TIKHONYUK O. M.

FUNCTIONAL-VEGETATIVE LEVELS AS THE MEASURE OF LASER THERAPY EFFECTIVENESS

(INFORMATION 2)

Rehabilitation center of the Vinnytsia institute of the University "Ukraine"
(scientific adviser - M.D., Professor V. G. Makats)

These materials are unique. For the first time the effectiveness of laser 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: laser therapy, functional and vegetative diagnosis.

Наведені матеріали не мають аналогів. Вперше реабілітаційна ефективність лазерної терапії 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: лазерна терапія, функціонально-вегетативна діагностика.

Приведенные материалы не имеют аналогов. Впервые реабилитационная эффективность лазерной терапии оценивается по ее влиянием на вегетативные уровне. 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: лазерная терапия, функционально-вегетативная диагностика.

Issue actuality. According to the recommendations of the World Health Organization (WHO), electropunctural diagnostics and "reflex therapy" 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.

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Aim and means of research. The aim of the scientific-research work (ScRW) is to provide functional-vegetative assessment of laser therapy (LTh) in the field 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 transfusiology, 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: PA-s (significant prevalence parasympathetic activity); PA-e (expressed prevalence of parasympathetic activity), FcP (functional compensation of parasympathetic activit-y); VE (vegetative equilibrium); FcS (functional compensation sympathetic activity); SA-e (expressed prevalence of sympathetic activity); - (significant preva-lence of sympathetic activity) [13].

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

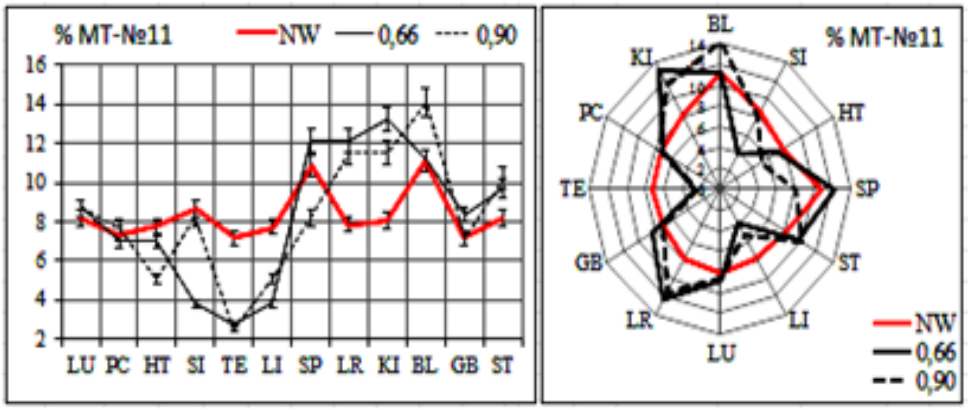
**IAN - International Acupuncture Nomenclature (WHO); FN - its French analogue.*

Experimental part. The experiment was conducted at physiotherapeutic department of the Vinnytsia regional child clinic. Volume and conditions of study: 39 children were studied of different age and both genders; the research was conducted during the first half of the day (10:00 – 12:00) (before and after the laser therapy (LTh). Every diagnostic session involved the assessment of the bioelectric activity of the twelve symmetric pairs of functionally active zones (24 FAZ) on the skin; in total 1872 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 OF THE RESEARCH AND THEIR ANALYSIS.

1.The influence of defocused laser on the initial functional-vegetative levels of the diseased children.

Under the initial state of **significant parasympathetic activity**, the influence of defocused laser positively influences the vegetative homeostasis, transferring it to the higher level of functional activity – expressed parasympathetic activity (fig. 1). At the same time, the specific dynamics of the basic systems of the first functional complex is observed as follows: 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 compensa-tion…



