MINISTRY OF HEALTH
OF THE RUSSIAN FEDERATION

Pavlov First Saint Petersburg
State Medical University

USE OF ELECTROSTIMULATOR ABP-051 FOR NORMALIZATION OF THE BODY FUNCTIONAL CONDITION

METHODICAL GUIDELINES

St. Petersburg
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The methodical guidelines on the use of physical therapy device "ABP-051" include the set of procedures using impulse low frequency currents with the method of transcutaneous electrostimulation in patients It helps to prevent and treat disadaptation and other body functional conditions in case of increased physical and psychoemotional loads, to preserve working capacity of persons with the increased exposure risk of stress situations, workers of hazardous and extreme professions (shift work, rotation method, night work).

The exposure procedures included to the present recommendations have high clinical efficacy both in monotherapy and potentiate methods of pharmacological normalization of functional conditions.

The guidelines are intended for specialists in physical and rehabilitation medicine, physiotherapists, sport physicians, industrial safety specialists and can be followed by patients after a consultation with medical specialists.

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INTRODUCTION

Therapeutic physical factors expose not only on pathogenetical (pain, inflammation, dystrophy, etc.) and sanogenetic (regeneration, restitution, tonus) processes, but also on a functional condition of the healthy body. Such exposure is made to increase body general resistance, correction of adaptation body reactions on certain factors and tolerance to physical and emotional loads of a working process.

Non-specific resistance (*lat. resistentia*) – is body resistance to exposure of any adverse factors of the external and internal environment (regardless of their nature) and its ability to preserve homeostasis includes immune system components and non-immune components sustaining various negative factors. To be earlier phylogenitcally, they provide initial body protection. Non-specific body resistance is provided, as a rule, not by one organ or system, but by interaction of the complex of various organs and physiological systems including all chains of regulatory processes. The regulation of non-specific resistance, except the immune system, is provided by skin and mucosal barrier, bronchial mucociliary apparatus, acidic gastric barrier, reticuloendothelial system, patrolling phagocytes, as well bactericidal enzymatic serum systems (lysozyme, cathepsin, properdin, etc.) and hypothalamic–pituitary–adrenal axis.

The long-term adaptation is achieved during long and targeted training of adaptation mechanisms. Hereby due to after-action in repeated exposures, the conditional-reflectory bonds are formed in the responsible functional systems of the body. During the professional activity, people with hazardous and extreme professions are often exposed to some stressogenic factors really endangering life and activity which lead to disadaptation disorders resulting in aggravation of the body functional condition. Several studies have shown that various stress disorders are 10 to 50% of medical consequences of professional activity. Somatic and psychiatric health conditions have a negative impact on professional activity itself, lead to occurrence and increased frequency of professional erroneous actions, risk of emergencies and failure in professional tasks.

In people of hazardous and extreme professions, neuropsychic area is the main target of adverse exposures. Its condition determines not only success of professional activity but also possibility of inadequate actions. According to modern concepts, over 30-40% of people with hazardous and extreme professions need functional condition normalization.

The interaction of stressor factors (multimodal etiological exposures which exceed phenotypical body opportunities) and stress-limiting body systems result in *disadaptation* – that is a reverse functional body condition which possible consequences lie in adaptation and health recovery or disease development [8, 10]. The disadaptation problem has significantly developed in the last decades due to achievements in correct assessment of body functional condition and recovery of professional health level [11, 21, 22]. As a result of screening studies, various types of psychophysical disadaptation were detected in 40% of working population. Non-standardized working day, psychological distress, hypokinesia, impaired eating behavior, obesity, tobacco smoking and family disharmony.

Disorders of stress-implementing and stress-limiting systems as a result of non-consistency of phenogenotypical body particularities to counteract stress-factors of excessive strength or duration play the leading role in disadaptation pathogenesis [27, 28]. The depletion of neuropsychic, neurovegatative, neuroimmune and neuroendocrine adaptation mechanisms with secondary psychoemotional, hormonal and immune disorders is the result of the implemented pathological process.

