

REPORT
on clinical evaluation
for
“Apparatus EHF-IR therapies portable
with changeable oscillators “CEM TECH”
13.06.08

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1. Introduction

The following standards and documents were used for conducting clinical tests and clinical estimation:

1. DIN EN ISO 14971:2007 Medical devices – Application of risk management to medical devices
2. MEDDEV 2.7.1 Evaluation of clinical data: A guide for manufacturers and notified bodies
3. Annex X of the DIRECTIVE 93/42/EEC of 14 June 1993 “Concerning medical devices”.

2. Description of the product, its functions and characteristics, connected to its clinical use.

2.1. Purpose description

“CEM TECH” EHF-IR therapy portable device with changeable oscillators (further – the device, changeable therapeutic oscillators), is a source of low-intense and background radiation (less than 10 microWatt/m²) of electromagnetic waves of extremely high frequency (EHF) and light infra-red (IR) ranges. The device is created for non-invasive influence on body’s biologically active points and sites of tissue with a purpose of correction of organs’ and systems’ functional activity by stimulation processes in tissue.

The device and changeable therapeutic oscillators can be used in treatment-and-prophylactic establishments of different specialization types, as well as individually, by prescription of a physician on stationary and outpatient basis.

The device is portable, with internal power supply of the direct current with nominal tension of 3 V (from 2 elements AA, LR03, 1.5 V each).

2.2. Product’s specification

The device consists of portable control unit (PCU) and remote EHF emitters attachable to the device through the connector with flexible cable.

Development of the device was done with consideration of well-known analogous EHF-therapy devices, such as “Yav” and “Amfit”, based on which, large number of clinical estimations was fulfilled. Technical characteristics of “CEM-TECH” allow its use not only as broadband radiation source, but also for working on fixed frequency. The device is made with the use of original technical solution: EHF radiator’s power supply comes from impulses of triangular shape with distinctive features of its resonator. When supplying the impulse on oscillator and its achievement of threshold voltage, the excitation of Gunn diode in broadband mode occurs, than it’s characteristics correspond to radiation of broadband EHF-therapy devices (for example, “Amfit”). With the increase in tension, formation of radiation happens on the diode on fixed generation frequency, which parameters, with appropriate tuning, are comparable to radiation from “Yav” devices.

Thus, technical solutions, executed in EHF-IR therapy device«CEM®-TECH», allow its effective work in all modes that are stated in the Owner’s manual.

The device is equipped with several oscillators of different frequency characteristics. Oscillators №1, 2, 3 generate broadband spectrum and have base radiation, that is in a shorter range, while oscillator №4 provides broadband radiation. Sort of oscillator makes a difference when working in active EHF-mode. In BRR-mode, all oscillators, except for infra-red, work in the same mode.

№1 – base radiation 40-43 GHz (wave length 7,5-6,977 mm) (EHF)

№2 – base radiation 52-57 GHz (5,769-5,263 mm) (EHF)

№3 – base radiation 57-63 GHz (5,263-4,762 mm) (EHF)

№4 – with broadband noise of Gunn spectrum

№5 – color and infrared with diapason of 0,4-1,2 mcm (Infrared)

For therapeutic use, the device influences patient’s areas of skin coverlet, containing biologically active zones of the organism.

The sequence of therapeutic procedures conductance as well as service conditions are described in the Passport, Owner’s manual, and Service manual.

3. Results from risk analysis

3.1 Identified risks

For determination of risks, connected with the use of the device, risk analysis has been carried out in accordance with ISO14971. The results are presented in Risk Management Journal №1/07.

3.1.1 Regarding clinical use

From the risk analysis, according to ISO14971 standards, risks connected to human element using the device and risks connected with unqualified personnel using of the device were revealed, “Risk Management Journal №1/07”. Risks after the conducted activities, can be applied to the category of insignificant and belong to the area of admissible values.

3.1.2 Regarding the chosen technical solution

The chosen technical solution can lead to the risks connected with hygiene, possible undesirable physiologic effect on operator or service stuff, “Risk Management Journal №1/07”. After conducted activities on risk minimization, risks transferred to the area of admissible values.

3.1.3 Regarding the design

Regarding the design, no risks were found.

3.2 Benefit from the device

From the analysis of publications on clinical tests of «CEM[®]-TECH» device, we can conclude that the influence of EHF-radiation on the body helps to:

- reduce pain syndrome of any genesis and inflammatory effects in pathologic centers;
- shorten the period of in-patient treatment for broad list of diseases;
- widen possibilities of rehabilitation treatment in ambulatory and home conditions;
- execute initial and secondary prophylactics.

All researchers certify good tolerance of EHF-influence and the absence of complications and side effects, including in patients that were observed after treatment over long periods of time (1-2 years). Patients had no or slight pain sensations in the place of influence (some patients had sensation of “light pricking” and “goose skin”).

No serious contraindications to the use of the device have been found, however, *the prescription of EHF-therapy should be avoided in the following cases:*

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- *Unstated diagnosis, especially abdomen pains;*
- *Individual intolerance to this type of therapy;*
- *Pregnancy, because it was not studied;*
- *Presence of implanted devices with autonomic power supply, for example, artificial pacemaker;*
- *Car driving and other actions which require the attention concentration*

The analysis of possible risks and their compartment with the results of longstanding clinical practice of the devices use for different health disturbances testifies the benefit of the device.

3.3 Comparison of the benefit and residual risk

Considering the fact, declared by the manufacturer, on safety and non-invasiveness of the method, an also, basing on clinical approbation, researchers came to the conclusion that the benefit from the device is bigger than residual risk from its use (Risk Management Journal №1/07, Statement on acceptability of residual risk from 29.05.07).

4. Procedure of working with literature

4.1 Description of the ways of significant literature data obtaining, selection, comparison testing, and critical analysis, used for clinical estimation.

The review includes publications that describe prospective controlled EHF-therapy testing for different diseases, in which analyzed groups of patients were selected by randomization and minimization methods and were comparable in age, sex, heaviness and duration of disease, and presence of concomitant diseases. The results were adequately statistically evaluated.

Selection criteria were met by clinical studies that were done on more than 8000 patients and healthy volunteers in large medical centers in Moscow, Tomsk, Nizhniy Novgorod, and other cities.

EHF-therapy effectiveness was estimated. Therapy was done separately, or together with standard therapy, in comparison with standard therapy. Influencing with electromagnetic radiation of EHF-diapason was done on the projection of affected organs or on the pathologic centers and/or biologically active points and zones. In the control groups, EHF-therapy was not conducted, or imitation of EHF-therapy was done, that is blind placebo control. In all cases, with the exception of specially pointed out ones, EHF therapy was done in “noise” mode.

Neurologicalal manifestations of vertebral osteochondrosis

Authors	Publication	Institution
Alaitseva S.V.	Possibilities of prognosis and assessment of the effect effectiveness with the electromagnetic radiations and alternating magnetic field in patients with the neurologicalal manifestations of a lumbar osteochondrosis: Author’s abstract of the master’s thesis.-Tomsk, 2004.-p. 21.	Tomsk SRI of health resorts and physiotherapy of RF Ministry of Health
Blinkov I.L., Gedymin L.E., Levitsky E.F.,	Use of background resonance radiation therapy for the pain syndrome cupping at the neurovertebrogenic diseases: Aid to	SRI of the traditional methods of treatment of RF Ministry of Health ,

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Mikhailov V.I., Kozhemyakin A.M., Brandt I.L., Dmitriev N.N., Golosova O.E.	physicians.-Moscow-1999.	All-Russian SR and testing Institute of a medical technique of the of the RF Ministry of Health, Tomsk SRI of the CyPhT of RF Ministry of Health
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Totally, 407 patients at the age of 19-83 years with vertebral osteochondrosis neurological manifestations were examined and treated. The intervertebral disk hernias were revealed in 204 patients. All patients were receiving usual medicament and physiotherapeutic treatment. 185 patients, receiving the EHF together with usual therapy, were included into the experimental groups. 222 patients were included into the control groups.

The use of EHF-therapy for vertebral osteochondrosis neurological manifestations without disk hernia has led to full cupping of the acute pain syndrome in 1-3 sessions in 52% of patients, a decrease of pain or its localization alteration, general health state improvement, and motor activity increase were noted, and a full disappearance of a pain syndrome was observed in 5-10 sessions. The placebo-procedures (EHF-influence imitation) were ineffective.

A regress of all basic signs of disease was observed for discogenic radiculopathies at the end of EHF-therapy course. Pain syndrome was significantly decreased in all patients (in 70% of the patients in a control group) and disappeared in 56% (in 26% of the patients in a control). Not only the quantitative characteristics of pain, but the qualitative ones as well were changing in a process of treatment. Pain was losing its burning, cutting, shooting character and was becoming tolerant, dull, and blunt. Pain sensitivity threshold in the local algogenic zones 2 times significantly statistically increased (from 1.1 ± 0.4 to $2.3 \pm 0.5 \text{ kg/cm}^2$, $p < 0.05$). The statistically significant dynamics of pain sensitivity threshold was not revealed in a control group at the end of treatment course.

Thus, an expressed anesthetic effect of EHF-therapy for vertebral osteochondrosis neurological manifestations was established.

Scoliosis of vertebral column in children

Authors	Publication	Institution
Miryutova N.F., Abdulkina N.G., Kozhemyakin A.M. Lipina E.V., Bartfeld N.N.	Electromagnetic radiation of EHF-range in reduction treatment of neuroorthopedic disturbances in patients with lumbar osteochondrosis, children and adolescents with idiopathic scoliosis: Aid to physicians.- Tomsk-2004	Tomsk SRI of Health resorts and Physiotherapy of RF Ministry of Health
Polyakova A.G., Kareva O.V., Loskutova N.V.	Correction of vascular disturbances in vertebrobasilar pool in children with scoliosis // Mater. of sympos. “Adaptation of different systems of the organism with vertebral column scoliotic deformation. Methods of treatment”. – M., 2003. – P. 82-84.	Nizhny Novgorod SRI of Traumatology and Orthopedics

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Totally, 200 children and adolescents at the age of 5-15 years with congenital and acquired deformations of vertebral column were examined and treated. Vertebrobasilar insufficiency phenomena were observed in 121 patients. According to roentgenologic data, the I degree scoliosis was noted in 38% of the children, the II degree scoliosis was seen in 44% of the children, and the IV degree scoliosis was observed in 5% of the children.

All patients were receiving usual medicament and physiotherapeutic treatment. 141 humans, receiving EHF-influence together with usual therapy, were included in the experimental groups. 59 patients were included in the control groups.

A rapid regress of pain syndrome was observed in all treated patients. In 5 procedures, pain in back, feet and headaches disappeared, and physical activity tolerance has increased. The vertebral column excursions in sagittal and frontal planes were increased by 1.5-2.0cm with the EHF-radiation use and by 0.7-1.5cm in a control group.

Disappearance or substantial decrease of headache and vertigo, arterial pressure normalization were subjectively noted in all patients after the 6-7 session of the EHF-therapy at vertebrobasilar insufficiency. In a control group, such clinical picture was developing only at the end of rehabilitation period, in 4-5 weeks, on average.

All researchers noted good reaction to EHF procedures. Nice relaxation feeling and quite often, sleepiness have been noted in great majority of patients during the treatment itself, which testify an adequacy of the effect and normalization of inhibition and excitation processes in the brain cortex.

Brain lesions of different genesis and headache

Authors	Publication	Institution
	The use of EHF-therapy in complex rehabilitation of patients with exogenous and organic lesion of brain: Method. recommend. – Tomsk.	Tomsk SRI of Psychic health, Tomsk Regional Psychiatric hospital. Tomsk SRI of Health resorts and Physiotherapy of RF Ministry of Health
Macheret E.L., Fiyalka B.N., Korkushko A.O., Parkinoza T.P., Babichenko N.A.	Experience of millimeter wave use in complex treatment of patients with closed craniocerebral injury with multizone EHF-therapy methodic// 10 th Russian symposium with international participation “Millimeter waves in quantum medicine” – M.: IRE RAS. 1995. – P. 58-59.	Kiev Institute of doctor development
Kuzmenko V.M.	Microwave resonance therapy role in the combined treatment of patients with cerebral atherosclerosis Lik Sprava 1998; 7; 146-148	
Popov B.M., Alshanskaya T.A.	The use of traditional and alternative medicine methods in a complex treatment of headaches // 11 th Russian symposium with international participation “Millimeter waves in a quantum medicine” – M.: IRE of RAS. 1997. – P. 67-71.	Irkutsky region, Ust-Ilimsk, Department of TMO-2 polyclinic reduction treatment

227 patients with brain exogenous organic lesions (of traumatic, vascular, infectious, toxic, and complicated genesis) were examined and treated. All of them were receiving usual medication therapy. Patients of the basic group (152 humans) were additionally receiving EHF-therapy. 75 patients were in the control group.

Headache, vertigo, and arterial pressure fluctuations were abruptly eased after EHF-influence session, in the basic group of patients with asthenic disorder. Arterial pressure was stabilized in more than 75% of the patients on 5-6 procedure (in a control group – on 10-12 day), headache became less intensive and rapidly disappeared. Asthenic manifestations were smoothly vanishing. Emotional lability, hyperesthesia were disappearing on 5-7 session, night sleep started to restore from the first procedures. Several patients have been falling asleep during a session. The average point improvement according to the MADRS scale was statistically significant ($p=0.001$), more expressed than in a control group of patients with organic affective disorder. Depressive emotions were becoming labile, mood was leveling due to general state improvement, headache disappearance. Patients believed in the need treatment, hypochondriac mood was more corrigible. The doses of antidepressants, tranquilizers and hypotensive medicines were decreased without subsequent aggravation of state of health, in comparison with the control group.

Effectiveness of EHF-therapy for headache was demonstrated on the example of 186 patients. Full cessation or substantial decrease of headache, reduction of the rate and fit duration on 83% of patients were noted. The signs of the disease were decreasing but not fully disappeared in 15% of patients. They needed a repeat course. 2% of the patients did not feel any effect.