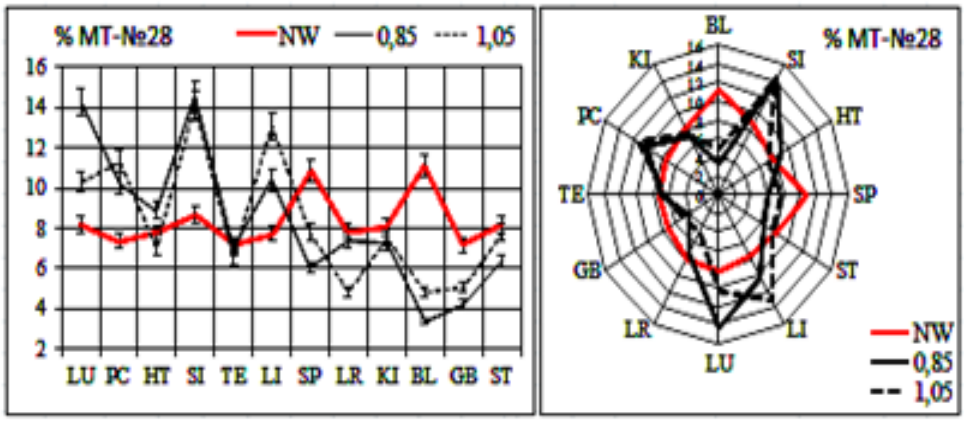
FUNCTIONAL-VEGETATIVE DIAGNOSIS

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

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

Fig. 1

Under the initial state of the **expressed parasympathetic activity**, the influence of defocused laser positively influences the vegetative homeostasis, transferring it to the higher functional level – to the zone of vegetative equilibrium (fig. 2). At the same time, we can observe specific dynamics of pacemakers of vegetative rhythm (basic systems of the first functional complex: excitation of BL (sympathetic activity) and multidirected reaction of SP (parasympathetic activity). Other systems (LU-PC-HT, SI-TE-LI, ST-GB-KI-LR) are in the state of mutually-dependent dynamic-functional compensation…



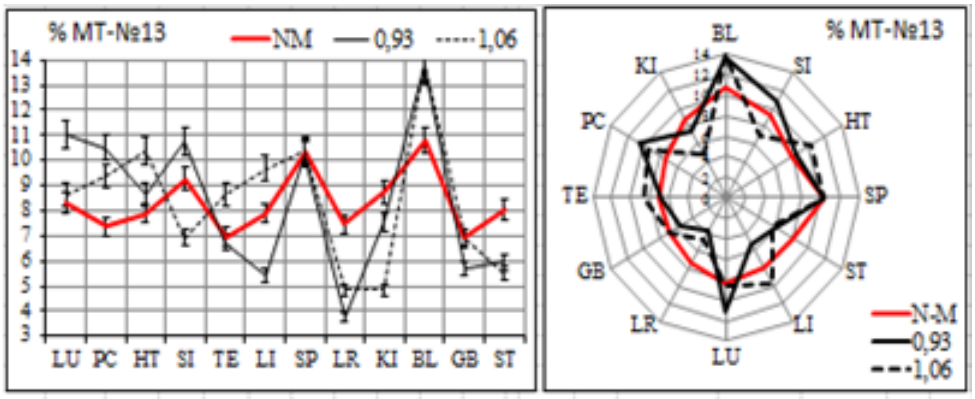
FUNCTIONAL-VEGETATIVE DIAGNOSIS

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

Fig. 2

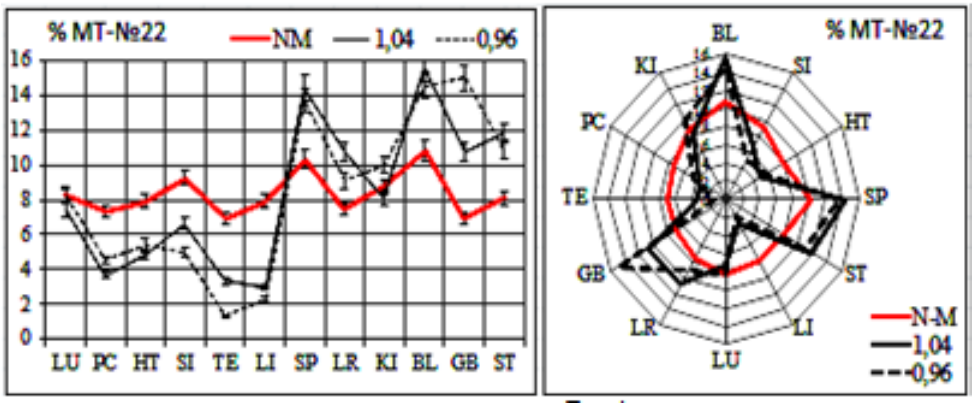
Under the initial state of **functional compensation of parasympathetic activity**, the influence of defocused laser on the epigastric region positively influences the vegetative homeostasis, transferring it to a higher functional level – predominantly to the zone of vegetative equilibrium (fig. 3). At the same time, we can observe probable oppression, or neutral response of the basic systems of the first functional complex BL-SP (sympathetic – 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…

Under the initial state of **vegetative equiliblrium**, the influence of defocused laser is relatively neutral in relation to functional-vegetative homeostasis (fig. 4). At the same time, we observe neutral (or insignificant oppression) dynamics of the basic systems BL-SP (sympathetic-parasympathetic activity) Other functional complexes (LU-PC-HT, SI-TE-LI, ST-GB-KI-LR) are in the state of mutually-dependent dynamic-functional compensation…