Depending on the leading chain of the pathogenesis of adaptation disorders, psychophysical and neurotic disadaptation, there are predominantly psychophysical and neurotic disadaptations.

The most common psychophysical disadaptation is the chronic fatigue syndrome characterized with the extreme chronic patient's tiredness which does not disappear even after the longterm rest and leads to the significant decrease of working capacity over the time – both cognitive and physical, vegetative disorders, decrease of immunity and general body resistance, as well the extreme general patient's asthenization. The main syndromes making the clinical picture in the complex chronic fatigue syndrome are asthenic-neurotic syndrome, syndrome of neurohumoral disbalance, as well the immunosuppressive syndrome.

The "manager's syndrome" is the second common psycho-physical disadaptation – the complex of symptoms including the increased fatigue and marked asthenic–neurotic syndrome, vegetative disorders, transitory arterial hypertension and impotence developing in young (30-45 years), actively working patients having (over 10-12 hours a day) cognitive and physical loads related to a patient's professional activity.

The main clinical manifestations of the manager's syndrome is weakness and constant tiredness, decrease of working capacity persisting for several months, periodic headaches, various sleep disorders (anxiety, hypersensitivity, insomnia or drowsiness, sleepy sensation after the sleep), neuropsychic disorders (apathy, emotional liability, photophobia, amnesia, increased irritancy, decreased intelligence and attention concentration, dysrhythmia, malaise and phobias), gastrointestinal disorders, arrhythmias, periodic rapid temperature increase not exceeding 38°C, increase of cervical, occipital and axillary lymph nodes, acute pains, muscle and joint pain, dramatic weight loss without any diet, complaints on appearance (paleness, eye sack, aggravated condition of nails, hair and skin), decreased libido and impotence.

Neurotic disorders related to stress and somatoform disorders refer to the group of psychogenic disorders presenting as specific clinical phenomena in the absence of objective somatic (diseases of human organs and system) and psychotic events (psychiatric diseases) characterized with constant patient's complains on the health problem resembling a somatic disease; hereby no pathological process explaining its occurrence is revealed.

The following disorders are found in the classification of somatoform disorders: undifferentiated somatoform disorder, hypochondriac disorder, somatoform dysfunction of the autonomic nervous system, persistent somatoform pain disorder, etc. Approximately in half of the cases, the condition of somatoform patients is classified as depressive.

Another neurotic disadaptation is tension headache - the headache occurring in people with high anxiety level, with clinically evident or masked depression developing during or after exposure of various stress factors which is presenting as compression type ("helmet" or "band" around the head), as a rule, without any clear localization, weak or moderate intensity not increasing due to physical load, accompanied sometimes with photo- or phonofobia.

In the clinical presentation, along with headaches, patients also have other pain syndrome – these can be cardiac, abdominal, cervical, back, joint aches. As a rule, pains of another localization are chronic and of psychalgic nature. Tension headache is combined very often with marked psychopathic (anxiety – depression disorders, masked atypical depression, hypochondriac personality features) and psychovegetative disorders (blood pressure fluctuations, tachycardia, hyperventilation syndrome, typical or atypical panic attacks, fainting).

As for people with hazardous and extreme professions, the abovementioned factors also overlap the high responsibility level in relation to surrounding people which imposes additional requirements to correct functioning of the neuropsychic homeostasis systems [11, 12]. The use of conventional drug approaches in the category of people is limited due to work with mechanisms, vehicles, other situations requiring rapid, sometimes instant reaction.

The main principles of rehabilitation treatment of patients with disadaptation is the complexity and multidirectionality of treatment measures (etiopathogenetic therapy), the use of activa-

tion methods of sanogenesis and adaptation, individual and microsocial directionality of treatment measures, continuity and repetition of treatment courses with minimum inclusion of drug therapy.

Activation of central stress-limiting systems (opioidergic, serotonergic, etc.) and local neuroendocrine modulators (adenosine, prostaglandins, antioxidants, etc.) induced by therapeutic physical factors block the stress hormones released with the action of adverse factors and provides crossover protective effect of the body adaptation to multimodal environmental factors ("general adaptation syndrome" according to G. Selye). Treatment physical factors recover structural metabolic disorders in the body and decrease disease risk significantly, prevent progression of a pathological process and its transfer to chronic phase, as well reduce the number of disease relapses [11, 14, 25].