Kuzmenko described the complete relief of a headache in 122 of 177 patients with pre-stroke forms of cerebrovascular pathology after EHF-therapy course. Prospective control study demonstrated that 65% of patients, treated with MWT, have been in remission for, approximately, 1 year versus 20% of patients from the matched control group, receiving a standard treatment.

Mono- and polyneuropathies

Authors	Publication	Institution
Megdiatov R.S., Vasilenko A.M., Arkhipov V.V., Kislov V.Ya., Kolesov V.V., Smirnov V.F.	The use of therapeutic and diagnostic system in a complex therapy of trigeminal nerve neuralgia // Proceedings of the 10 th Russian symposium with international participation “Millimeter waves in medicine and biology” 1995; Moscow, Russia, the Russian Academy of Sciences p. 83-84.	
Balchugov V.A., Polyakova A.G., Anisimov S.I., Efimov E.I., Kornaukhov A.V.	EHF-therapy with a low-intensive sound radiation. – N. Novgorod, publ. house of NNSU, 2002. – p. 192	

Megdiatov *et al.* reported effective application of MWT in patients with trigeminal neuralgia. Fifty-two patients were randomly allocated to receive either MW (group I) or sham procedure—inactive MW generator (group II) additionally to conventional medication. 16 out of 27 patients from

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group I (real MWT), reported the reduced pain intensity and decreased incidence of neuralgia attacks, in comparison to 4 out of 25 patients from the control group, who received sham MWT procedure.

High effectiveness of EHF-therapy was reported for both mono- and polyneuropathies. The analgesic effect and the increase in impulse transmission rate along the nerves were noted.

Syndrome of vegetative dystonia

Authors	Publication	Institution
Alaitseva S.V.	Forecasting and assessment possibilities of the effect of the influence with electromagnetic radiations and alternating magnetic field on patients with lumbar osteochondrosis neurological manifestations: Author’s abstract of the master’s thesis. – Tomsk, 2004. – p. 21.	Tomsk SRI of Health resorts and Physiotherapy of RF Ministry of Health
Kokoladze I.R.	Clinical variants and increase in biliary system functional disturbance treatment effectiveness in children with EHF-therapy use: Author’s abstract of the master’s thesis. – Saint-Petersburg, 2006. – p. 21	Saint-Petersburg, Polyclinic № 77
Silantieva E.S.	Treatment of uterine appendage chronic inflammation (hemodynamic aspects of EHF-therapy): Master’s thesis. – Moscow, 2000.	Scientific Center of Obstetrics, Gynecology and Perinatology of RAMS
Dikke G.B.	Influence of millimeter range electromagnetic waves on vegetative nervous system state in females after uterus amputation // Millimeter waves in biology and medicine. – 1999. – N1. – P. 28-33.	Tomsk SRI of Health resorts and Physiotherapy of RF Ministry of Health
	Antistress therapy with the use of background resonance radiation: Method. recommend.	Orenburg, Center of Adaptation Medicine of RF Ministry of Health

503 patients at the age of 5 to 63 with vegetative dystonia syndrome were examined and treated. They had neurological manifestations of osteochondrosis (153 humans), neurological signs of the CNS perinatal lesion in children (112 humans), reactive neuroses after road incident (74 humans), gynecologic diseases (164 humans). All patients were receiving usual medicamental and physiotherapy. Patients of experimental group (236 humans) were additionally receiving EHF-therapy. 267 humans were included in the control group.

More rapid regress of disease was observed in experimental group of patients on the 4-5 day, on average. The main VDS manifestations disappeared or were significantly decreased in 76-90% of patients after EHF-therapy (90% - in a group with EHF sound mode use). An observation within 2 months after treatment has revealed the achieved effect stability.

From the 3-4 day of treatment fatiguability, irritability, emotional lability, sleep disturbance, and headaches have been decreasing or disappeared with EHF-therapy use. Working capacity and mood have been increasing. The average values of vegetative disorder rate were: 9.7 points prior to treatment, 6.3 points after the treatment ($p < 0.01$) and the average values of the vegetative disorder

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intensity were 9.2 and 5.9 points ($p < 0.01$), respectively. The hemodynamic characteristics alterations were started only on the 4-5 day of treatment. A positive reographic dynamics was noted after a treatment course. Comparative analysis has revealed statistically significant alteration of upper and lower extremity reogram following values: reographic index was increased by 15%; rate of a slow blood-filling was increased by 12%; a diastolic index was reduced by 26%; a diastolic index – by 24%; peripheral resistance value – by 17%; average rate of a venous component diminishing – by 37%; venous outflow index – by 41% of the initial one ($p < 0.05$).

The placebo-procedures were not changing vegetative status of patients in the control group. The reogram indexes were not changing statistically significantly.

Infantile cerebral paralysis

Authors	Publication	Institution
Skopyuk M.I., Soloviyova A.A.	Effectiveness and safety of microwave and resonance therapy in infantile cerebral paralysis treatment: double blind cross investigation // Physics of the Alive. – 1994. – V.2, N1. – P. 91-101.	
Kurofeeve V.A., Ruev V.V., Antonova L.V., Kovalenko V.N.	Experience of millimeter therapy use in treatment of patients with infantile cerebral paralysis // 12 th Russian symposium with international participation “Millimeter waves in a quantum medicine” – M.: IRE of RAS, 1997. – P. 75-76.	Moscow, The “Covert” MTC Ltd.

Totally, 100 children with infantile cerebral paralysis were treated. Treatment effectiveness after the 1st EHF-therapy course improved in 63% of children, positive dynamics had been seen in 96% of children after 2-3 courses.

Positive dynamics of clinical and paraclinical values was noted under the influence of the treatment course. Children were more active, their speech has improved, muscular tonus decreased in 87.5% of patients. Volume of active movements in hip joints increased by 15°, on average, in knee joints – by 20°, and in talocrural articulations – by 10°. Muscular strength in extremities was increasing: hand dynamometry was increasing by 1.2kg, on average. Strength of lower extremity proximate departments according to “holding suspended at the 45° angle” functional test values was increasing from 7.6±1.8 to 21.4±5sec ($p < 0.01$). Lower extremity muscle EMG-signal amplitude was increasing statistically significantly: femur flexors – by 40.0mkV ($p < 0.05$), crus flexors – by 34.0mkV ($p < 0.05$), crus extensors – only by 17.5mkV. Pathologic reciprocity coefficient was decreased by 18.7%. That data testified the improvement of supraspinal regulation and neuromuscular transmission. Gait and supporting function improved in 37% of children; atactic disorders decreased in 82.5% of children. At the same time, the hyperkinesias expression stayed practically stable.

Comparing different age group treatment results, researchers recorded that treatment results in the younger children (2-3 years) appeared to be statistically significantly higher, than in children of 5-6 years and children of a preschool age. Thus, all successfully treated children had younger age, because they had no fixed contractures. The children with the rigid muscular tonus and hyperkinesias terminated the course of treatment without improvement.

Epilepsy

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Authors	Publication	Institution
Pashnin A.G.	Joint use of anti-epilepsy medicine and millimeter therapy for treatment and prophylactics of secondary-generalized epilepsy attacks in farmoresistant patients//14 Russian symposium “Millimeter waves in medicine and biology”. – M.: 2007. – P. 36-40.	Russian Sate Medical University, Moscow

84 patients with farmoresistant epilepsy in the age group of 20-45 and duration of disease from 2 to 10 years were examined. All patients were receiving basis anti-epileptic therapy. Patients from the basic group (55 people) were additionally receiving EHF-therapy. After the course of treatment, patients were experiencing 2 times fewer attacks, and had a positive dynamics on EEG with functional samples, which remained in 6 months after the EHF-therapy course. In the control group (29 people) such positive dynamics was not observed.

Joint diseases

Authors	Publication	Institution
Kamenev Yu.F., Gerasimov A.M.	Substantiation of EHF radiation use for stabilization of degenerative and dystrophic alterations in articular cartilage in patients with deforming osteoarthritis. Millimeter waves in biology and medicine 1996; 4: 30-34.	The N.N.Priorov CITO
Kapustina N.B., Kornaukhov A.V. Polyakova A.G., Kolesov S.N., Priluchny M.A.	The use of deep integral radio thermometry for microcirculation alteration assessment for EHF-therapy in patients with deforming arthritis of hip joints and Pertes’ disease // Millimeter waves in biology and medicine. – 2001. – N2. – P. 46-52.	Nizhny Novgorod SRI of Traumatology and Orthopedics
Aleshenko V.V., Pisanko O.I.	EHF-therapy for hemophilic arthropathies and hemarthroses of knee joints // 10 th Russian symposium with international participation “Millimeter waves in a quantum medicine” – M.: IRE of RAS, 1995. – P. 61-63.	Ukraine, Kiev, City Clinical Hospital N25
Shlyapak E.A., Gabidova N.T., Evseeva S.N., Apanasevich Z.K.	EHF-therapy for children with juvenile rheumatoid arthritis Vopr Kurortol Fizioter Lech Fiz Kult 1996; 6: 19-21	
Usichenko T.I., Ivashkivsky O.I., Gizhko V.V.	Treatment of rheumatoid arthritis with electromagnetic millimeter waves applied to acupuncture points – a randomized double blind clinical study Acupunct Electother Res 2003; 28: 11-18.	

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Totally, 500 patients at the age of 25-79 years with degenerative dystrophic diseases of joints (a deforming osteoarthritis, Porges’ disease, a psoriatic osteoarthropathy) were examined and treated. All patients were receiving usual treatment. 284 humans, receiving EHF-influence together with usual therapy, were included into experimental groups. 216 patients were included in the control groups.

The use of EHF-radiation in a complex of rehabilitation measures has permitted to achieve clinic-functional value improvement in 87% of patients with degenerative and dystrophic diseases of joints (an increase of the muscle strength, movement volume in the interested joint and tolerance to physical loads).

The dynamics of thermo asymmetry gradient alteration in experimental group with unilateral deforming arthritis was already noted after the first EHF-therapy session. Positive dynamics (i.e. leveling of the deep integral temperature values) is fixed in a lumbar area ($p < 0.05$). Statistically significant temperature gradient decrease is fixed in a point of the greater trochanter projection ($p = 0.01$), in anterior inguinal fold area ($p = 0.01$) and in lumbar area ($p = 0.03$) in patients with Porges’ disease.

Statistically significant temperature gradient value alterations were not revealed in the control group.

The use of EHF-therapy for hemophilic arthropathies and hemarthroses provides sharp decrease of pains in joints, significant decrease of hormonal medicine dosage, decrease in the expensive hemostatic medicine infusion (thousands of roubles a day), and twice decrease of days spent in the hospital – from 21 to 10-12 days.

Shlyapak et al. reported on EHF beneficial effects in treatment of children with juvenile rheumatoid arthritis. 138 children were randomly included into experimental groups with EHF-therapy inclusion into a medical complex and without it. The intensity of joint pain was decreased by 50% in all three groups after a MWT. Morning stiffness and circumference of the affected joints were also decreased, and the functional joint status improved in 80-90% of children.

Traumas, wounds and burns

Authors	Publication	Institution
Polyakova A.G., Builova T.V., Vashkevich D.B., Kareva O.V.	EHF-therapy in the reduction treatment of patients of traumatology and orthopedic profile // Review. Medical technique. 2003. N12.	N. Novgorod SRI of Traumatology and Orthopedics
Kamenev Yu.F.	Use of EMR in traumatology and orthopedics // Millimeter waves in biology and medicine 1999; 2: 20-24	Moscow, The N.N.Priorov Central Institute of Traumatology and Orthopedics
Azov N.A., Kornaukhov A.V., Razhivin A.P., Mazina E.I., Azov S.N.	EHF-therapy with “Amfit” apparatus in pediatrics // Millimeter waves in biology and medicine. N2(14), 1999, P. 45-48	Nizhny Novgorod State Medical Academy N. Novgorod, Infantile polyclinic N22
Loginov V.I.	Treatment of postoperative wounds with low-intensive bandwide electromagnetic radiation of EHF-range: Author’s abstract of master’s thesis. – N.N., 2002. – p. 22 (14.00.27-	Nizhny Novgorod Garrison Military Hospital. Railway hospital N1

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Matrosov V.I.	Influence of millimeter waves on organism’s immunologic reactivity and purulent wound healing // Millimeter waves in biology and medicine: Coll. of reports of the 12 th symp. – M.: 2000. – P. 9-12.	Vladivostok, Military Hospital of Federal border guard service of the RF
	Optimal resonance therapy: Teaching and methodical aid to physicians and students. – Nizhny Novgorod 2000	The “ELM” Ltd., Nizhny Novgorod State Medical Academy

Totally, 495 patients at the age of 8-60 years with traumatic and postoperative damages of skin, soft and osteal tissues, including the ones that are complicated by purulent process and slowly healing, were examined and treated. All patients were receiving usual treatment. 259 humans, receiving EHF-influence together with usual therapy, were included in experimental group. 236 patients were included in the control group.

EHF-therapy causes 1.5-2 times acceleration of medical effect beginning in all phases of a wound process: an exudation phase duration is 10 days (14 days in a control group), a regeneration phase duration is 7 days (10 days in a control group). The dates of local inflammatory sign subsiding were decreased twice: 2.4±0.16 days after herniotomy (4.3±0.21 days in a control group, p<0.05), 2.3±0.15 days later the appendectomy (4.5±0.22 days in a control group, p<0.05). Body temperature in the first 4 days was 36.7±0.5°C (37.1±0.6°C in a control group, p<0.05). Suppuration in the basic group appeared in 1.3% of cases, in the control group – in 6.7%. The periods of disablement and staying at a hospital were reduced by 3-4 days.

All researchers have noted expressed anesthetic effect of EHF-therapy. Pain decrease in postoperative wound appeared in 3-12 hours after the first session, full disappearance of pains started in about 2 days. EHF-therapy use led to three times decrease in promedol dose for postoperative pain cupping. Wound pains have been present for 3-5 days in the control group patients.