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

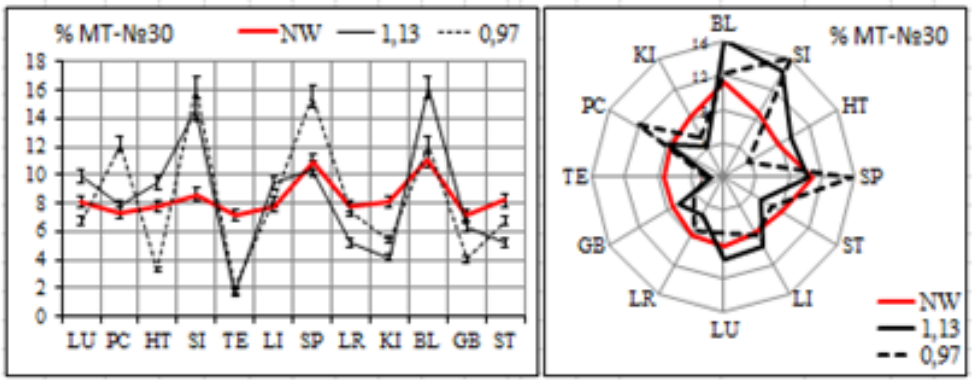
Fig..3



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

Fig. 4.

Under the initial state of **functional compensation of sympathetic activity**, the influence of defocused laser positively affects the vegetative homeostasis, mainly transferring it to the lower functional level – to the zone of vegetative equilibrium (fig. 5). At the same time, we can observe specific dynamics of the leading systems of the first functional complex: probable oppression of BL activity (sympathetic orientation) and neutral response of SP (parasympathetic). Other systems (LU-PC-HT, SI-TE-LI, ST-GB-KI-LR) are in the state of mutually-dependent dynamic-functional compensation…

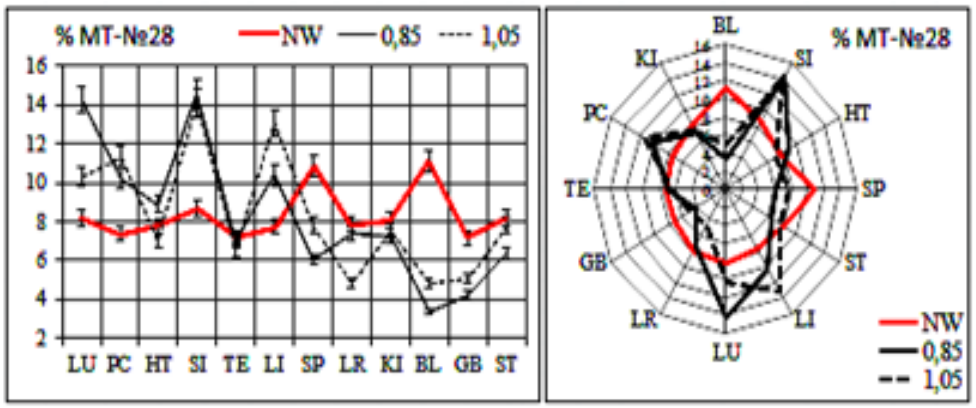


FUNCTIONAL-VEGETATIVE DIAGNOSIS
PA-s
PA-e
FcP
1 VE
2 FcS
SA-e
SA-s

Fig. 5

Under the initial state of the **expressed sympathetic activity**, the influence of LTh positively affects the vegetative homeostasis, transferring it to the lower functional levels (fig. 6). At the same time, we can observe specific dynamics of the basic systems of the firs functional complex: probable oppression of BL (sympathetic activity) and the multidirected response of SP (parasympathetic activity) Other functional systems (LU-PC-HT, SI-TE-LI, ST-GB-KI-LR) are in the state of mutually-dependent dynamic-