Due to the fact that non-specific body resistance is determined with relatively stable properties of various organs, tissues and physiological systems not related often with active reactions to the exposure, the physical methods increasing the resistance include both methods of immunity stimulation (immunomodulatory methods) and the methods affecting its non-immune components, nervous and endocrine system. To increase adaptation to stressor exposure and body resistant, together with immunostimulating methods, nowadays, the methods increasing the body adaptation to the environment and its individual factors are used [5, 7, 14, 18].

Such methods expose to various body organs and systems and prevent developing fatigue. The methods of physiotherapy such as electrostimulation of biologically active areas combining the elements of pharmacological, physical and psychological exposure to the human body are of great importance in rehabilitation technologies. Electrostimulation – a treatment exposure to impulse and alternate currents on biological active areas. Electric impulses are brought to the skin projection of biologically active areas. The use of small-sized electrodes allows to expose to the area with higher density currents which can lead to excitation of neurotransmitters present here and polarization of tissues related with the biologically active area with subsequent change of their functional properties [13, 24].

Unlike activation of serotonergic systems, in electric impulse exposure to local tenderness areas, electrostimulation induces activation of predominantly opioidergic neurotransmitter system of the brain performing the central analgesia [6, 15]. Being exposed to low frequency current, the metenkefalin level is increased in the liquor, and high frequency currents – β-endorphin inducing more marked analgesia. Moreover, the activating action of electrostimulation on metabolism of various body tissues is experimentally proven (nervous, muscle and epithelial).

Electrostimulation is one of the types of reflectory therapy in which a biologically active area is exposed to electric current with various parameters. Electric current is the most physiological instrument for exposure to biologically active areas differing functionally in some electrophysiological anomalies.

A normal biologically active is characterized with increased electric conductivity, decreased osmic resistance, increased electrocutaneous potential and electric capacity in comparison with other skin regions. In pathological conditions, hyper- or hypofunctional changes correlating with clinical disease manifestations occur in the body [13].

Being exposed to alternating current impulses identical in their parameters (form, magnitude and frequency), action potentials of single nerve fibers of the certain type undergo electrostimulation. It leads to local changes in skin microcirculation and tropics due to both local (evolving per the axonreflex mechanism and segmental-reflectory reactions [19, 23, 25].

Series of current impulses of various frequency expose selectively on sensitivity and motor nerve mediators of the dorsal roots of spinal nerves and trophic fibers present within. Being exposed to alternating current impulses compatible in their parameters (form and frequency) with action potential of single nerve fibers of the definite type, their excitation occurs which leads to local

changes of skin microcirculation and tropics due to local and segmental-reflectory reactions.

Electric impulses are brought to the skin projection of the biologically active area using small-sized electrodes which leads to exposure of high density currents to the points. Such points may induce excitation of nerve mediators present here and polarization of tissue related to the biologically active area with subsequent change of their functional properties.

Evolution-mediated particularities of metameric structure of the upper extremities in humans [9, 12, 19] are known. They are presented as the common autonomic-segmental innervation of visceral organs and definite metamers: the same segments of the spinal cord are involved in innervation (though of various nature) of dermatomes of hands and organs of the systemic vascular resistance, and other organs ("Zones of Zakharyin-Geda") [9]. So, for example, somatic innervation of the forearm skin occurs from segments C5-C8, Th1; sympathetic hand innervation from Th4-Th7; autonomic heart innervation – C3-C5, C8, Th1-Th3; aorta – Th1-Th3.