EHF-therapy use for burns leads to more rapid granular tissue forming and epithelization signs appearance. It is important that regeneration process activation takes place along with patient’s general health state improvement. EHF-therapy use for vast burned surfaces permits to rapidly prepare them for the autodermoplasty and to improve skin graft implantation.

Posttraumatic osteomyelitis

Authors	Publication	Institution
Slyotov A.A.	The use of EHF-therapy for mandible posttraumatic osteomyelitis treatment: Author’s abstract of the master’s thesis. – Voronezh, 2006. – p. 22	Stavropol, City Clinical Hospital N4

Computer cytomorphometry and clinicolaboratory examination in 98 patients with mandible posttraumatic osteomyelitis was made. The age of patients was 18-69 years. Patients were receiving traditional treatment: opening of a purulent nidus, revision and adequate drainage of fat areas, secvestrectomy, detoxication, infusive therapy, daily treatments with antiseptic solutions. The EHF-therapy was additionally prescribed to the experimental subgroup patients.

When analyzing the received data of a computer morphometry, it was established that in all of the cases, leukocyte cytomorphologic characteristics have a tendency to normalization in patients

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receiving background EHF-therapy. Reduction of inflammation exudation phase periods and stimulation of reparative process earlier beginning were noted in a basic group, in which periods of staying at a hospital were reduced by 2,8 days, on average.

Posttraumatic contractures

Authors	Publication	Institution
Vovk S., Vovk M.	About low-intensity millimeter range EMR effectiveness in rehabilitation of patients with contractures after locomotorium traumas // Millimeter waves in biology and medicine: Coll. of reports of the 13 th symp. – M.: 2003. – P. 46-47.	Republic of Moldova, Yalovenky Regional Hospital

447 patients with contractures as a result of different traumas were examined and treated. They were divided into three groups:

1. 251 humans receiving the EHF-therapy only;
2. 134 humans receiving the EHF and electrophoresis with a potassium iodide 5% and a novocain solution 5%;
3. 62 humans receiving electrophoresis with a potassium iodide 5% and a novocain solution 5% in combination with ultrasound.

Practically similar clinical effect was achieved in 1st and 2nd groups. An anesthetic effect began in 239 humans (95.3%) and 127 humans (94.7%), respectively, out of which in 67.3% and 66.4%, respectively, after the 4-7 procedures. Microcirculation and trophic disturbances were normalized in 244 (97.2%) and 130 (97.0%) humans, respectively. Reduction of the movement normal volume in joints was observed in 180 (71.1%) and 95 (70.8%) patients, respectively. The electrophoresis did not improve EHF-effect in any way.

An anesthetic effect in the 3rd group of patients began in 30 humans (48.4%) only. Microcirculation and trophic disturbances were normalized in 48 (77.5%) humans. Movement normal volume reduction in joints was observed in 20 (32.2%) patients.

Acute Cholecystitis

Authors	Publication	Institution
Strusov V.V., Utkin D.V., Timofeev V.A.	EHF-therapy in abdominal surgery // 11 th Russian symposium with international participation “Millimeter waves in quantum medicine” – M.: IRE of RAS, 1997. – P. 53-54.	The N.S.Semashko Moscow Medical Stomatology Institute

136 patients with acute cholecystitis were examined and treated. All patients in preoperative period were receiving basic therapy. 74 patients were included in experimental group. They were additionally treated with EHF-therapy. 62 humans were included in a control group.

The ecrease of the gallbladder inflammatory alteration degree after 3 sessions of EHF-therapy was noted in 55% of patients. There has been no improvement in a control group for the same period of time (0%), 82% of patients did not have any improvement and a development of the gallbladder destructive alterations has seen in 18% of patients.

Acute pancreatitis

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Briskin B.S., Efanov O.I., Bukatko V.N.	Programs of MMW-therapy for acute pancreatitis treatment // Millimeter waves in biology and medicine: Coll. of reports of the 13 th symp. – M.: 2003. – P. 43-45.	Moscow, City Clinical Hospital N50, The N.S.Semashko Moscow Medical Stomatology Institute

338 patients with acute pancreatitis were examined and treated. 88 patients had edematous form, 147 patients had sterile pancreonecrosis, 103 patients had infected pancreonecrosis. All patients were receiving a standard medical complex. 209 patients were included into experimental group. They were additionally treated with EHF-therapy. 129 humans were included into a control group. Treatment period was reduced from 16+3.5 to 12+2.4 days ($p<0.05$) for acute pancreatitis edematous form in experimental group, compared to the control one. The period of staying at resuscitation was reduced from 7+2.3 to 4.2+1.2 days ($p<0.01$) for sterile pancreonecrosis, lethality decrease was from 13.9% to 5.6%, the hospitalization date decrease was from 24+2.1 to 18.6+2.7 days ($p<0.01$). Lethality of patients with infected pancreonecrosis was decreased from 22.8% to 11.3%, hospitalization duration was reduced from 42.3+4.2 to 28.5+3.2 days ($p<0.01$).

Ulcerous disease and chronic gastroduodenitis

Authors	Publication	Institution
Azov N.A.	The use of AMFIT device for gastroenterologic disease prophylaxis and therapy // Actual questions of clinical medicine and border guard health state conservation: Collocation. – Chita: Search, 2002, p. 290-292	Kislovodsk, Military Hospital of BGS of Russia, Nizhny Novgorod, Military Medical Institute of FBGS of the RF
Bukatko V.N.	Therapy of complicated gastroduodenal ulcers // Millimeter waves in biology and medicine. – 2002. – N3. – P. 41-54.	Moscow, City Clinical Hospital N50, The N.S.Semashko Moscow Medical Stomatology Institute
Ilinsky I.S.	EHF-therapy in combination with aeroiono- and balneotherapy in patients with ulcerous disease of the stomach and duodenum // 10 th Russian symposium with international participation “Millimeter waves in a quantum medicine” – M.: IRE of RAS, 1995. – P. 67-69.	Izhevsk, Scientific Research Center “Ikar”

Totally, 913 patients with ulcerous disease of stomach and duodenum were examined and treated. In 134 humans, it was complicated by hemorrhage, in 47 – by perforation, in 28 – by penetration. All patients were receiving standard antiulcerous therapy (antibacterial medicines, metronidasol, denol and dietotherapy). 505 patients, receiving EHF-effect together with a standard therapy, were included into experimental groups. 408 patients were included into the control groups.

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Ulcerous defect epithelization periods were assessed. An inclusion of EHF-therapy into a medical complex leads to epithelization date reduction by 2-4 days, on average (14-16 days versus 18-20 days in a control group).

The quantity of recurrences during a year after treatment has been assessed. The recurrences in the control group were observed in 72% of patients, with the use of EHF-therapy – 0-2%.

High effectiveness of EHF-therapy inclusion into a medical complex can be explained by its regulating and normalizing influence on the pro- and anticoagulant system balance and different links of immunity. The researchers noted the blood procoagulant activity decrease, the blood fibrinolytic activity normalization to 250.5+19.5min (in a control – 346.5+24.0, p=0.001), normalization of IgA, IgM levels in blood and phagocytosis values in 100% of patients.

A normalization of endoscopic picture was noted on the 8-10 day of treatment, beginning in patients with chronic gastroduodenitis, receiving EHF-therapy together with a standard one, which is more rapid than in the control group. No acute attack and worsening of health state in any patient were noted. The complaints of pains and gravity in epigastry were already cupping on the 2-3 day of the treatment, treatment duration at a hospital was decreased by 3 days.

Dysfunction of the bile-excreting tracts

Authors	Publication	Institution
Kokoladze I.R.	Clinical variants and increase of biliary system functional disturbance treatment effectiveness in children with the use of EHF-therapy: Author’s abstract of the master’s thesis – Saint-Petersburg. 2006. – p. 21	Saint-Petersburg, Polyclinic N77

112 children, complaining of characteral bile-excreting tract functional insufficiency sign complex, were under observation. The age of children was 5-12 years.

After examination, all children were recommended generally accepted traditional treatment: the dietetic and strengthening measures, the combined cholagogue medicines.

112 children were divided into 3 subgroups depending on the type of treatment for different scheme treatment comparative effectiveness assessment by simple randomization method: the 1st subgroup (32 children) was receiving traditional medicament treatment; the 2nd subgroup (71 children) was receiving medicament treatment and EHF-therapy; the 3^d subgroup (9 children) “placebo” was receiving medicament treatment and EHF-therapy imitation.

Medicament therapy of bile-excreting tract functional insufficiency appeared to be low-effective and did not remove pathologic alterations, revealing at USI (the signs of pachychoia and a bile crystallization were cupping only in 9.4% of children (p>0.05), character of the gallbladder contractions was not altered).

The comparative results of medicament and EHF-therapy in children with bile-excreting tract functional insufficiency have demonstrated that “spontaneous” pain removal was noted at any type of therapy, i.e. for medicament treatment (the 1st and 3^d subgroups) – in 96.9-77.8%, in complex treatment with drugs and EHF-therapy – in 100%. Dyspeptic syndrome elimination was also rather successful at any scheme of a complex therapy with traditional drugs and EHF-therapy. A disappearance of pain and dyspeptic syndromes with the use of EHF-therapy happened on the 2nd-4th day, while with the use of a medicament therapy – on the 5th-7th day.

Cupping of either “vesical” signs, characteristic of bile-excreting tract functional insufficiency, was noted with a high rate at all the therapy schemes, however its 100% elimination was registered in the 2nd subgroup (medicaments combined with EHF-influence).

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The comparison of therapy different scheme results has demonstrated that a statistically significant decrease of the pathologic alteration rate, revealed by ultrasound, was observed only in the 2nd subgroup (a medicament treatment in combination with the EHF-therapy), where the pathologic alterations, revealed by ultrasound, have disappeared in 50% of children. It is possible, that the bile-excreting tract central regulation disorders have greater significance in a pathogenesis of the sign development.

EHF-therapy was well endured by all children; no cases of complications or side effects were noted.

Chronic pancreatitis

Authors	Publication	Institution
Lyan N.V., Lyan V.N., Votoropin S.D.	Millimeter waves in chronic pancreatitis therapy // 12 th Russian symposium with international participation “Millimeter waves in quantum medicine” – M.: IRE of RAS, 2000. – P. 17-19.	Tomsk, Tomsk State University, Tomsk region, Seversk, Center of Oriental Medicine “Ayurveda”

EHF-therapy effectiveness for chronic pancreatitis was demonstrated on 84 patients. Full recovery and pancreas function reduction was received in 86%, stable remission during a year was received in 14%. Pain syndrome cupping, psychoemotional status normalization, intestine digestive, and absorptive ability stabilization were observed.

Obstetrics and Gynecology

Authors	Publication	Institution
Silantieva E.S.	Treatment of uterine appendage chronic inflammation (hemodynamic aspects of the EHF-therapy): Master’s thesis. – Moscow, 2000.	Scientific Center of Obstetrics, Gynecology and Perinatology of the RAMS
Parshina O.V.	Prophylactics of miscarriage during deficiency in lutein phase with the use of electromagnetic EHF field: Author f. dissert. c.m.s. – Barnaul, 1995. – 20 p.	Siberian State Medical University
Knyazeva V.O.	Condition of humoral immunity and lipid peroxidation in women after abortion in late phases in the precense of EHF-therapy. Author f. diss. c.m.s. – Novosibirsk, 2007. - 20 p.	City’s Clinical Hospital №11, Novosibirsk

Complex examination of 78 patients with uterine appendage chronic inflammation in a stable remission period, with reproductive function disturbance with regular rhythm of menstruation was made. The diagnosis in all of the patients was laparoscopically confirmed.

Physiotherapy started not earlier than a month after surgery, on the 5th-7th day of menstrual cycle, without combining with any medicinal medicine or physical factor.

All patients were divided in two groups by randomized selection method: basic group – 58 females, receiving EHF-therapy, and the compartment one – 16 humans, receiving placebo-influence.

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EHF-therapy was well endured by the patients. Patients’ general condition was satisfactory, inadequate reactions were absent, the concomitant extragenital disease and state intensification or aggravation signs were not revealed. The daily registering values of arterial pressure and heart rate were within the physiologic norms. Meteo-labile patients were not noting inadequate aggravation of a general condition during meteo-unfavorable days. All patients have received a full course of treatment in the planned mode and volume.

Pains in the lower areas of abdomen have been less intensive from the 3rd-4th day of treatment during EHF-therapy process already. Partial or full anesthesia of 85% of the patients was achieved in the end of treatment, psycho-vegetative state improvement is achieved in 76% of patients. An observation during 2 months after treatment has revealed stability of the achieved effect.

Progressing softening of adhesive structures, improvement of palpatory detecting state and an increase of the uterus excursion (at its initial limited mobility) have been noted in 50 (86%) patients on the 4th-5th day of treatment in the period of receiving EHF-therapy for bimanual research and pain decrease at pelvis wall palpation – in all females. However, a transition to mobile stage was noted at the end of treatment only in 6 (31%) out of 19 patients (33%), having fixed and subfixed retrodeviation of uterus, a degree of adhesion softening was insignificant, especially in patients with expressed alterations.

According to the colposcopy data, positive dynamics up to the end of epidermization was noted at EHF-therapy in 15 (83%) of 18 (31%) females, having the initial ectopia of the uterus neck epithelium. A colposcopic picture was not altered in patients from the “placebo” group.

Researchers have the information of pregnancy beginning in 15 females, receiving EHF-therapy (28%), and in 1 patient from the “placebo” group (6%).

80 women aged from 26-30 with primary miscarriage, caused by deficiency of lutein phase, were observed. They were divided in two groups. 60 women of basic group were receiving EHF-prophylactics. 20 women composed the group of placebo-control. Pregnancy was planned in months after the end of treatment course.