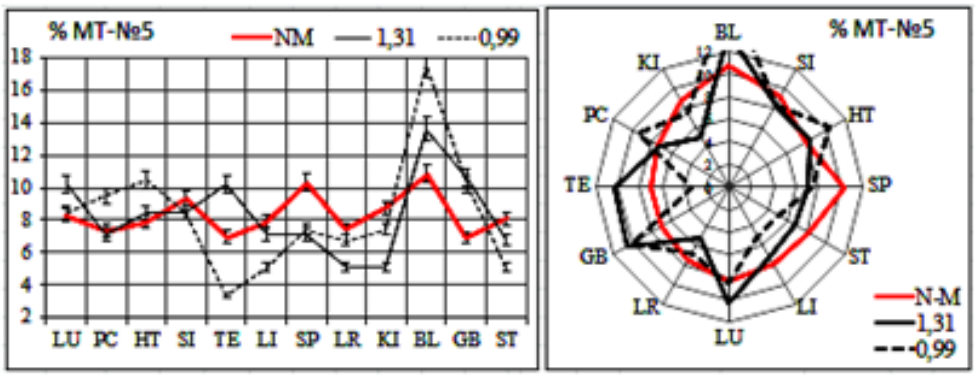
functional compensation…



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

Fig. 6

Under the initial state of **significant sympathetic activity**, the influence of defocused laser positively affects the vegetative homeostasis, transferring it to significantly lower levels of functional activity – to the state of vegetative equilibrium (fig. 7). At the same time, we can observe specific dynamics of the basic systems of the first functional complex: probable oppression of BL (sympathetic activity) and neutral response of 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…

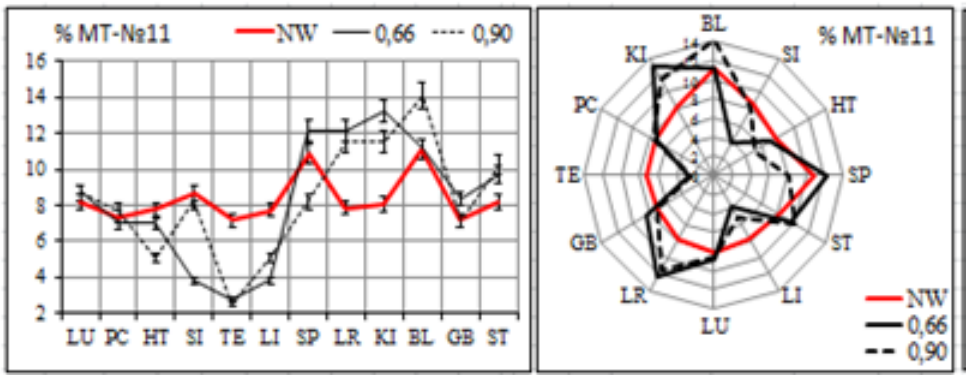


FUNCTIONAL-VEGETATIVE DIAGNOSIS
PA-s
PA-e
FcP
2 VE
FcS
SA-e
1 SA-s

Fig. 7

In this view, independently from the topographic zone of laser irradiation, the defocused LTh under various therapeutic pathology possesses specific influence on the functional-vegetative homeostasis of the diseased children (transfers the initial parasympathetic oppression to to a higher vegetative level, while sympathetic excitation – to the lower one). This suggests, that there is a normalizing functional-vegetative orientation, which is mainly demonstrated in the cases of significant and expressed sympathetic-vegetative prevalence. At the same time, the provided analysis testifies to the absence of gender peculiarities of functional-vegetative responses in relation to the influence of defocused laser under the conditions of the physiotherapeutic in-patient department. Under all conditions of the observation LTh initiates a normalizing influence under various initial levels of sympathetic and parasympathetic activity. In addition, attention should be paid to the practical absence of the gender dependency on the influence of the defocused laser irradiation of various topographic zones in female and male groups of observation (fig.8-21).

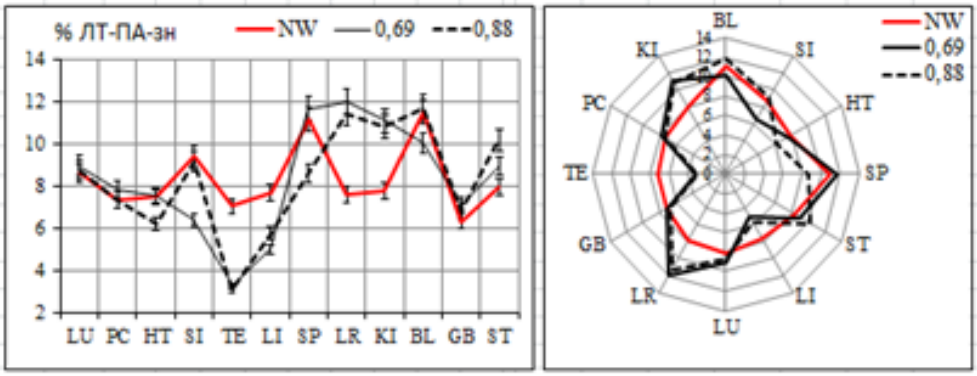
При початковій значній перевазі парасимпатикотонії (мал.8-9)



FUNCTIONAL-VEGETATIVE DIAGNOSIS

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

Fig. 8. Female group.