With electrostimulation of peripheral nerve transmitters, ascending impulse flow lead to activation of the main antinociceptive brain structures – central gray matter and raphe nuclei obtains polysynaptic afferent entries predominantly along Aβ-fibers. Such currents suppress power of impulse flows along nociceptive nerve transmitters, decrease the magnitude of induced potentials in raphe nuclei and induce the release of endogenous opiates by brain stem neurons retarding impulsion entering the brain along thin Aδ- and C-afferents. Stimulating neurons of the vasomotor center, impulse currents correct their functional properties effectively. Experimental and clinical data on high efficacy of electrostimulation in normalization of vascular tonus serve as the ground for numerous attempts to use it cardiology, in normalization of vegetative disorders – the bright example of the method efficacy is its ability to correct both increased and decreased level of blood pressure [14, 16, 24].

It is known that cardiovascular and vasomotor centers are represented by the network community of CNS structures and include centers of the sympathetic nervous system and preganglionc spinal cord neurons C6, Th1-Th3, centers of the parasympathetic nervous system represented by preganglionic neurons of the vagus nerve nucleus, higher CNS centers and individual nuclei of the hypothalamus, limbic system and the cerebral cortex.

Marked morphofunctional bonds on the spinal cord level implement the shift mechanisms of ascending flows of electric impulsion from the somatic region to the vegetative one on segmental and suprasegmental levels of the peripheral nervous system [1, 2, 20]. The stellate ganglion plays an significant role in differentiation of exposure areas and communicative topology л (C6-C8; n. vagus; n. vertebralis; n. cardiacus cervicalis inferior).

The main effects of electric impulse exposure:

- Vegetative tonus normalization
- Increase of non-specific body resistance
- Stimulation of antinociceptive and stress-limiting structures
- Modulation of regulatory body systems (nervous and immune) with the increase of tolerance of increased psycho-emotional and physical loads

The improvement of physical treatment methods in the beginning of the XXI century led to generation of the third generation physiotherapeutic devices. They allow to implement innovative rehabilitation technologies based on the results of functional studies on psychophysiology and rehabilitation medicine. The devices implement a new tendency of the automatic program management of physiotherapeutic exposure parameters. Among such devices, there is an electrostimulator "ABP-051" for blood pressure normalization (manufactured by "Inferum" LLC, Yekaterinburg, Russia).

A portative transcutaneous electrostimulator “ABP-051” is comfortable to manage and has a modern ergonomic design. It is intended for the use in healthcare and resort/recreational facilities, as well, it can be used by patients themselves for autonomic application beyond medical institutions.

INDICATIONS FOR THE ELECTROSTIMULATOR USE

Procedures of electrostimulation of biologically active areas using device “ABP-051” are indicated to:

- Persons with *psychophysical disadaptation*: Z73.6 (ICD code) activity limitations induced by the decrease or loss of working capacity (fatigue, professional burn-out); desynchrosis: seasonal depressive disorders, persons with chronic fatigue syndrome, “manager syndrome”, people suffering from meteopathic reactions, persons after 11 months (provided that labor and rest regime is followed), or after 6 months (if labor and rest regime is not followed, or with exhaustive working regime (frequent night shifts, non-standardized working schedule)) of working activity; persons exposed to load from definite sensory and signal systems (locodrivers, air traffic controllers, employees of the State Emergency Service).
- Persons with neurotic *disadaptation*: F43.0 acute stress reaction; G 93.3 chronic fatigue syndrome; Z73.0 overfatigue (asthenia); F45.3 somatoform vegetative dysfunction.
- For *recreational* prophylactic measures: persons with correctable (for example, hypodynamia, smokers) and uncorrectable (genetic susceptibility) risk factors of diseases in visceral organs and disadaptation occurrence; persons in the conditions of increased psychological and/or physical load (pilots, mechanism operators and drivers/locodrivers, military men performing duty tasks, emergency service specialists, etc.). Hereby prophylactic measures can be taken in the settings of non-medical institutions, on a working place.

CONTRAINDICATIONS

The main contraindications for electrostimulation made using device ABP-051 are:

- Presence of an implanted pacemaker;
- Atrial fibrillation;
- Individual intolerability of the electric current;
- Skin damage of the left wrist;
- Neoplasms of any etiology and location;
- Acute fevers of unknown origin;
- Acute psychotic, alcohol or drug-induced excitation.