Under the influence of EHF-therapy, patients’ psychoemotional status has changed: sleep and mood normalized, irritability disappeared, efficiency improved. The length of lutein phase increased from $7,3 \pm 0,6$ to $9,8 \pm 0,9$ in the first and $12,4 \pm 1$ ($p < 0,05$) in the second menstrual cycle after the treatment. Estradiol level has increased from 420 ± 77 pmole/l to 600 ± 54 pmole/l and progesterone from $5,85 \pm 2,15$ pmole/l to $16,35 \pm 3,7$ pmole/l ($p < 0,05$). In the control group, statistically significant numbers were not observed.

Dynamic observation after women during pregnancy showed that the use of EHF-prophylactics eliminates the necessity of hormonotherapy.

Effectiveness of EHF-prophylactics to the amount of delivery at term totaled at 98%. One patient had preterm delivery of alive fetus weighting 2400 g in the term of 34 weeks. Congenital malformation and deviations in neuro-mental development in children were not observed.

In the group of placebo-control, as a result of complex influence and spasmolytics, it was possible to keep pregnancy until the term only in 85% of women.

88 women were observed after induced abortion in the term from 21 to 26 weeks. In after-abortion period, all women were receiving standard therapy, and patients in the basic group (55 people) were additionally getting EHF-therapy. The observations showed immune-modulating effect from EHF-therapy (statistically significant decrease in circulating immune complexes), decrease in activity of peroxide oxidation, and increase of activity of antioxidant system, which was not observed in the control group.

In the conditions of EHF-therapy there was no activation of infectious-inflammatory processes in chronic nidus of inflammation, pain in the lower stomach area, discharge from uterus and signs of intoxication disappeared 2 days earlier.

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Skin diseases

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Kurnickov G.Yu., Kornaukhov A.V., Nickulin N.K., Klemyonova I.A., Zharickov V.I., Lizunova A.A.	EHF-therapy in skin disease treatment // Millimeter waves in biology and medicine. – 1999. – N1. – P. 38-39.	Nizhny Novgorod Scientific Research Dermatovenerologic Institute
Drovgannickova L.P., Orlov E.V., Kiselyova O.V.	Effectiveness of methotrexate and EHF-therapy in a complex treatment of patients with psoriasis // Millimeter waves in biology and medicine: Coll. of rep. of the 13 th symp. – M.: 2003. – P. 33-36.	
Adaskevich V.P.	Use of millimeter range electromagnetic radiation in a complex therapy of patients with atopic dermatitis // 10 th Russian symposium with international participation “Millimeter waves in a quantum medicine” – M.: IRE of RAS, 1995. – P. 53-54.	Belarus, Vitebsk, Vitebsky Medical Institute
Labzovskaya N.P.	Complex treatment of patients with vitiligo with the use of background-, endoionfores of copper and EHF-waves: Author’s abstract of the master’s thesis – Tomsk, 2003. – 23 p.	Siberian Medical University
Voronina T.N.	Herpetic infection: clinic-pathogenetic grounds for the use of EHF-therapy: Author’s abstract of the master’s thesis – Saratov, 2003. – 23 p.	Saratov State Medical University
Shishenacheva E.E.	Improvement of treatment methods of sulfur-resistant syphilis by the use of varied immuno-corrective therapy, through skin laser blood radiation, and EHF-therapy: Author’s abstract of the master’s thesis – Novosibirsk, 2006. – 19 p.	Khakassky Republican Dermatovenerologic Clinic

Totally, 336 patients at the age of 14-72 years with psoriasis were examined and treated (extended psoriasis – in 76 humans, psoriatic arthritis – in 58 humans). All patients were receiving basic therapy. 180 patients, receiving EHF-effect together with a basic therapy, were included into experimental groups. 176 patients were included into the control groups.

All researchers were noting anti-inflammatory, analgesic, regenerative effect, resorption of infiltrates with EHF-therapy inclusion into medical complex. An expressed clinical effect was noted in 78% of the experimental group patients and in 61% of the control group patients.

An average duration of staying in hospital of patients, receiving EHF-therapy, was 27.3 days, which is 20.3% shorter, than in the group of patients, receiving traditional medicament therapy. Early recurrence decrease (during the first 6 months after treatment) by 23.3% (10% - among the patients, receiving EHF-therapy, 33.3% - in the control groups) has been noted in experimental groups.

The trophic ulcers are difficult problem for treatment. 10 patients were under observation. Medical dermatitis after treatment with antiseptics, ointments, enzymatic medicines was observed in

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patients. Dermatitis has been cured during 3-4 days from the outset of treatment; pain syndrome was cupped after the first 2-3 sessions; the ulcers, with a depth of no more, than 1mm and the area of 2-10cm² have been covered with epithelium for 12 days, on average.

EHF-therapy for atopic dermatitis has demonstrated general health state improvement, pruritus cessation, expressed effect on a humoral immunity, the neuroendocrine system correction, the antiallergic effect. The experimental group of patients (112 humans) was noting painlessness of the procedure. Treatment effectiveness without EHF-therapy was insufficient in control group (32 patients).

There is data on EHF-therapy effectiveness for microbial eczema, acne, and neurodermite in the mode of high frequency waves (5.6 mm). Clear anti-inflammatory effect has been seen.

135 patients with vitiligo were examined and treated. All of them were receiving basis therapy (vitamins, hepato-protectors). Patients were divided into three groups: 1 – were additionally getting copper electrophoresis (35 persons), 2 – were receiving EHF-therapy in the mode of fixed frequencies (7,1 mm) (67 persons), 3 – were getting only basis therapy (control – 33 persons).

After EHF-therapy, in 38% of the cases, the researchers noted recovery of gut organisms, the number of T-lymphocytes increased from 33,3±0,2% to 43,3±3,2% (p<0,05), which was not seen in other groups. The beginning of pigment recovery began in 2,9±0 months in the 1st group, in 2,3±0,3 months in the second group, in 3,4±0,3 months in the 3rd group. In the group of patients receiving EHF-therapy, in 45% of the patients pigment recovery started already in the process of treatment or right after it; during the examination of these patients in a year, full pigment recovery was achieved in 10% of the patients.

104 patients with herpetic infection were examined, 51 patients were diagnosed with Herpes simplex with face localization or in the area of genitals, and 53 patients were diagnosed with Herpes zoster. All patients were getting traditional therapy. Patients of the experimental group (74 persons) were additionally getting EHF-therapy in the mode of the fixed frequencies (7,1 mm). Analgesic and anti-inflammatory effects of EHF-therapy were revealed. In the experimental group, vanishing of itching and burning was happening 2 days earlier, on average (p<0,001), epithelization of erosions was happening 4 days earlier (p<0,001), and seizure of scabs happened 7 days earlier (p<0,001) than in the control group. After EHF-therapy, post-herpetic neuritis was observed on 35% less than usual.

All researchers were noting the absence of EHF-therapy’s unfavorable influences and complications, its good endurability by the patients. The patients have been noting the insignificant painful sensations in a form of “pricking”, “tingling” and “pressure” during the trophic ulcer area radiation.

90 patients aged from 19 to 50 were examined. All of them, after sypphilis treatment had complex of serologic reactions that did go negative during a year or more after this treatment. Patients were divided in three groups: 1st group had 30 persons that were additionally getting immune-corrector likopid, 2nd group had 30 persons that were additionally getting EHF-therapy, 3rd group had 30 persons that were receiving only traditional therapy (disintoxication and antibacterial).

Researches showed that EHF-therapy has immune-corrective action, anti-depressive effect, and it quickens negativation of the complex of serologic reactions. Periods after which negativation took place were: 11,3±1,6 months in the 1st group, 5,8±0,8 months in the second group, 18,6±1,6 months in the 3rd group. The number of patients without the decrease in positivity in 1st and 2nd groups was 2 persons, in the 3rd group this number was 7 persons.

Infectious and parasitic diseases

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Lepyokhin A.V., Levitsky E.F., Kozhemyakin A.M. Frolov A.G., Lukashova L.V., Buzhak N.S., Dobkina M.N.	Treatment of ixodic vernal borreliosis and vernal encephalitis with background resonance radiation (BRR) method: Method. recommend. – Tomsk, 2001. – p. 9	Siberian State Medical University, Tomsk SRI of Health resorts and Physiotherapy of the RF Ministry of Health
Danilov E.A., Kozhemyakin A.M. Yamkovo S.D.	Effectiveness of surgical treatment of patients with lung tuberculosis destructive forms in combination with chlamydic and mycoplasmatic infections	Moscow, Central SRI of Tuberculosis of RAMS, Moscow
Khomenko A.G., Novikova L.N., Kaminskaya G.O., Efimova L.P., Golant M.B., Balakireva L.Z., Gedimin L.E.	Estimation of functional status of blood phagocytes when choosing optimal EHF-therapy mode in patients with lung tuberculosis// 10-th Russian Symposium with international participation “Millimeter waves in quantum medicine” – M.: IRE of RAS. 1995. – P. 13-15.	Central SRI of Tuberculosis of RAMS, Moscow
Shuldyakov A.P., Zaitseva I.A., Trubetskov A.D., Bogdanovich Yu.V.	Electromagnetic radiation of millimeter range in treatment of children with acute viral hepatitis // 10 th Russian symposium with international participation “Millimeter waves in a quantum medicine” – M.: IRE of RAS. 1995. – P. 21-22.	

Totally, 231 patients at the age of 30-61 years with chronic infectious diseases were examined and treated. Vernal encephalitis was observed in 30 humans, chronic opisthorchiasis, BT dyskinesia with hypomotility prevailing, chronic cholecystitis (cholangiocholecystitis) was seen in 106 humans, and lung tuberculosis (critical forms) in combination with chlamydic and mycoplasmatic infections were observed in 95 humans. All patients were receiving a complex reduction treatment. 135 patients, receiving EHF-influence together with basic therapy, were included into experimental groups. 86 patients were included into control groups.

95 patients had been examined and treated in the period of 1998-2003 years in a surgical department of the Central Scientific Research Institute (SRI) of Tuberculosis of the Russian Academy of Medical Sciences (RAMS) for assessment of EHF-therapy influence on a character of tuberculosis process flow, complicated with chlamydic and mycoplasmatic infections (ChMI). Tuberculoma in a decomposition phase was seen in 10 patients, infiltrative lung tuberculosis in a decomposition phase was seen in 10, fibrocavernous tuberculosis of one lobe of the lung was seen in 5, fibrocavernous tuberculosis of more than one lobe of the lung was seen in 40, caseous pneumonia was seen in 10, tuberculous empyema, and complicated with a bronchial fistula was seen in 20. ChMI were discovered in the respiratory and urogenital tracts.

Treatment of the concomitant ChMI with EHF use was done on 55 patients out of 95 infected ones. Positive dynamics and stabilization in a pulmonary tuberculosis flow were achieved in 89.1% of cases and only in 47.5% of cases in the untreated patients. Postoperative complication rate in the treated group was 25.7% and 65.7% in the untreated group.

In patients with tuberculosis without concomitant ChMI that were under influence of EHF-therapy (86 persons) doctors has seen quickening of resolving of infiltrates in 89% of the cases,

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abacillaring and closing of cavity disintegration in 59% of the cases, 1 month earlier, on average, than in the control group (50 patients). Besides, under influence of EHF-therapy, in 100% of the patients neurotoxic and pyrogen reactions on administration of the medicines were eliminated.

Two groups of patients at the age of 30-61 years were examined and treated for assessment of EHF-therapy effectiveness for vernal borreliosis and vernal encephalitis. 15 patients were included in the first group; mixed infection was observed in 10 of them and the vernal encephalitis (VE) was observed in 5 (with chronic recurring antigenemia of VE virus during 2-8 years after the mite sucking). Rehabilitation measures with EHF use were undertaken in that group. Background resonance radiation (BRR) mode was used: with record of the BAP (biologically active points) spectral characteristics and the information and wave fluctuations of the “Heel” firm complex medicines.

15 humans in the second (control) group were treated without EHF use, but with the use of pharmacologic medicine traditional schemes.

Fever in a process of treatment in the first (experimental) group has been seen for 1-3 days, sweating was observed for 1-3 days, weakness was observed for 10 days, headache was observed for 1-3 days, erethism was observed for 2-4 days, photophobia was observed for 2-4 days, insomnia was observed for 4-5 days, and arthralgias were observed for 30 days. Subjective general condition improvement in a form of a motor activity increase, headache and arthralgia intensity decrease, and sleep normalization was seen in 12 humans after 1-3 procedures of reduction treatment. A PCR to VE virus (with the initial positive results) was repeatedly done at a discharge from a hospital to all the patients with VE, the data was negative; the antibody titers to antigen of VE virus and borrelia were increased.

Fever in a process of treatment in a control group has been seen for 3-5 days, sweating was observed for 24 days, weakness was observed for 30 days, headache was observed for 15 days, erethism was observed for 10 days, photophobia was observed for 6-8 days, insomnia was observed for 10 days, arthralgias was observed for 30 days. Basic signs were observed longer, than in experimental group (the difference is starts from 2 days for fever to 20 days for sweating and weakness). The lack of difference according to that value is noted for arthralgias only.

All reconvalescents were examined in 1 month, 3 months, 6 and 9 months after treatment. In the both groups of patients, at the therapy result comparison, it was established that stable positive dynamics was already observed on the early days of the therapy outset in experimental group. Only arthralgias were observed in the experimental groups of patients in a month, the arthralgias, insomnia and erethism were observed in the control group.

There have been no complaints in the experimental group of patients at observation for 9 months after treatment, i.e. EHF-therapy effect was stable. Patients in a control group were complaining of arthralgias, insomnia, erethism, headache, weakness, and sweating.

155 children with acute viral hepatitis were examined and treated. All patients were receiving standard therapy. EHF-influence was added to it in the experimental group of patients (103 humans). Stable effect of EHF-therapy in acute period of the disease, decrease of the number of patients with intermittent and delayed flow of disease, compared to the control group, were noted.