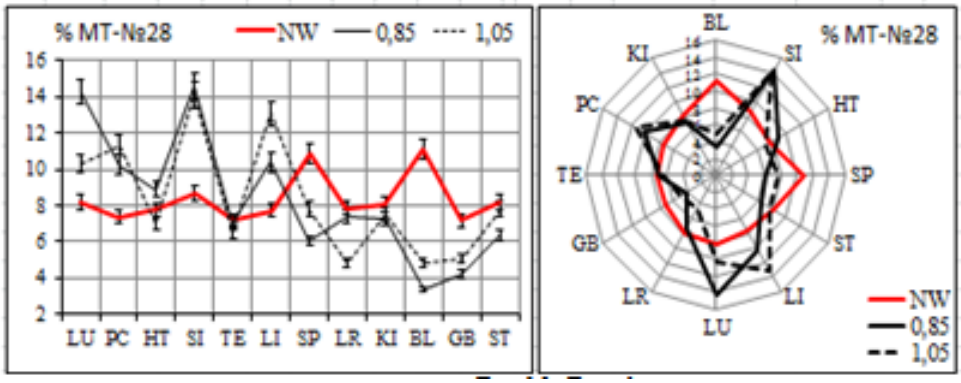


FUNCTIONAL-VEGETATIVE DIAGNOSIS

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

Fig. 9. Male group

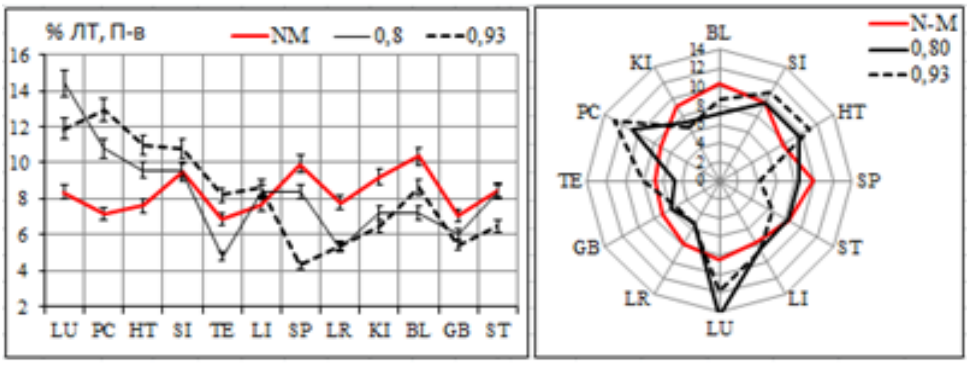
При початковій вираженій перевазі парасимпатикотонії (мал.10-11)



FUNCTIONAL-VEGETATIVE DIAGNOSIS

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

Fig. 10. Female group.

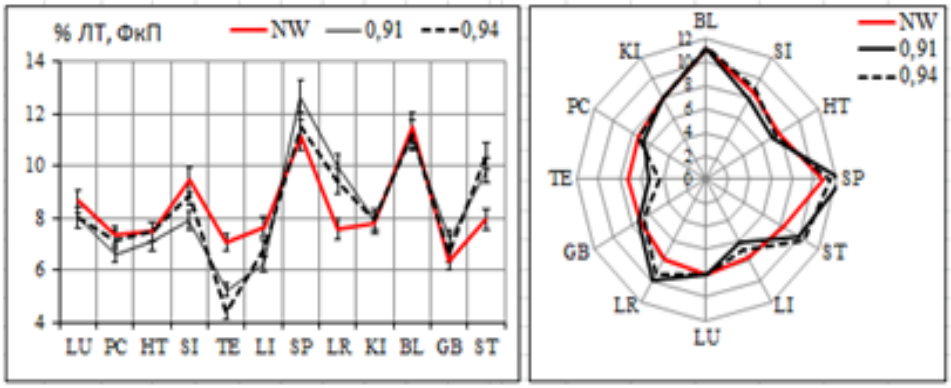


FUNCTIONAL-VEGETATIVE DIAGNOSIS

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

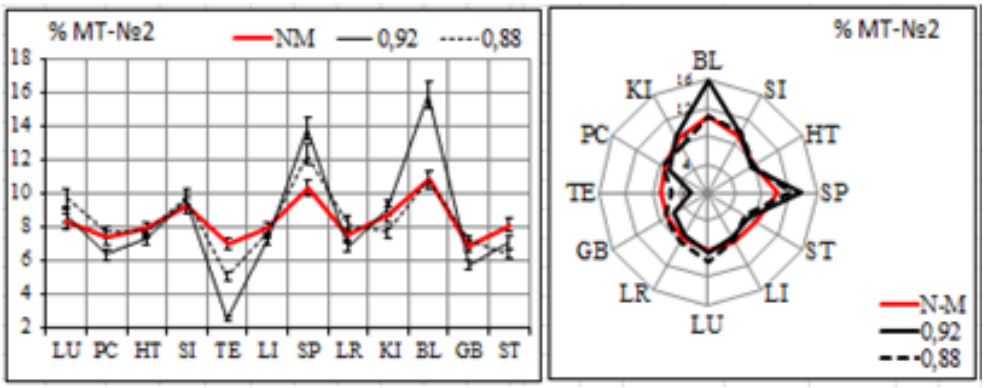
Fig. 11. Male group.