MATERIAL MANAGEMENT

The methods of blood pressure normalization are implemented with the electrostimulator "ABP-051" (Fig.1) manufactured by "Inferum" LLC (Yekaterinburg), marketing authorization of the Federal Agency for Surveillance in Healthcare RZN 2016/3776 dated 31 March 2016; EC Certificate № 1942/MDD dated September 1, 2017.

The device appearance and its construction are presented on Fig.1.

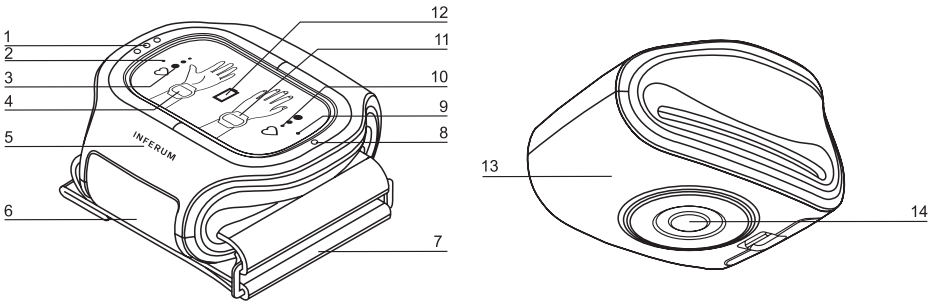

Fig. 1. Appearance and construction of device "ABP-051"

1 – On/Off key of Program No 1 (has three relief points on the surface).
2 – LED indicator of Program No 1. After the light emitting diode starts flashing white, a sound signal occurs to state that Program №1 is over.
3 – Symbol of Program No 1.
4 – Symbol of the correct installation of the device on the forearm for Program No 1
5 – Company logotype.
6 – Battery compartment lid.
7 – Cuff for fixing the device upon the wrist.
8 – On/Off key of Program № 2 (has one relief point on the surface).
9 – LED indicator of Program No 2. After the light emitting diode starts flashing white, a sound signal occurs to state that Program No 2 is over No.
10 – Symbol of Program No2.
11 – Symbol of the correct installation of the device on the forearm for Program No 2.
12 – Low battery indicator.

Internal side of the device contains:
13 – Operational surface of the device body.
14 – Electrodes for electric stimulation.

Device "ABP-051" forms successive series of two-phase electric impulses differing from each other in frequency, stimulation intervals and exposure magnitude (Fig. 2).

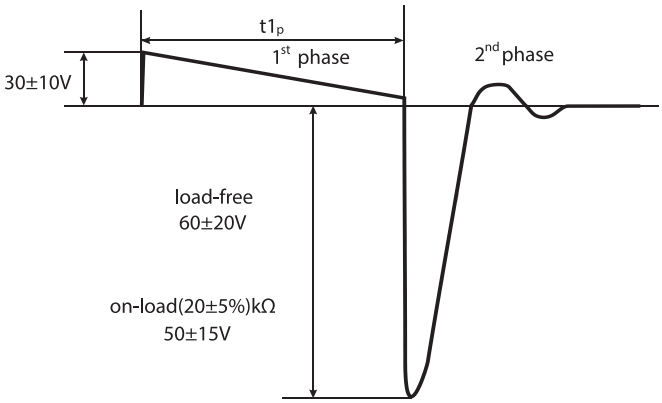

Fig. 2. Form and parameters of a single impulse generated by the device "ABP-051"

The first impulse phase has a fixed magnitude and duration in the ranges 30±10V, (25÷32)±3 μs, and the second phase – convergent sinusoidal fluctuations 60±20 V which form is changed depending on complete electric resistance (impedance) values of the skin surface in the supra-electrode space. The frequency of convergent impulses depends on the skin impedance value in the supra-electrode space.

Device "ABP-051" uses two automatic programs. Program No 1 is used for normalization of psychophysical disadaptation and implementation of recreational technologies, and Program No 2 – for normalization of neurotic disadaptation.