Prophylaxis of the acute respiratory viral infections

Authors	Publication	Institution
Balchugov V.A., Efimov E.I., Kornaukhov A.V., Anisimov S.I.	EHF-prophylaxis of infectious diseases in organized groups // Millimeter waves in biology and medicine. – 1999. – N1. – P. 34-37.	Nizhny Novgorod, Military Medical Institute of RF FBGS
Balchugov V.A.	Method of ARD nonspecific prophylaxis in	Nizhny Novgorod,

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	organized groups: Author’s abstract of the master’s thesis. – Nizhny Novgorod, 2000. – p. 24	Military Medical Institute of RF FBGS
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418 military men, serving on the call basis or a contract, at the age of 18-27 years were under observation. They were divided into experimental and control groups by randomization method. The EHF-prophylaxis of acute respiratory viral infection (ARVI) was done in experimental group (210 humans). EHF-effect was not done in a control group (208 humans).

During EHF ARVI-prophylaxis in epidemic season of 1997-98 years, the ARVI morbidity among the “fresh blood” had been registered in 17.3% (39.4% - in a control group), 32.2% amongst those, who has signed a contract (54.2% - in a control group). Statistically significant 2 times decrease of morbidity was observed after EHF-prophylaxis ($p=0.001$). ARVI in the experimental group had a lighter form, disease duration was decreased by 1-2 days; ARVI complications were not registered. Complications in a form of pneumonia were registered in 4.5% of patients from the control group.

Cardiovascular diseases

Authors	Publication	Institution
Afanasieva T.N., Petrova V.D.	Electromagnetic radiation of millimeter range as a way of the hypertensive crisis cupping // 10 th Russian symposium with international participation “Millimeter waves in quantum medicine” – M.: IRE of RAS, 1995. – P. 38-40.	Saratov, Saratovsk State Medical University
Parshina S.S., Golovachyova T.V. Subbotina N.V., Kirichuk V.F., Lopatina N.A., Afanasieva T.N.	Reactivity of vascular wall endothelium and rheologic properties of blood in patients with instable stenocardia at MMD EMR treatment // Millimeter waves in biology and medicine: Coll. of rep. of the 13 th symp. – M.: 2003. – P. 47-50.	Saratovsky SMU
Shaifyuk O.Yu., Gordeev I.G., Lebedeva A.Yu.	EHF-therapy in treatment of stenocardia of tension with painless myocardial ischemia events // Millimeter waves in biology and medicine. – 2002. – N1. – P. 24-39.	Moscow, Russian State Medical University, City Clinical Hospital N15
Myasin E.A., Kotov V.D., Soboleva L.N.	Use of millimeter range band-narrow sound radiation for hypertensive disease treatment // 10 th symposium “Millimeter waves in quantum medicine” – M.: IRE of RAS, 1995. – P. 40-42.	Moscow region, Fryazino, Polyclinic N1 of the RAS
Troitsky V.V.	Influence of millimeter range electromagnetic radiation on acute myocardial infarction flow // 10 th symposium “Millimeter waves in quantum medicine” – M.: IRE of RAS, 1995. – P. 36-38.	Moscow, Academy of Postgraduate Education of Physicians, Chair of therapy

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Schelkunova I.G., Matrenina I.V., Lebedeva A.U.	MM-therapy of non-coronogetic myocardium lesion // Millimeter waves in biology and medicine. – 2003. – N1. – P. 51-58.	Russian State Medical University, City Clinical Hospital №15, Moscow
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Totally, 616 patients at the age of 41-69 years with ischemic heart disease (IHD) were examined and treated. Stable stenocardia of tension of functional class (FC) III-IV, chronic circulation insufficiency of I-IIA stages, rhythm disturbances in a form of 1-4a gradation ventricular arrhythmias according to B.Lown, M.Wolf, and supraventricular extrasystole with the concomitant diseases (hypertensive disease of I-II stages, chronic bronchitis, osteochondrosis of vertebral column different departments) were found in 141 humans. Instable stenocardia of IIA and IIB classes, according to Braunwald, was found in 154 humans, and acute myocardial infarction was found in 321 humans. All patients were receiving basic medicament therapy (prolonged effect nitrates, calcium antagonists, β -blockers, antiarrhythmic medicines). 358 patients, receiving EHF-therapy together with basic therapy, were included into experimental groups. 358 patients were included in the control groups.

EHF-therapy in acute period in patients with myocardial infarction has been leading to pain syndrome decrease during the treatment course in 58% of the patients (in 19% - in a control group). Good clinical effect was noted in 48% of the patients (in 12% - in a control group), satisfactory effect – in 28% of the patients (in 13% - in a control group), unsatisfactory effect – in 24% of the patients (in 75% - in a control group). Antianginal effect in experimental group was reached in 76% of treated patients and the effect has been present at observation after a month. During that period of time, antianginal effect has been present in 11% of patients in a control group.

As a result of EHF-therapy inclusion into medical complex, statistically significant decrease of painless myocardial ischemia events by 48.3%, $p=0.001$, as well as general duration of painless myocardial ischemia by 41.4%, $p=0.001$, is recorded. No statistically significant alterations were recorded according to these values prior and after the treatment.

According to echocardiography data, the value normalization was in 73.3% of people with the left ventricle disturbed diastolic function in experimental group, in a control group – in 30% only.

EHF-therapy use in the BRR mode with an individual selection of frequencies in patients with stenocardia of tension has led to stenocardia fit average number decrease by 31.5% per day and the nitroglycerin intake average number decrease by 43.6% per day, compared to the initial state, the pain myocardial ischemia event average number decrease by 27.2% and the painless one – by 21.2%, the pain myocardial ischemia general duration decrease by 34.0% and the painless one – by 21.4%, the ventricular extrasystole average number decrease by 30.7% a day, the supraventricular ones – by 26% relating to the initial data. There was no necessity for nitroglycerin intake in 80% of the patients of II FC and 17.6% of III FC. However low effectiveness of EHF-therapy in 75% of patients with painless myocardial ischemia, with total duration of more than 60min daily, with the ST segment shift maximum amplitude of more than 3mm, was observed.

The number of stenocardia attacks and nitroglycerin intake in the control group was decreased by 14.2% and 20.1%, respectively (2 times worse than in experimental group), number of the pain and painless myocardial ischemia events was decreased by 18.4% and 16.2%, respectively. The ventricular extrasystole average number decrease was 23.2% a day, the supraventricular ones – 17.1% relating to the initial data (by 5-10% worse than in experimental group).

Good clinical effect from EHF-therapy was noted at II FC in 73% of patients, at III FC – in 41% of patients (in the control – 15% and 0%, respectively), satisfactory effect – in 20 and 35% of patients, respectively (in the control – 31% and 19%, respectively), unsatisfactory effect – in 7 and 24%, respectively (in the control – 54% and 81%, respectively).

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High effectiveness of EHF-therapy at IHD can be explained by the fact of positive influence on anticoagulant blood protection system (normalization of antithrombin III activity level from 70.7+2.8% to 80.2+2.7% (p=0.016), in the control group – without alterations) and normalization of erythrocyte deformability (from 1.96+0.02 to 1.2+0.06, p=0.02, in the control group – without alterations) were observed in the experimental group of patients, tissue oxygenation was increasing as well. There is also data available on cholesterol level 1.6 times decrease.

200 patients with hypertensive disease of different degree of gravity, receiving standard therapy, were examined and treated. EHF-effect was added to basic therapy in the basic group of patients (135 humans).

Patients from the basic group were noting significant improvement of their general condition – in 63% of the cases, headache and noise disappearance – in 27% of the cases, all the patients were noting the decrease of erythrim, sleep improvement, hypotensive medicine dosage decrease. The research with reencephalography use has demonstrated statistically significant improvement of arterial cerebral circulation values to its asymmetry decrease in 67% of patients, improvement of a blood flow along the brain arterial vessels, blood flow redistribution into the most ischemized part of the brain area, the decrease or disappearance of venous congestion signs in 60% of the patients. Catecholamine excretion level alteration to normalization was also observed.

AP decrease to the working range with EHF-therapy 40-60 minute session in the acute period of hypertensive crisis was observed in 98% of the patients with the 1st type hypertensive crises and in 68% of the patients – of the 2nd type. According to the reography data, peripheral vessel resistance decrease from 55 to 44 conventional units (the 1st type of a crisis) and from 78 to 66 conventional units (the 2nd type of a crisis) was noted.

Ander supervision of Schelkinova and co-auth., patients with noncoronary pathology were examined: 55 persons with initial prolapse of mitral valve (average age of the patients was 25), 45 persons with hypertrophic cardiomyopathy (average age of the patients was 35), 42 persons were getting radiotherapy on the area of mediastinum because of the tumors (radiation myocarditis), 26 persons were treated with cardiotoxic medications (toxic myocarditis). All of them had blood circulation insufficiency of different classes according to NYHA classification. In a random order all patients were divided in two groups. The groups of patients receiving EHF-therapy included 20 patients with initial prolapse of mitral valve, 10 had hypertrophic cardiomyopathy, 14 had actino myocarditis, and 15 patients had toxic myocarditis. In this group, statistically significant decrease of cardialgy episodes in 24 hours (from 3-9 before treatment and up to 1-8 after treatment, p=0,018), improvement of psychological status and self-appraisal quality of life, normalization of hemostasis system indicators were observed. However, anti-arrhythmic action in these patients was not detected. Among patients that were not receiving EHF-therapy, statistically significant dynamics of the above mentioned indicators was not observed, while in connection with hemostasis system disturbances, prescription of anti-coagulants and disagregants was required.

Bronchopulmonary diseases

Authors	Publication	Institution
Menkov N.V., Bryzgalova O.N., Maltseva G.R., Makarova E.V., Lyubaavina N.A., Gulyaeva A.V., Smirnova N.S.	EHF-therapy treatment effectiveness of community-acquired pneumonia patients // Gerald of the Lobachevsky Nizhny Novgorod university. Series Biology. Issue 1(6). Electromagnetic fields and radiation in biology and medicine. N. Novgorod: Publ. house of NNSU, 2003. P. 167-175.	N. Novgorod, MTPI “City clinical hospital N10”

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Denisova E.V., Anisimov S.I.	EHF-therapy use in treatment and prophylaxis of bronchial asthma // Millimeter waves in biology and medicine, N2(18), 2000, P. 26-30.	Nizhny Novgorod Regional Infantile Clinical Hospital
Mintser O.P. Dzyublick A.Ya., Kuzmenko V.M.	The use of electromagnetic radiation of extreme high frequencies for treatment of patients with chronic nonobstructive bronchitis // Millimeter waves in medicine. Collocation of articles. Edited by acad. N.D.Devyatkov and prof. O.V.Betsky. Vol. 1. – Moscow, 1991. – P. 135-150.	
Borisova S.B.	Treatment of patients with respiratory apparatus sarcoidosis by means of influence of electromagnetic waves of millimeter diapason with noise emission: Author f.diss...c.m.s. – N.Novgorod, 2005. – p. 25.	
Yakushina G.N.	Systematic effects of EHF-influence when treating patients with broncho-obstructive syndrome: Author f.diss...c.m.s. - Tula, 2001. – p. 28.	Medical and sanitary unit №7, Tula, SRI of New Medical Technologies, Tula.

180 patients with community-acquired pneumonia were examined. Two groups of patients were separated considering their clinical peculiarities:

The 1st group (151 patients) had light critical (27 patients) and average critical (124 patients) uncomplicated course of extrahospital pneumonia.

The 2nd group (29 patients) had critical course of community-acquired pneumonia. Clinical course of 7 patients was complicated with parapneumonic pleuritis; in 3 patients it was complicated with pulmonary tissue destruction.

All patients were treated according to accepted standards, including antibacterial, detoxication therapy, mucolytics, broncholytic medicines according to indications, and oxygen therapy. Two subgroups, identical by age and clinical characteristics of the included patients, were singled out in each of the pointed groups. A complex treatment with EHF-therapy use was done in experimental subgroup, patients from the control subgroup were receiving full treatment, excluding only EHF-therapy.

EHF-therapy in 16 out of 151 patients was used in the 1st group of patients with light and average critical course. Clinical and roentgenologic signs disappearance was noted in the experimental subgroup of patients, receiving EHF-therapy treatment, on the 11.3±0.7 day of treatment, on average (in the control group – on the 15.6±0.8 day, p<0.05), normalization of blood leukocyte number and S.R. (sedimentation rate) was noted on the 14.2±0.6 day of treatment (in the control group – on the 16.7±0.9 day, p<0.05). Pneumonia has been cured during 22 days in 15 patients of that group, a delayed course of pneumonia was observed in one patient only. The residual alterations were found in 5 patients (31%) at a discharge from hospital. The average period of treatment at a hospital was 18.4 days.

Delayed course of the disease was seen in 30 cases (22%) of 135 patients of a control subgroup, not receiving the EHF-therapy in a complex of medical measures. The residual alterations were preserved in 66 patients (49.6%) at a discharge from a hospital. The average period of hospitalization was 19.8 days.

4 out of 29 patients were receiving EHF-therapy in a group of patients with critical course of pneumonia. In all patients of that subgroup the pneumonia was resolved on the 27th day of treatment.

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The residual alterations were preserving in 2 patients (50%) at a discharge. Average dates of hospital treatment were 23.5 days.

General condition improvement and pulmonary tissue infiltration resorption were beginning in the more durative dates in 25 patients of a control subgroup, not receiving EHF-therapy. 19 patients (70.2%) were discharged with residual alterations, S.R. increase was preserved in 12 patients (44%) and roentgenologic alterations – in 16 patients (59%). These patients needed longer hospital treatment (the average period of hospitalization was 26.7 days).

Thus, EHF-therapy inclusion in the medical measure complex increases treatment effectiveness of patients with community-acquired pneumonia in the form of its duration reduction and prevents delayed course of the disease even in the group of patients with critical course.