При початковій функціональній компенсації парасимпатикотонії (мал.12-13)



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

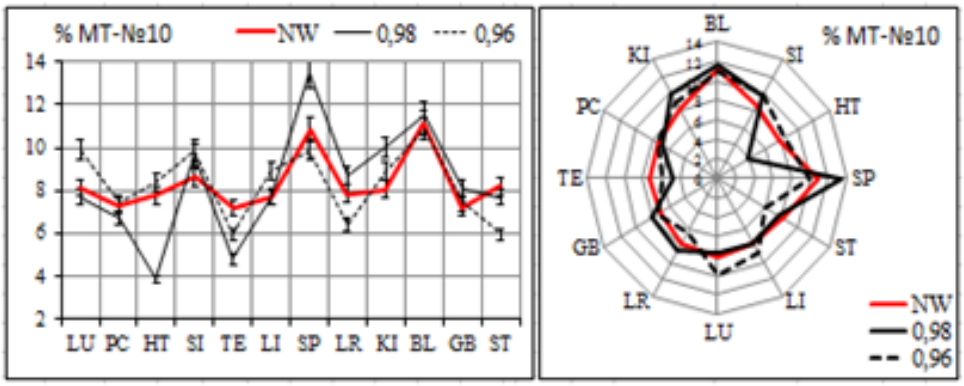
Fig. 12. Female group.



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

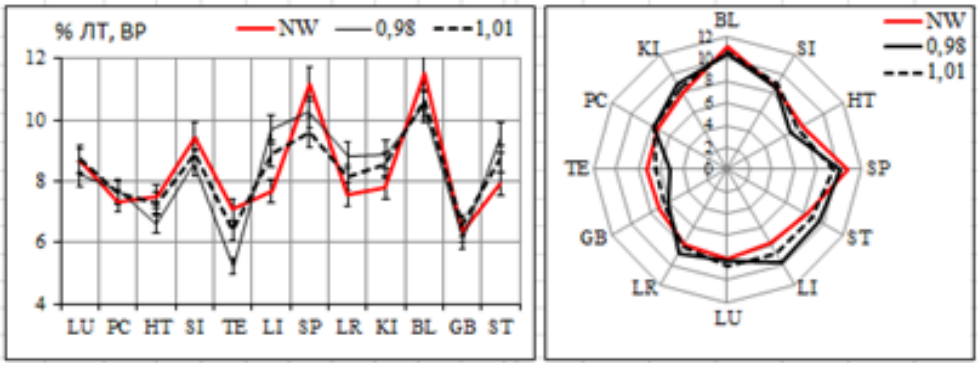
Fig. 13. Male group.

При початковій вегетативній рівновазі (мал.14-15)



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

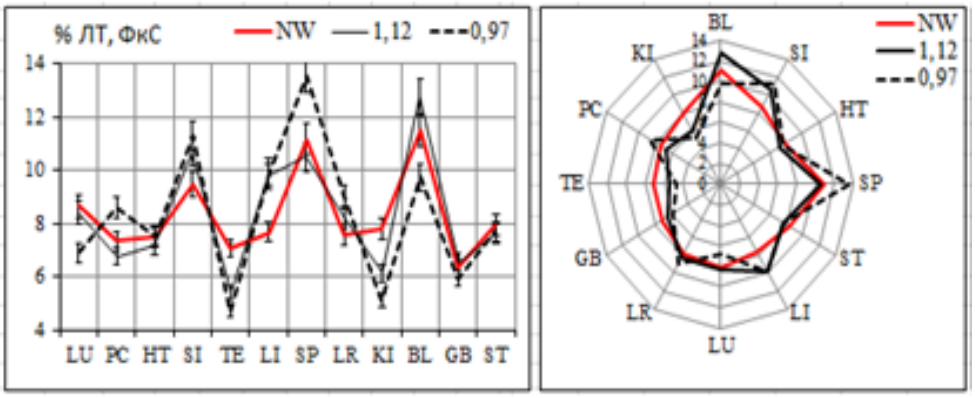
Fig. 14. Female group.



