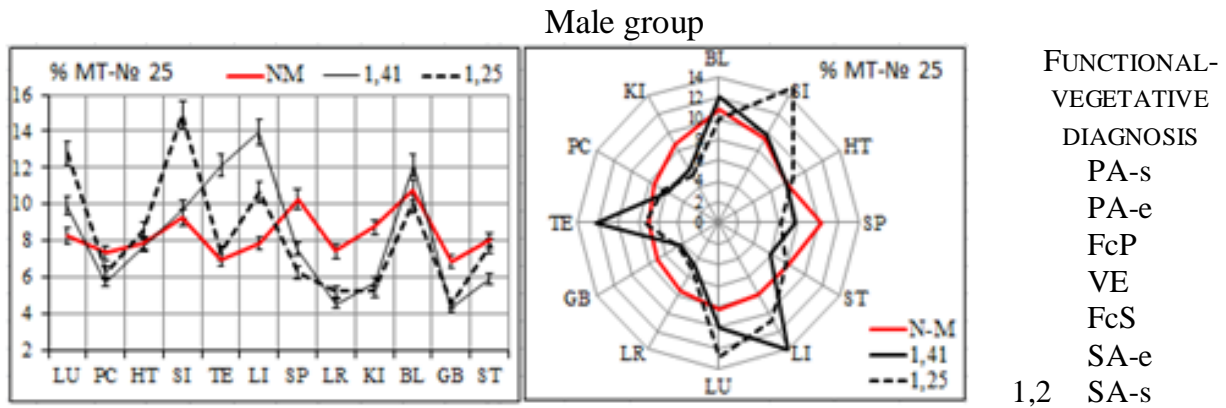
Under the initial significant prevalence of the sympathetic activity (fig. 13)

№	Female group (%)						Male group (%)							
	PA _s	PA _e	FcP	VE	FcS	SA _e	SA _s	PA _s	PA _e	FcP	VE	FcS	SA _e	SA _s
1							100							100
2							100							100

Female group



FUNCTIONAL-VEGETATIVE DIAGNOSIS
 PA-s
 PA-e
 FcP
 VE
 FcS
 SA-e
 1,2 SA-s



General conclusions of the research

1. Functional-vegetative diagnostics has proved its capability to provide experimental research on the estimation of functional-vegetative efficiency of the rehabilitational magnetotherapy.

2. Magnetotherapy (MTh) demonstrates stimulation of the sympathetic vegetative orientation. With no relation to a zone of influence, MTh transforms the vegetative homeostasis “from the significant prevalence of the parasympathetic activity to the significant prevalence of the sympathetic activity”.

3. In relation to the initial levels of functional—vegetative homeostasis, the following should be remembered: under the initial PAs the influence of MTh is positive; under the initial PAe the influence of MTh is relatively positive; under the initial FcP the influence of MTh is relatively negative; under the initial VE the influence of MTh is relatively neutral; under the initial FcS the influence of MTh is relatively negative; under the initial PAe and PAs the influence of MTh is negative.

4. Taking the point of therapeutic appropriateness of maintenance of functional-vegetative homeostasis within the frames of an acceptable zone of norm (“functional compensation of parasympathetic activity – vegetative equilibrium – functional compensation of sympathetic activity”) the usage of magnetotherapy is shown only under the initial significant and expressed prevalence of parasympathetic activity.

5. Before the usage of magnetotherapy in the system of physiotherapeutic rehabilitation, children must undergo FVD (using the methodology of V.G. Makats), keeping in mind that the positive rehabilitational dynamics directly depend on the normalization of functional-vegetative levels.

6. The multidirected activity of the systems of the first complex BL-SP (sympathetic – parasympathetic activity), points to the functional readiness of the child organism to produce the opposite responses to the influence of magnetotherapy.

7. The method of functional-vegetative diagnostics (according to V.G. Makats) is easy to deploy, provides valid results during retesting and should be employed in the rehabilitational practice for the control over physiotherapeutic efficiency of magnetotherapy under in-patient and out-patient conditions.

Використана література

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