In 1999, 84 children in the age of 3-15 years with “bronchial asthma” (atopic) diagnosis were receiving treatment with EHF-therapy method. Periods of the disease phases were different – from an acute attack phase to a remission phase, a severity of the disease was varying from critical to episodic. EHF-therapy course was combined with medicament therapy, massage, ET, inhalation, and halotherapy. Control group patients were not receiving EHF-effect.

Positive clinical effect was noted in all patients after EHF-therapy. It helped general condition improvement, cough decrease, decrease of necessity of the inhalation broncholytics, dyspnea decrease, and improvement of bronchial secretion passage. The auscultative picture was significantly improved, the number of rales was decreased; external respiration function values were improved and normalized.

EHF-therapy provided immunomodulating effect, which was manifested in nonspecific general reactions of the organism and statistically significant alteration of leukocyte subpopulation. An increase of T-suppressor number by 30% is the treatment effectiveness criterion. These cells cause the immune response suppression and hence, inflammation at the immunotissue damage. Treatment result was the decrease of immunoregulating index of T-helpers/T-suppressors (from 5.7 to 3.1, $p < 0.05$). An increase of the Th/Ts ratio due to Ts is typical for diseases, in a pathogenesis of which autoimmune mechanism takes place. An increase of the Th/Ts ratio at BA is usually manifested in a peak of disease (acute attack) in the process of great activity. Thus, the Th/Ts ratio decrease, after EHF-therapy course, testifies activity decrease of the immune mechanisms that are capable of tissue damage reaction development, i.e. a positive treatment result. EHF-therapy method can help to reduce medical therapy to minimum and to omit it in the repeated courses.

After EHF-therapy for chronic obstructive bronchitis (138 patients, 50 of them were additionally getting EHF-therapy) general health state of the patients was improved, bronchoobstructive syndrome was cupping, and indicators of external respiration were improving as well. After the treatment, the number of patients with severe stage of bronchus obstruction decreased by 37%, the number with bronchus obstruction of medium stage decreased by 16%. The decrease or disappearance of rales in lungs was noted at auscultation.

EHF-therapy effectiveness is also noted for chronic nonobstructive bronchitis.

187 patients with sarcoidosis of thoracic glands and lungs from 15 to 70 years old were examined and treated. All patients were receiving sub clinic doses of prednisolone. Patients of the test group (60 people) were additionally getting EHF-therapy. EHF-therapy allowed doctors to achieve better results in all stages of sarcoidosis by 20%, according to the data from roentgenologic study. In the test group, after the course of EHF-therapy, erythrocyte sedimentation rate lowered from $17 \pm 1,3$ mm/h to $13,6 \pm 1$ mm/h ($p = 0,034$), the content of lymphocytes in blood increased from 30% to 35% ($p < 0,001$), indicators of immunogramme and external respiration functions improved. In the control group, statistically significant changes in these indicators were not observed. After EHF-therapy, the frequency of exacerbations was 2,3 times lower than with use of hormone therapy.

Diseases of teeth and mouth cavity

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Authors	Publication	Institution
Kosova M.M.,	The use of EHF electromagnetic fields for prophylaxis for complication after prosthetics with removable dentures in humans with partial adentia: Author’s abstract of the master’s thesis. – Moscow, 2006. – p. 26	Institute of Qualification Improvement of Federal Medicobiological Agency
Efanov O.I., Volkov A.G.	Influence of EHF-therapy on clinical course of parodontitis // 11 th Russian symposium with international participation “Millimeter waves in quantum medicine” – M.: IRE of RAS, 1997. – P. 43-44.	N.S.Semashko Moscow Medical Stomatology Institute

Examinations and observations of 96 humans at the age of 39-74 years (the average age was 58.1±2.3 years) with extensive defects of dental row (a lack of 7 and more teeth) were made. Dental row defects were substituted by removable denture different constructions after the measures on a mouth cavity sanitation, according to the diagnosis and treatment plan.

All humans, included in the research, were divided in 3 groups, comparable according to the basic clinicofunctional characteristics:

The 1st group (basic) – 66 patients have been undergoing EHF electromagnetic field influence 7-8 days prior to removable denture application, and from the second day after a prosthetics termination.

The second group (control) – 30 patients have been receiving “placebo” procedures 7-8 days prior to denture application to the adentia area (the future prosthetic bed) and from the second day after prosthetics termination.

Local inflammation signs in the basic group were 1.6 times less observed and less manifested than in the control group. Pain sensations when chewing occurred only in 20% of the cases were less expressed and did not lead to forced temporary refusal from using dentures after the full course of EHF-therapy. Burning sensation of a mucous membrane under the denture, pain on a tip of the tongue and speech defects disappeared in 100% of the patients. Hyperemia, hypersalivation, and mucous membrane traumas were preserved only in 10% of the patients.

All control group patients were feeling pain when chewing, besides, pain has been present during the day in 60% of them, despite performing stomatologooorthopedist recommendations (herb gargle and etc.). This has been forcing the patients not to wear dentures for 1-2 hours and more. Burning sensation in prosthetic bed area was present in 85% of the patients. Speech defect, connected with getting used to a denture, was noted in 76% of the patients. Hyperemia and myxedema were noted in 90% of the cases, and traumatic damages of a mucous membrane were seen in 46% of cases. Pain and reddening of a tip of a tongue area were noted in 30% of the cases. Hypersalivation took one of the central places in clinical picture (90%). Clinical symptomatics expression was decreased in 41.9% of the cases only in the end of the treatment course, however, no substantial improvement of a general condition in that period was noted in majority of patients. General condition aggravation due to the damage of mucous membrane intensification and obvious decubital phenomenon development was noted in 20% of the cases.

EHF-therapy use in a complex treatment of parodontitis has lead to inflammation signs cupping, local circulation normalization in parodontium, remission period shortening, and rheoparodontography value process stabilization in the experimental group of patients (75 humans), compared to the control group (34 humans).

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Malignant tumors

Authors	Publication	Institution
Teppone M.V., Avakyan R.S.	EHF-therapy in oncology // Millimeter waves in biology and medicine. – 2003, N1. p. 3-19.	PAPH Moscow Regional Oncology dispensary
Kabisov R.K.	Millimeter waves in oncology: reality, problems, perspectives. – Millimeter waves in biology and medicine, 1992, N1. – p. 55-61.	The P.A.Hertsen Moscow SR Oncology Institute
Beletskaya O.M., Makarenko B.I., Lysenko N.A., Beznosenko B.L.	Results of electromagnetic SHF-radiation use for oncologic patient treatment // Foreign radioelectronics. – 1996. – N12. – P. 25-28.	
Pletnyov S.D., Devyatkov N.D.	EHF-radiation use for skin melanoma for the recurrence and metastasis prophylaxis // Millimeter waves in biology and medicine. – 2001. – N1-2. – P. 44-45.	
Grubnick B.P., Sitko S.P., Shalimov A.A.	Experience of Sitko MRT technology use for oncologic patient of III-IV stage rehabilitation J Physics Alive 1998; 6: 97-102.	
Kareva N.P., Loseva M.I., Efremov A.V., Pospelova T.I., Cirendorzhev D.D., Kim L.B.	Influence of millimeter waves on antioxidant status and cytokine level in patients with lymphomas //14 Russian symposium with international participation “Millimeter waves in medicine and biology” – M.: 2007. – p. 16-20.	Novosibirsk State Medical University

Totally, 489 patients at the age of 21-79 years with malignant tumors of different localization (100 humans with large intestine and rectum cancer, 139 humans with skin melanoma, 28 humans with stomach cancer, 110 humans with mammary gland tumors, 50 humans with mouth cavity and ENT-organ tumors, 20 humans with lung cancer and mediastinum tumors, 20 humans with esophagus cancer, 22 humans ovary, body and cervix of the uterus cancer) were examined and treated. All patients were receiving traditional treatment (surgery, polychemotherapy, symptomatic treatment). 170 humans, receiving EHF-influence together with usual therapy, were included into experimental groups. 200 humans were included in the control groups.

Polychemotherapy courses were conducted without expected complications. Treatment effect was assessed as a satisfactory in 74% of the patients with large intestine and rectum cancer with EHF-therapy inclusion in the medical complex. EHF-therapy combination with an operative treatment helped healing by first intention in 79% of the patients (in the control – in 30%), disease recurrences were revealed in 12.5% (in the control – in 30%), metastases – in 29% (in the control – in 65%).

As a result of EHF-therapy application for the patients of IV clinical group with stomach cancer or large intestine cancer diagnosis (50 people), was reached expressed analgesic effect, weakness and dyspeptic phenomenon decreased, appetite was normalized, number of leucocytes and hemoglobin increased, body mass increased for 720±103 g. Complex treatment of patients during several months was accompanied by tumor reduction in 25% of the cases, stabilization in 50% of the cases, and progressiveness in 25% of cases. In the control group (20 people), which did not include EHF-therapy, all patients were experiencing progressiveness of tumor process with growth of the necessity of analgesic medications.

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Not a single case of recurrence or metastasis spreading has been observed during 9-18 months after EHF-therapy for skin melanoma. A five-year observation has revealed generalization signs in 41% of cases. A five-year observation in the control group has revealed generalization signs in 71.5% of the cases.

EHF-radiation use in patients with ENT-organ tumors (larynx cancer had 19 patients, laryngopharynx cancer had 13 patients, mouth cavity fundus mucous membrane cancer had 22 patients, upper jaw cancer had 6 patients) prevents pre-inflammatory and other complications appearances in 76% of the cases (35% in the control group), the number of recurrences (12%) and metastases (22%) decreased by more than two times. The number of recurrences in the control group was 22 and 44%, respectively.

Grubnick et al. have been describing pain relief effect, taking place already during the first session of MWT influence study in 39 patients with chronic neuropathic pain from abdominal cancer. All patients have gradually reduced and completely ceased their analgesic treatment with opioid drugs during MWT course. Improvement of a night sleep, appetite, and intestinal function was registered in 36 patients after a MWT. 32 patients were reporting life quality improvement.

Inclusion of EHF-therapy in the standard treatment with lymphomas (27 people with non-Hodgkin's lymphomas and 15 people with lymphogranulomatous) led to activation of antioxidant body defense, suppression of free radical oxidation process and normalization of anti-inflammatory body defense level, thereby, lowering toxic damage of normal tissues during chemotherapy. In the comparison group (28 people with non-Hodgkin's lymphomas and 17 people with lymphogranulomatous) the tendency of deepening of antioxidant status disturbances was observed.

All of the above-mentioned permits us to systematize modern indications of EHF-therapy use in oncology in the following form:

1. Preparing of patients with basic localization cancer for combined treatment stages (medicine of the organs and systems to surgical trauma, radial damages and medical aggression).
2. Treatment of concomitant diseases and prophylaxis of complications in people from the risk groups.
3. Prophylaxis and elimination of complications after the special methods of treatment.
4. Treatment of paraneoplastic syndrome.
5. Increase of other treatment method results.
6. Symptomatic therapy of incurable patients.
7. Systemic correction of ecologic and precancerous pathology.
8. Prophylaxis of tumor process progressing after combined treatment.

Benign tumors

Authors	Publication	Institution
Dolgushina A.F.,	The use of millimeter therapy in treatment of mammary gland benign diseases // 11 th Russian symposium with international participation “Millimeter waves in a quantum medicine” – M.: IRE of RAS, 1997. – P. 14-15.	Tumensky region, Tobolsk, TDE “Medics”
Zaporozhan V.N., Bespoyasnaya V.N., Sobolev R.V.	Influence of EHF electromagnetic radiation on endocrine, immune, and proteolytic system state after surgical removal of ovary benign tumors // 11 th	Ukraine, Odessa, SRI of Health and Family

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	Russian symposium with international participation “Millimeter waves in quantum medicine” – M.: IRE of RAS, 1997. – P. 36-38.	
Dikke G.B., Gridneva T.D.	Clinical effectiveness of EHF-therapy in a complex treatment of uterus and mammary gland combined hyperplastic diseases // 12 th Russian symposium with international participation “Millimeter waves in a quantum medicine” – M.: IRE of RAS, 1997. – P. 15-17.	Tomsk, SRI of Health Resorts and Physiotherapy

In 85 patients with mammary gland benign diseases, treated with EHF-therapy, inflammatory process was cupping in 100% of cases, secretory disease and premenstrual period syndrome was cupping in 75% of the cases. Localized fibroadenomatosis disappeared or significantly decreased in 90% of patients. Not a single case of the mammary gland cancer has been noted for 4 years of observation after EHF-therapy.

Levels of prolactin secretion, follicle stimulating hormone, estradiol and progesterone in 100% of females became proximate to norm in 6 months in 100 patients with EHF-therapy use after ovary benign tumor removal operation. EHF-therapy has positive influence on human’s organism regulatory system state, favors removal of shifts in the immune system, connected with the immunity T- and B-system link depression.

Menstrual function improvement, decrease of uterus average size from 7.6 to 6.8 weeks and myomatous node average diameter decrease from 24 to 19mm (p<0.05) were observed in 33 females with uterus fibromyoma after EHF-therapy. Significant improvement was observed in 26% of the cases, improvement – in 68% of the cases, without alterations – in 6% of the cases. Worsening of the condition has not been seen.

Diseases of the endocrine glands

Authors	Publication	Institution
Lisenkova L.A., Petrosyan V.L., Gulyaev A.I., Kirichuk V.F., Chernova V.E., Acad.Gulyaev Yu.V. Acad.Devyatkov N.D., Sinitsyn N.I.	The use of spectral and wave diagnostic and resonance and wave therapy methods for thyroid pathology // 10 th Russian symposium with international participation “Millimeter waves in quantum medicine” – M.: IRE of RAS, 1997. – P. 16-18.	Saratov, Saratovsk branch of RAS IRE, Saratovsk State Medical University, “Scientific Medical Center of Physics and New Methods of Medicine” Ltd.
Popov B.M., Alshanskaya T.N., Popova E.B., Svistulina L.B.	Experience of complex treatment (with the use of MM-therapy) of patients of endocrine type in hospital setting // Millimeter waves in biology and medicine. – 2004. - №1. – p. 57-67.	Polyclinic №2, Ust- Ilimsk

Health state improvement of diffusive toxic and nontoxic nodular goiter, visual decrease of thyroid gland size, alteration of its consistency from dense to soft-elastic, and tissue consistency

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unevenness decrease were described after treatment of 56 patients with EHF-therapy. Disappearance or rapid decrease of solitary node sizes in 4 patients was also noted.