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

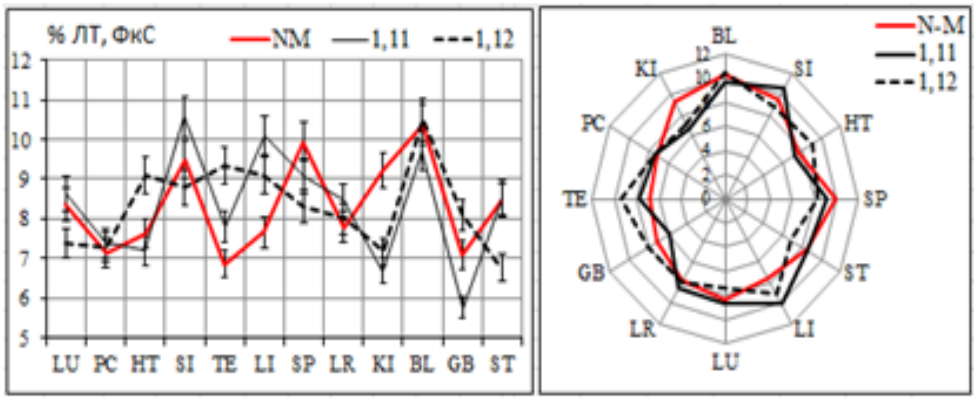
Fig. 15. Male group.

При початковій функціональній компенсації симпатикотонії (мал.16-17)

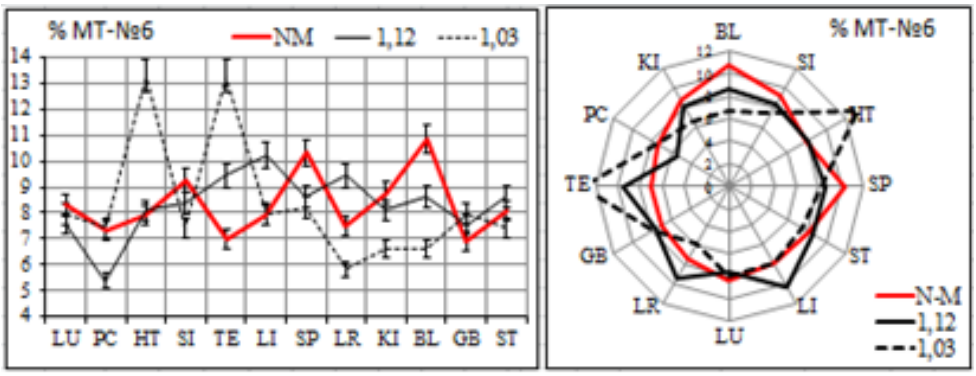


FUNCTIONAL-VEGETATIVE DIAGNOSIS
PA-s
PA-e
FcP
2 VE
1 FcS
SA-e
SA-s

Fig. 16. Female group.



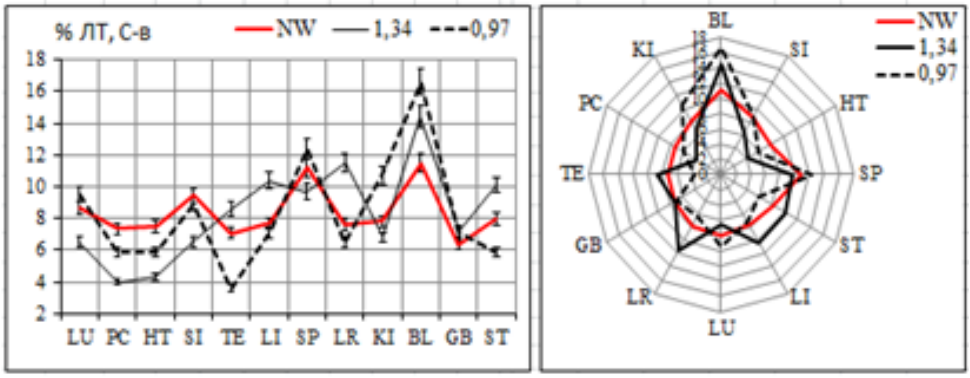
FUNCTIONAL-VEGETATIVE DIAGNOSIS
PA-s
PA-e
FcP
VE
1,2 FcS
SA-e
SA-s



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

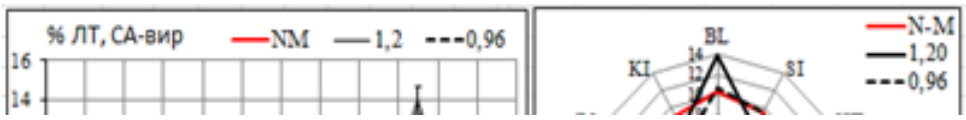
Fig. 17. Male group.