Main technical characteristics

Characteristics		Characteristics value
Program No 1	Exposure purpose	Psychophysical disadaptation, recreational measures
	Working impulse rates, Hz	9.2 and 77
	Total operation time, min.	5
Program No 2	Intended use of the exposure	Neurotic disadaptation
	Working impulse rates, Hz	77 and 140 with magnitude modulation, frequency 4
	Total operation time, min.	6
Electric pulse magnitude (load-free)	Phase 1, V	30±10V
	Phase 2, V	60±20
Dimensions, not more than, mm		80x80x40
Electrostimulator weight (with the cuff and builtin electrodes (without power supply cells), not more than, kg		0.3
Consumed power, not more than, mA		200
Supply voltage, V		3±0.6
Electric power supply source		Galvanic batteries, Type AAA (R03), 2 pcs.
Degree of the device body protection		IP41 pcs.
Degree of protection of the working units from electric current damage		Class: BF

PROCEDURE METHOD

The treatment exposure is implemented using the stable method with fixed location of electrodes in the projection of biologically active areas (Fig.3).

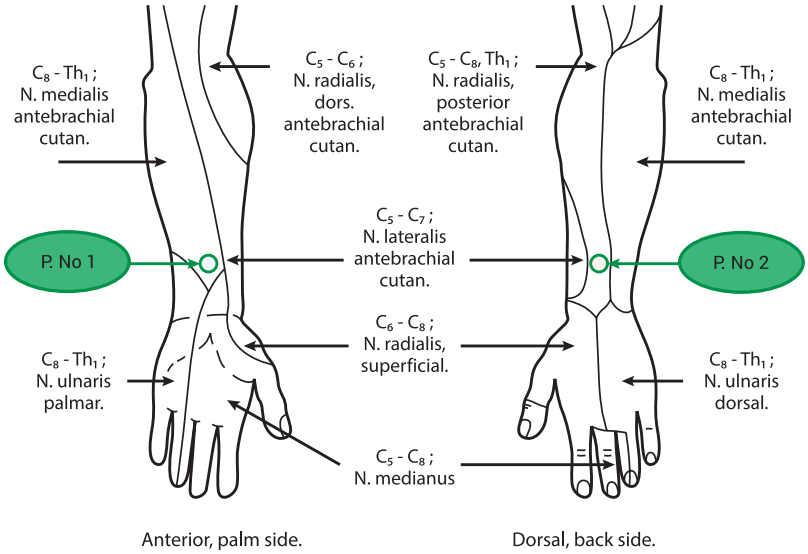

Fig. 3. Segmental innervation and skin sensitivity distribution per the peripheral nerves of the left forearm and hand. Positions of device "ABP-051" electrodes for procedures using Program No 1 (P. No 1) and Program No 2 (P. No 2)

For persons with psychophysical disadaptation, as well for prophylaxis of adaptation failures, Program No 1 is used. Procedures are made 1- 3 times a day, treatment course 10-14 days. At the beginning of the normalization course a short-term transient unstable BP dynamics may occur with further consistent decrease in hypertension or consistent increase in hypotension and further BP stabilization. BP stabilization during the procedures may serve as efficacy indicator, together with normalization of functional ability. Device "ABP-051" can be used not only by specialists but also by persons in need of the procedures.

For persons with neurotic disadaptation and susceptibility to hypotonia, Program No 2 is used. Procedures are made 1-3 times a day, treatment course 14-20 days. Prior the start of Program No 2, BP is measured, if the increased pressure is found, procedures should be made only after a consultation with a physician.

For disadaptation prophylaxis and normalization, procedures can be made as required, immediately on the working place, during the shift, etc. if any signs of adaptation failure, overstrain, tiredness occur, or for their prevention. Procedures can be repeated, with interval at least 2-3 hours.

Repeated regular electrostimulation courses are made in 2-4 weeks.

PROCEDURE TECHNIQUE

Preparation to the procedure

Prior a procedure, a patient is informed about the device and nature of sensations occurring as evident low frequency painless vibration appearing the procedure, treatment goal is explained, it is recommended to take off all items from the left hand (watch, rings, chains, etc.) and free the distal third of the left forearm from the clothes.