13% of treated children have ceased insulin injections (under endocrinologist observation) with diabetes stable compensation, confirmed by laboratory and clinical methods of examination, after EHF-therapy for diabetes mellitus of the 1st type and its complications (the micro- and macroangiopathies, hepatosis, cataract, nephropathy, cardiopathy). Diabetes mellitus complication regress was noted in 89% of the patients, diabetes course stabilization was noted in 96%, stable effect from influence during a year and more was observed in 45% of the patients.

The most important therapeutic effect of EHF-therapy for diabetes mellitus of the 1st and 2nd types is stabilization of blood sugar level, which permits to select dose of insulin or other antidiabetic medicines more precisely and to compensate and maintain blood sugar at a stable level. The more expressed therapeutic effect was observed in patients with diabetic angiopathies – the lower extremity vessel angiopathy, retinopathy, nephroangiopathy, and polyneuropathy.

110 patients with pancreatic diabetes of the 1st type in the age of 30 to 50 years and 180 patients with pancreatic diabetes of the 2nd type in the age of 40 to 60 years (length of the disease was from 5 to 20 years) were examined. After EHF-therapy course, insulin dosage was decreased for 6-8 units, the number of sugar-decreasing tablet medications was decreased for 5-10 mg, especially in patients with the length of the disease of less than 5 years. In 68 patients, diabetic foot of 2 or 3 types with predominance of naturopathic manifestations was diagnosed. With the use of EHF-therapy, clinical effect in such patients occurred much faster – in 12-15 days against 25-30 days in the control group. In case of diabetic neuropathy, along with EHF-therapy, there was stabilization of arterial pressure, disappearance of edemas, and decrease of creatinine and urea level in blood.

Diseases of eyes

Authors	Publication	Institution
Kheilo T.S., Bogdanova L.V.	EHF-therapy in ophthalmologic practice // 10 th Russian symposium with international participation “Millimeter waves in quantum medicine” – M.: IRE of RAS, 1995. – P. 55-56.	Moscow, Medical center “Mediton”
Kheilo T.S., Plokhova O.A.	EHF- and magnet-and-laser therapy in ophthalmologic practice // 11 th Russian symposium with international participation “Millimeter waves in quantum medicine” – M.: IRE of RAS, 1997. – P. 51-52.	Moscow. Center of therapeutic ophthalmology
Heilo T.S.	Millimeter waves in the system of complex treatment of degenerative diseases of eye retina// 14 Russian symposium “Millimeter waves in medicine and biology” - M.: 2007. – p. 79-81.	Center of therapeutic ophthalmology, Moscow
Goncharenko N.L.	EHF-puncture in a complex treatment of uveitises: Author f.diss..c.m.s. – Moscow, 2002. – 20 p.	

260 patients with eye diseases (55 humans – diabetic retinopathy, 100 humans – inflammatory diseases of eyes, including allergic genesis, 105 – degenerative diseases of eye retina and visual nerve) were examined and treated. All patients were receiving standard treatment and 123 patients of

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experimental group were receiving EHF-therapy. Patients with inflammatory diseases of eyes were noting goiter cessation, general state improvement, and antiallergic effect after EHF-therapy course.

In posttraumatic and postsurgical uveitises, EHF-therapy was contributing to faster normalization of blood circulation in bulbar conjunctiva and faster rehabilitation of color perception function.

Electrooculogram value improvement, general condition improvement was noted in patients with a diabetic retinopathy. Disappearance of unpleasant eye sensations was noted in 100% of the patients after EHF-therapy.

In degenerative diseases, the increase of visual acuity and widening of visual field were observed. Under the influence of EHF-therapy, there was improvement of microcirculation in bulbar conjunctiva in 92% of patients, in the control group – in 87%.

Andrology

Authors	Publication	Institution
Neplokhov E.A., Kolmatsui I.A.	Complex physiobalneotherapy of climacteric disorders in males: Aid to physicians. – Tomsk, 2000. – p. 9.	Tomsk SRI of Health Resorts and Physiotherapy of RF MPH
Kolmatsui I.A., Neplokhov E.A., Vysotina O.K.	Reduction of sexual and reproductive health in males, suffering from excretory and toxic sterility at sanatorium stage of treatment: Method. recommend. – Tomsk, 1998. – p. 11.	Tomsk SRI of Health Resorts and Physiotherapy of RF MPH
Dremuchev N.A., Golunov V.A., Korotkov V.A., Kotov V.D., Myasin E.A.	The use of wave millimeter range band-narrow sound radiation and express-diagnosis according to Foll for chronic prostatitis treatment // 11 th Russian symposium “Millimeter waves in a quantum medicine” – M.: IRE of RAS, 1997. – P. 57-61.	Moscow region, Shyolkovo, Polyclinic N1

92 patients at the age of 48-68 years with andropausal disorder clinical manifestations were under observation in andrologic clinic of Tomsk scientific research Institute (SRI) of health resorts and physiotherapy.

Half of the patients were suffering from prostate benign hyperplasia of the 1st stage, besides, gland volume was not exceeding 45cm and concentration of prostate-specific antigen in blood serum was 4.0ng/ml. Patients were noting working capacity increase, mood and memory improvement, muscular tonus intensification, and sleep normalization in 2-3 weeks after the treatment outset with EHF EMR use. More than half of the patients were noting sexual attraction intensification, spontaneous and adequate erection intensification and reduction, and orgasm normalization.

As a result of treatment of 77 patients with chronic prostatitis in moderately acute attack and remission stage with EHF EMR, pain and dysuric syndrome cupping in 90% of the patients, sexual function improvement, which was characterized by libido, adequate erection intensification, and coitus time normalization were noted. Decreases in pains from edema and tonus normalization were noted during prostate digital investigation. Leukocyte quantity normalization and lecithin granulation content increase were traced in the prostate secretion analyses. Climacteric disorder index prior to treatment was 12.5±1.0 and after the treatment – 8.9±0.55 (p<0.05).

EHF-therapy was used in 30 patients with secretory toxic sterility, at the age of 23-42 years, suffering from this disease from a year to 8 years. Sleep normalization, erythrism decrease, mood

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normalization were observed at the end of treatment, which favors higher level of patient’s adaptation in the usual life. Stimulation of spermatogenesis quantitative and qualitative values, particularly, an increase of spermatozoon general quantity, per cent of the actively mobile spermatozoa and the decrease of their agglutination, were noted during ejaculate investigation.

Diseases of the liver

Authors	Publication	Institution
	Optimal resonance therapy: Teaching and methodical aid to physicians and students. - Nizhny Novgorod 2000.	“ELM” Ltd., Nizhny Novgorod State Medical Academy

Patients with liver diseases (cirrhosis, hepatosis, and chronic viral hepatitis) received EHF-therapy course. As a result, biochemical value normalization occurred in 82% of the patients, organ size and structure normalization occurred in 58 % of patients (according to the USI and computer tomography data). After the therapy course, this effect remained during a year and more in 73% of the cases. EHF-therapy is an effective method for solving normalization problems of metabolic process disturbances in hepatocytes, appearing due to inflammatory diseases of liver, its toxic lesion, including medications’ side effect. It can be used in both cases: as independent method for chronic inflammations and in combination with detoxication and anti-inflammatory therapy for acute cases.

Diseases of vessels

Authors	Publication	Institution
	Optimal resonance therapy: Teaching and methodical aid to physicians and students. – Nizhny Novgorod 2000	“ELM” Ltd., Nizhny Novgorod State Medical Academy

Evidently expressed therapeutic effect of EHF-therapy for lower extremity artery obliterating diseases was observed with the maintenance of the collateral circulation basic ways along the internal iliac and deep femoral artery systems at presence of limited, critical zones of the extremity distal department tissue ischemia.

Therapeutic effect of EHF-therapy (especially at endarteritis angiospastic stages) was sufficiently well expressed: pain syndrome was rapidly decreasing, sleep was normalizing, intermittent claudication was decreasing, resistance to physical activity was increasing, peripheral circulation and microcirculation were improving with visible decrease of skin trophic disorders. Objectification and assessment of EHF effectiveness by regional hemodynamics and microcirculation study with the ultrasonic dopplerography use, detection of oxygen tension in tissues and etc. in the process and after the treatment were permitting to confirm clinical alteration dynamics.

EHF-therapy can be used for all stages of vessel obliterating diseases as an independent method in both conservative and surgical treatment. EHF-therapy is more effective for I-II stages of Raynaud’s disease.

EHF-therapy use for postthrombophlebitis syndrome and trophic ulcers has led to pain syndrome cupping after the first 2-3 sessions, and as a rule, regional circulation improvement, edema removal, and faster ulcer epithelization.

Narcology

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Authors	Publication	Institution
Arzumanov Yu.L., Kolotygina R.F., Abakumova A.A. et al.	Perspectiveness of MM-wave use in clinical picture of alcoholism // 11 th Russian symposium with international participation “Millimeter waves in a quantum medicine” – M.: IRE of RAS, 1997. – P. 72-76.	Moscow, State Scientific Center of Narcology, RF MPH, SRI of neurology of RAMS
Lyan N.V., Lyan V.N., Votoropin S.D.	Millimeter therapy of wave in a toxicomania treatment // 12 th Russian symposium with international participation “Millimeter waves in a quantum medicine” – M.: IRE of RAS, 1997. – P. 52-55.	Tomsk State University, Tomsk region, Seversk, Center of Oriental Medicine “Ayurveda”

53 patients suffering from chronic alcoholism received in EHF-therapy. Researchers have seen improvement of general health state, decrease of internal tension, anxiety, thirst for alcohol, nausea, normalization of sleep and appetite, disappearance of vegetative disturbances and neurological manifestations, improvement of thinking operations and logical conclusions in 80% of the patients.

Positive effect on psychic, emotional and somatic spheres was reached in 42 patients with toxicomania, as a result of EHF-therapy use. Stable positive effect was achieved in 41% of the patients. EHF-therapy was low-effective for toxic addicts with long term addiction (more than 2-3 years) and greater dosage (5-6 grams a day).

5 Results of literature data analysis.

"CEM[®]-TECH" device was developed with consideration of well-known technical analogues and results of extensive medical and biologic studies applied to the wide class of methods in physiology area.

Frequency radiation diapasons of «Yav», «AMFIT» series of devices, the results of their long-term clinical use, and in-house clinical studies were analyzed and used during the process of development of "CEM[®]-TECH" device.

"CEM[®]-TECH" device for EHF-IR therapies combined technical and medical specialists' developments that are connected with radiation with fixed frequencies in EHF-diapason of 42,2 GHz (7,1 mm), 53,5 GHz (5,6 mm), 60,7 GHz (4,9 mm), in the mode of noise generation in diapason of 42-78 GHz, and in IR diapason.

The device works in the impulse mode, which allowed us to reach good clinical results of its clinical use connected with realization of fractional (separated) influence mode. The impulse mode also allowed us to build compact device with miniature oscillators.

Interaction of external radiation source and biological object is resonance in nature not only by frequency, but also by radiation power. When increasing power of external radiation from zero to 10^{-16} - 10^{-19} Wt/cm², we can observe resonance response of biological object (U.A. Skripnik, A.F. Yanenko, B.F. Manoilov, et. Microwave radiometry of physical and biological objects. Zhitomir. Volin'. 2003, p. 63-69), in which connection, the maximum of the described dependence shifted to the beginning of ordinate axis for relatively weak processes (often, these can be pathologic processes in comparison with processes happening in healthy tissue). This distinctive feature allows us to conduct oppression of pathologic process in the together insignificant erection of healthy tissue. The influence of low intensity electromagnetic radiation on biological object allows us to use it for physiotherapeutic treatment of significant number of human and animal diseases. It can also be used for increasing of

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biological object’s resistance towards negative external factors, and for adaptation to the change of environmental conditions.

First, the device’s action comes from the properties of semiconductor structures on the basis of A_3B_5 compounds. Development of Gunn diodes is based on gallium arsenite (GaAs) and indium phosphate (InP) that are related to A_3B_5 compounds. Their particular qualities show that voltage-current characteristic with negative differential conductivity $\partial I/\partial U < 0$ can be realized in these structures (for example, Levinshtein M.E., Pozhela U.K., Shur M.S., Gunn Effect., M., 1975). Value of this voltage-current characteristic exceeds the value of differential conductivity ρ of biological object ($|\partial I/\partial U| > \rho$). Second, the presence of own electromagnetic fluctuations of background level is typical for these structures. Characteristics of the structures can be defined by dipole-active conditions of volume of the crystal with defects of crystalline structure and its borders.

On the assumption of this condition fulfillment, when applying on biological object of semiconductor object (on the basis of A_3B_5 compounds), and when supplying tension that exceeds border value U_0 on this object, corresponding on the device’s voltage-current characteristic change on the area with negative differential conductance, formation of generator contour with inclusion in it of biological object (on which (or close to which) semi-conductor device is situated) takes place. Spectrum of generated radiation is defined by reactivity constituent of system’s impedance “semi-conductor device – biological object” and includes own frequencies of biological substances of the object, pathogenic factor in the zone of influence, and biological object as a whole. Process of electromagnetic radiation generation is caused by formation of electrons with increased energy on cathode of semi-conductor device that based on A_3B_5 compounds. Energy of “burning” electron can exceed the energy of electron of semi-conductor conductivity (which is not receiving external tension) in hundreds of times. Electrons are drifting on the volume of semi-conductor and being absorbed on anode of the device. When passing through semi-conductor of electrons, which possess increased energy, and also in the conditions of variable electromagnetic field (connected with a process of generation) forming, transformation of dipolar-active conditions of semi-conductor structure, because of the changes in quantum-mechanical conditions of its border areas, becomes possible. This transformation is defined by electromagnetic field in the sample that is forming with participation of not only semi-conductor volume, but also of surrounding environment, including biological object, which is a part of generator contour of the system “semi-conductor device – biological object”. After disconnection of semi-conductor device from power supply, changed condition of dipolar-active components of A_3B_5 structure is maintained and characteristics of own radiation of the structure do not change. These characteristics stay stable in the condition of absence of any external influence that possesses energy, sufficient for their change.