При початковій вираженій перевазі симпатикотонії (мал.18-19)



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

Fig. 18. Female group.

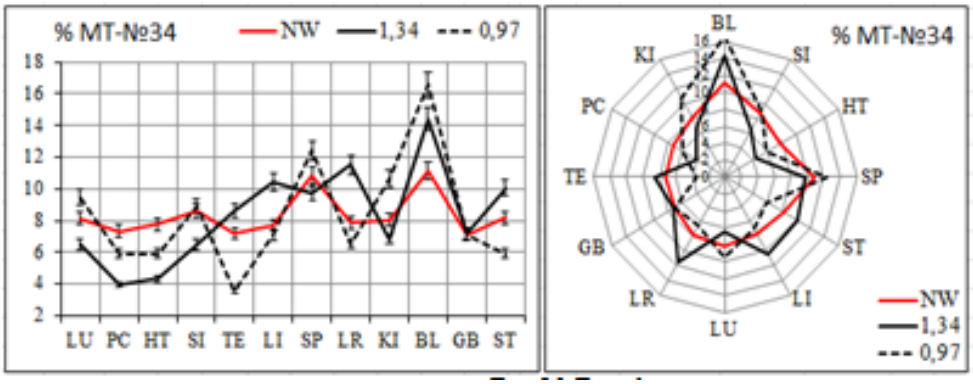


FUNCTIONAL-VEGETATIVE DIAGNOSIS

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

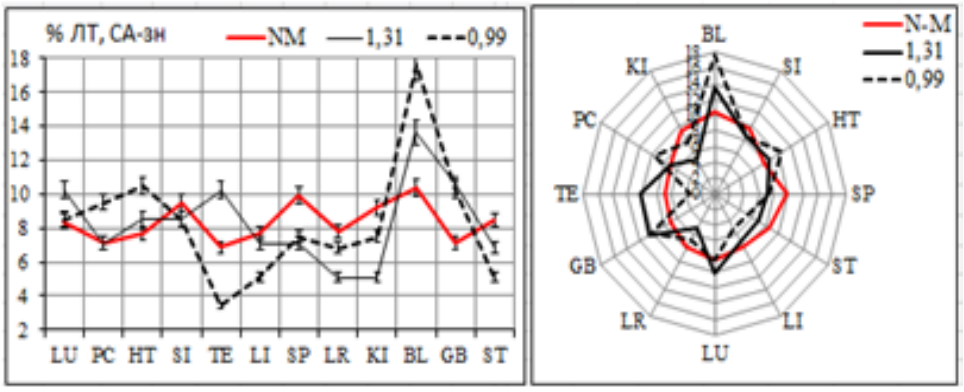
Fig. 19. Male group.

При початковій значній перевазі симпатикотонії (мал.20-21)



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

Fig. 20 Female group



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

Fig. 21. Male group.

Conclusions

1. The provided analysis testifies to the absence of gender peculiarities of functional-vegetative responses to the influence of the defocused laser in the conditions of the physiotherapeutic in-patient department.

2. Under all conditions of the research the rehabilitational factor initiates a normalizing influence under various initial levels of parasympathetic and sympathetic activity of functional-vegetative homeostasis.

GENERAL CONCLUSIONS TO THE CONDUCTED SCIENTIFIC RESEARCH

1. It was the first case when the experiment on the study of functional-vegetative efficiency of rehabilitational laser therapy took place.

2. The defocused laser therapy possesses specific influence on the functional-vegetative homeostasis of the diseased children (transfers parasympathetic oppression to a higher vegetative level, while sympathetic extitation – to a lower one). It can be assumed that laser therapy produces a normalizing functional-vegetative orientation,

which more vivid in the cases of significant and expressed sympathetic-vegetative prevalence.

3. Independently from the topographic region (zone) the usage of defocused laser its influence, from functional-vegetative point of view, should be considered as normalizing (which activates biophysical mechanisms of vegetative adaptation). During the observations no negative outcomes of the defocused laser therapy were found.

4. Through all groups under the observation, we noticed the value of the systems of the first functional complex – pacemakers of the functional rhythm (functional system BL controls sympathetic activity, while SP – parasympathetic activity).

5. The method of functional-vegetative diagnostics (according to V. Makats) is easy to use, provides comparative results during retesting, positively perceived by children and should be used in the rehabilitational practice for the control of the physiotherapeutic efficiency of laser therapy.

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