For the procedure, patient should take any body position comfortable for him/her in a sitting or supine position. Procedures are not made in vertical position.

Prior using the device, a patient is warned that he/she should discontinue procedure with device ABP-051 if any adverse reactions as vegetovascular syndrome, cephalagia and allergic reactions occur, and refer further to the specialist. If any sensations are absent, and the skin is dry, then you can treat the skin with a wet drape or wipe moistened with water or for better contact between the device electrode and the skin.

During the procedure, the patient should never read, sleep, touch the device body or change the device position on the arm.

Performance of procedures for normalization of psychophysical disadaptation and health improvement (Program No 1)

Make a procedure in the exposure area which is localized in the internal surface of the distal third of the left forearm (see Fig.3).

Place the device cuff on the left hand so that the orange hand image on the device (Fig. 1, cl.11) is located above, and move the device on the forearm to the set exposure area.

Fix the device in the lower third of the forearm so that the right edge of the device body is located parallel to the fold in the wrist joint (Fig. 4).

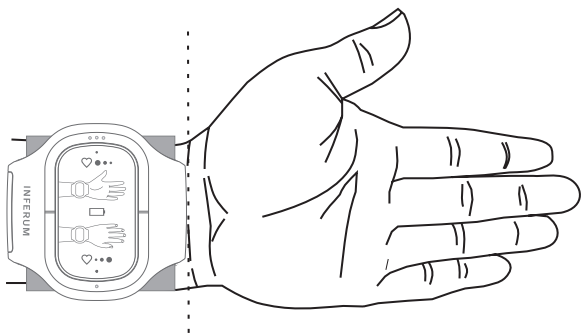

Fig.4. Correct device location on the left forearm in normalization of psychophysical desadaptation and health improvement.

Fix the cuff so that the device electrodes contact the skin closely; without impairment of local blood flow in the area, and a patient does not feel any discomfort.

Pressing On/Off key of Program No 1 (Fig. 1, cl.1), switch on the device. And the corresponding light-emitting indicator will flash on the device screen (Fig. 1, cl.2), and the program for normalization of increased BP will switch on, and then, 5 minutes after the normalization program, it will auto-matically switch off after the sound signal, and the corresponding light-emitting indicator will fade.

For manual (compulsory) device switch off, press and hold On/Off key of Program No 1 (fig. 1, cl.1) for over 1 second, the device will switch off, and the corresponding light-emitting diode will fade.

After the device switches off, loosen the fixed cuff and remove the device from the forearm. After the procedure, a patient should have a rest for 20-30 min.

Procedure for normalization of neurotic disadaptation (Program No 2)

Make the procedure in the exposure area which is localized in the dorsal surface of the distal third of the left forearm (see Fig. 5).

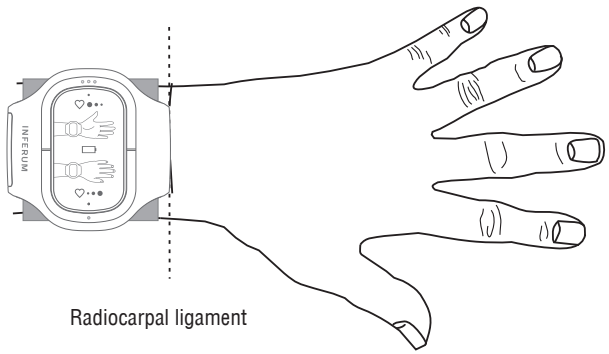

Fig. 5. Correct working position of the device on the left forearm in normalization of neurotic disadaptation.

Place the device cuff on the left hand so that the blue hand image on the device (Fig. 1, cl.11) is located below, and move the device on the forearm to the set exposure area.

Fix the device in the lower third of the forearm so that the right edge of the device body is located parallel to the fold in the wrist joint (Fig. 4).

Fix the cuff so that the device electrodes contact the skin closely; without impairment of lo-cal blood flow in the area, and a patient does not feel any discomfort.

Pressing On/Off key of Program No 2 (Fig.1, cl. 8) switch on the device. And the corresponding light-emitting indicator will flash on the device screen (Fig. 1, cl.9), and the program for normalization of increased BP will switch on, and then 6 minutes after the normalization program, it will automatically switch off after the sound signal, and the corresponding light-emitting diode will fade.

For manual (compulsory) device switch off, press and hold On/Off key of Program No 2 (Fig. 1, cl.8) for over 1 second, the device will switch off, and the corresponding light-emitting indicator will fade.

After the device switches off, loosen the fixed cuff and remove the device from the forearm.

End of the procedure

After the procedure, quiet rest is recommended for 20-30 min.

After each procedure, the device electrodes should be treated with a soft absorbing cloth moistened slightly with disinfecting solution (for example, 3% aqueous hydrogen peroxide solution). Be careful, water should not penetrate into the device.

The device should be kept with dry electrodes.

EFFICACY OF THE MEDICAL TECHNOLOGY

The studies carried out by various authors [3-5, 26] show that therapeutic mechanisms of electroneurostimulation are based on reflectory mechanisms. As a result of their implementation, the cascade of multilevel compensatory body response reactions is formed involving the autonomic nervous system and endocrine – humoral regulation mechanisms which provides effective normalization of functional condition of patients including those with adaptation disorders– disadaptation [12, 15]. The presence of the range of proven therapeutic effects and high method efficacy allows to use it in patients with various types of disadaptation disorders.

The efficacy of normalization of psychophysical disadaptation per Program No 1 is confirmed with the decrease of the stress-index up to values about 70÷160 and increase of the total power of the range of regulatory system up to values exceeding 1000 ms^2, as well in the decrease of activity value of the regulatory system to the normal or up to the values close to the normal from 7÷8 to 3÷4. It is stated that BP decrease is observed only in those cases when blood pressure prior the procedure exceeds the normal values. The increase of working capacity and mood improvement is related to the release of endogenous opioid peptides.

The procedures for normalization of neurotic disadaptation per Program № 2 are accompanied with the decrease of systolic BP fluctuations, gradual increase of the total power of the range of regulatory system with course exposure. The decrease of anxiety, joint, cardiac, abdominal and cervical pains is observed [17].

The high clinical efficacy and reduced duration of dysfunctional conditions during electroneurostimulation is indicated in rehabilitation programs implemented in neurology, sport medicine, cardiovascular, genitourinary, musculoskeletal diseases [17, 19]. The method safety, simplicity and convenience of procedures as well by patients individually, makes it possible to use electrostimulation of biologically active areas as the innovative technology by patients themselves for normalization of their functional condition.

It is established that the use of electroacupunture in normalization of the functional condition in patients with disadaptation is 3 times more effective than outpatient treatment, and 4-5 times effective that drug therapy. The social-economic effect of electrostimulation used in patients with disadaptation is provided by the reduction of temporary disability terms, improvement of cognitive and mnestic abilities, increase of working capacity and level of patients' professional health.

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ANNEXES
USE AND STORAGE RULES

The device safety corresponds to the requirements of GOST R 50267.0 for Class II, Type BF.

The device surface is even, without any acute ledges, burrs, angles and mechanic damages which may hurt a patient.

Electrodes and cuffs should be examined at least once a month for pollutions and loosened cuff fixage.

Per electromagnetic compatibility, the device corresponds to the requirements of GOST R IEC 60601-1-2-2014.

Depending on a potential risk of the use, the device refers to products of class 2a – low risk devices.

Materials from which electrodes are made, contact directly with a patient's skin, have the toxicological conclusion.

If any device malfunctions are found, the operations should be stopped prior the problem elimination.

Depending on hazard of operation failures, the device refers to Class B per GOST R 50444. The storage conditions in the manufacturer packaging at the manufacturer and consumer warehouses correspond to storage conditions 2 per GOST 15150.

METHODICAL GUIDELINES

USE OF ELECTROSTIMULATOR ABP-051 FOR NORMALIZATION OF THE BODY FUNCTIONAL CONDITION

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