After device’s disconnection from the power source, interaction of external electromagnetic field with dipolar-active conditions of crystal volume takes place. As a result, polaritons (combined condition of charged particles’ (dipoles) oscillatory motion with electromagnetic field) formation occurs (Vinogradov E.A. “Polaritons of semiconductor micro-cavity”, Successes of physical science., v.172, p.1372-1410). Oscillatory motion of semi-conductor structure crystal, and consequently, polaritons spectrum is defined by its internal dipolar-active condition. When influencing on semi-conductor structure with external electromagnetic radiation, by using polariton mechanism, formation of own electromagnetic fluctuations of background level of semi-conductor structure takes place. The spectrum of these fluctuations was defined by the change of dipolar-active components of A_3B_5 structure in generation mode and spectrum of own frequencies of biologic object, including pathogenic factor. When using semi-conductor structure A_3B_5 as an active element of generator (with placing it on biological object and with supplying of power that exceeds border tension, i.e. working in the mode, which corresponds to the area of related voltage-current characteristic with negative differential

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conductivity), under the influence of external electromagnetic field, the condition of this structure can change.

In this case, frequency spectrum of over-reflected radiation contains its own frequencies of biologic substances and biologic object as a whole. Consequently, changes in the condition of semi-conductor structure and characteristics of its own radiation are also defined by spectrum of own frequencies of biological object and pathogenic factor.

Intensiveness of radiation is extremely small: power density is no more than 10^{-20} BT/cm², therefore, at the contact of semi-conductor structure with biological object, radiation does not suppress biological activity of healthy cells in biological substance, which are staying in the condition of stable balance. At the same time, the radiation is strong enough to suppress pathologic factors that are in the development stage and subjected to even weak external influence.

External influence leads to the loose of steady development tendency of pathogenic microorganisms and pathologic processes. It also stabilizes physiologic processes in organism’s substances, which are staying in the condition of stable balance. High suppression effectiveness of pathogenic factor can be explained by the fact that radiation frequency is correlated with the condition of biologic substances and biologic object in the moment of formation of influencing radiation.

Thus, the presence in voltage-current characteristic of semi-conductor device, containing structure on the basis of A_3B_5 compound, the presence of area with negative differential conductivity, value of which exceeds the value of differential conductivity of biological object, and the absence of resonator (as an internal part) in the device allows to formulate electromagnetic radiation under the influence of external electromagnetic factors. Spectrum of this electromagnetic radiation contains own frequencies of biological substances of biological object and own frequencies of pathogenic microorganisms and pathologic processes.

So, technical solutions, laying the foundation of "CEM[®]-TECH" devices series, allow us to realize not only traditional classical methods of EHF-therapy, which were used before in the devices «YAV» and «AMFIT», but also original mode of background resonance radiation. Wide spectrums of used methods, on the assumption of proper training of medical stuff, permits the conductance of highly effective treatment of many diseases without using harsh methods of influence on the organism and practically avoid side effects.

Nosologic forms and registered basic effects of EHF-therapy are showed in the table below:

<i>Nosologic forms</i>	<i>EHF-therapy action</i>
Neuropathology	
1. Neurological manifestations of spinal osteochondrosis, including discogenic radiculopathies	Expressed anesthetic effect, rise of pain sensibility barrier in the local algogenic zones
2. Children’s spinal scoliosis	Expressed anesthetic effect, rise of tolerance to physical loads, growth of spinal excursions
3. Vertebrobasilar insufficiency	Disappearance or sufficient reduction of headache and giddiness, normalization of arterial pressure
4. Exogeno-organic brain traumas (of traumatic, vessel, infective-toxic and complex genesis)	Disappearance of asthenic signs, emotional lability, hyperesthesia, headache, giddiness, arterial pressure oscillations, night sleep restoration
5. Cerebral atherosclerosis	Normalization cerebral blood circulation, normalization of lipid exchange indexes
6. Headache	Significant reduction of headache intensity and length of the attacks
7. Mono-and polyneuropathy	Anesthetic effect, growth of speed of impulse passing

8. Syndrome of vegetative distonia, including vegetative crises (panic attacks)	through the nerves Normalization of vegetative status, headache reduction or disappearance, improvement of gemodynamics according reography data
9. Reactive neuroses and stress-reactions – treatment and prophylactic	Reduction or disappearance of irritation, emotional lability, sleep disorders, improvement of working capacity, mood improvement
10. Infantile cerebral paralysis	Reduction of muscles tone, growth of active movements amount
11. Epilepsy, including pharmacoresistant	Reduction of attacks quantity and positive dynamics of EEG-view
Joints diseases	
12. Degenerative-dystrophic joints diseases (deforming osteoarthritis, Perthes’ disease, psoriatic osteoarthropathy)	Anti-inflammatory effect, growth of muscles strength, amount of movements in the influenced joint and tolerance to physical loads
13. Gemarthroses and hemophiliac arthropathies	Anesthetic effect, homeostasis normalization
14. Rheumatoid arthritis	Significant reduction of pain and morning joint stiffness, immune-modulating effect
Surgery pathology	
15. Traumatic and postoperation traumas of skin, soft and osseous tissues, including complicated by purulent process and flaccidly regenerating	Shortage of all phases of wounding process, anti-inflammatory effect, stimulation of regeneration, including osseous tissue, prophylactic of suppuration, expressed anesthetic effect, reduction of anesthetic medications dose
16. Burns	Anesthetic effect, quick generation of granulose tissue and epithialialization
17. Posttraumatic osteomyelitis	Term shortage of exudative phase of inflammation and stimulation of earlier beginning of reparative processes, normalization of cytomorphologic characteristics of leucocytes
18. Posttraumatic contractures	Anesthetic effect, normalization of microcirculation and trophic disorders, restoration of normal movements amount
19. Acute cholecystics	Anti-inflammatory effect
20. Acute pancreatitis	Term shortage of treatment, positive influence on immune system condition
Gastroenterology	
21. Stomach ulcer and duodenum ulcer, including complicated by bleeding, perforation or penetration	Term shortage of epithialialization of ulcer defects, reduction of relapses
22. Functional insufficiency of gall outlet ways	Quicker and more effective pain and dyspeptic symptoms cupping, reduction of symptoms of gall clotting and crystallization, normalization of gall balder contractive function
23. Chronic gastroduodenitis, including the presence of Helicobacter pilori infection	Quicker and more effective pain and dyspeptic symptoms cupping
24. Chronic pancreatitis	Effective pain reduction, restoration of pancreas function

Obstetrics and gynecology

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| 25. Chronic inflammation of uterus adnexa, including cases with reproductive function disorder | Anesthetic effect, commissural structures softening, restoration of reproductive function |
| 26. Miscarriage of pregnancy | Growth of luteal phase term of menstrual cycle, rise of oestradiol and progesterone levels, elimination of the need in hormonotherapy |
| 27. Postabortal complications | Immunomodeling effect, reduction of inflammatory complications |

Dermatology

- | | |
|---------------------|---|
| 28. Psoriasis | Anti-inflammatory, anodizing, regenerative effect, infiltrators resolution, term shortage of the treatment, reduction of relapses |
| 29. Trophic ulcers | Anti-inflammatory, anodizing, regenerative effect, term shortage of the treatment, epithelialization of ulcer defects |
| 30. Atopic eczema | Anti-allergic effect, itching reduction |
| 31. Microbic eczema | Restoration acceleration |
| 32. Seborrhea | Restoration acceleration |
| 33. Neurodermatitis | Itching reduction |
| 34. Vitiligo | Pigment restoration |
| 35. Herpes | Expressed anodizing and anti-inflammatory effects |
| 36. Syphilis | Immunocorrective action, acceleration of negativation of serologic reactions complex |

Infective and parasitic diseases

- | | |
|---|--|
| 37. Chronic opisthorchiasis | Improvement of contractive function indexes and volume characteristics of gall balder, vanishing of opisthorchiasis eggs from the gall |
| 38. Lungs tuberculosis, including in composition with chlamydial and mycoplasmic infections | Stabilization of tuberculosis current in lungs, reduction of postoperational complications frequency, acceleration of infiltrators resolution, abacillation and closure of integration cavity |
| 39. Ticks encephalitis and ticks borreliosis | Growth of movement activity, reduction of headache and artralgia intensity, sleep normalization, reduction of fever term, of weakness and sweating, growth of antibodies caption for the antigen of ticks encephalitis and borreliosis virus |
| 40. Virus hepatitis | Restoration acceleration |
| 41. Acute respiratory virus infections – prophylactic and treatment | Morbidity reduction by 2 times, illness current in a light form, shortage of the illness period, absence of acute respiratory virus infections complications |

Cardiology

- | | |
|---|--|
| 42. Ischemic heart disease: tension angina, unstable angina, myocardial infarction, arrhythmias | Expressed antianginal effect, reduction of episodes number of painless myocardial ischemia, improvement of diastolic function of the left ventricle, reduction of angina attacks, reduction of arrhythmia episodes, reduction of nitroglycerin dose, normalization of activity level of antithrombin III and erythrocyte deformability |
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43. Arterial hypertension, including hypertonic crises	Hypotensional effect, reduction of peripheral vessels resistance, improvement of arterial cerebral blood circulation indexes, reduction or vanish of vein stagnation signs, normalization of catecholamine excretion
44. Noncoronary myocardial traumas (mitral valve prolapse, cardiomyopathy, myocarditis)	Reduction of cardiologic episodes, life quality improvement, normalization of hemostasis system indexes
Pulmonology	
45. Pneumonias	Rise of efficiency and shortage of treatment terms, prevention of protracted disease current
46. Bronchial asthma	Reduction of cough and breathlessness, reduction of need in inhalation broncholitics, improvement of bronchial discharge, reduction of rales, normalization of outer breath function indexes, immune-modulating effect
47. Chronic nonobstructive bronchitis	Anti-inflammatory effect
48. Chronic obstructive bronchitis	Broncoobstructive syndrome arrest
49. Lung and intrachest lymph nodes sarcoidosis	Normalization of roentgenogram indexes, immunograms and outer breath function, reduction of acerbations and relapses frequency
Dentistry	
50. Anodontia and teeth prosthesis application	Expressed anti-inflammatory effect
51. Paradontis	Expressed anti-inflammatory effect, regeneration stimulation, normalization of local blood circulation in paradontis
52. Gingivitis	Expressed anti-inflammatory effect
Oncology	
53. Malignant neoplasm (colon and rectum cancer, skin melanoma, stomach cancer, breast tumor, lung cancer, ovary cancer, ENT-organs etc.)	Reduction of complications quantity and expression after polychemotherapy, reduction of relapses and metastases number, anesthetic effect
54. Lymphomas (lymphogranulomathosis no Hodgkin’s lymphomas)	Activation of organism antioxidative protection, suppression of free radical oxidation and normalization of proinflammatory cytokines level
55. Benign breast tumor	Prophylactic of malignant transition, anti-inflammatory effect
56. Benign ovary tumors	Normalization of gender hormones secretion and immune status
57. Uterus fibromyoma	Reduction of nodes sizes
Endocrinology	
58. Exophthalmic toxic goiter	Reduction of thyroid gland sizes, its consistention change
59. Node goiter	Vanishing or sudden reduction of solitary nodes sizes
60. Diabetes mellitus and its complications (micro- and macroangiopathy, hepatosis, cataract, nephropathy, cardiopathy)	Complications regress, diabetes current stabilization, reduction of insulin dose
Andrology	

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61. Andropausal disorders	Libido intensification, sexual function improvement
62. Benign prostate hyperplasia	Libido intensification, sexual function improvement
63. Chronic prostatitis	Pain and dysuric syndrome reduction, sexual function improvement
64. Secretion toxic infecundity	Spermatogenesis stimulation
Eye diseases	
65. Diabetic retinopathy	Improvement of electrooculogram indexes, vanishing of unpleasant sensations in the eye
66. Inflammatory eye diseases, including allergic genesis	Anti-allergic effect, itching reduction
67. Degenerative retina and visual nerve diseases	Rise of visual acuity, visual spreading, improvement of microcirculation in bulbar conjunctive
Liver diseases	
68. Cirrhosis	Normalization of biochemical indexes, sizes and liver structure
69. Chronic hepatitis	Normalization of biochemical indexes, sizes and liver structure
70. Hepatosis	Normalization of biochemical indexes, sizes and liver structure
71. Toxic liver traumas	Normalization of biochemical indexes, sizes and liver structure
Vessels diseases	
72. Obliterate atherosclerosis of inferior limbs	Vanishing of pain syndrome, reduction of intermittent claudication
73. Obliterate endarteritis	Vanishing of pain syndrome, reduction of intermittent claudication
74. Raynaud’ disease	Peripheral blood circulation and microcirculation improvement
75. Postthrombophlebitic syndrome	Vanishing of pain syndrome, acceleration of throphic ulcers reparation
Narcology	
76. Chronic alcoholism	Reduction of inner tension, anxiety, desire for alcohol
77. Toxicomania	Positive influence on psycho, emotional and somatic spheres

After analyzing data from literature sources, the following mechanisms of EHF-therapy influence on the body were described:

Normalization of immune system functioning (increased number of T- and decreased number of B-lymphocytes and immunoglobulins (Ig) A and M (Bakaliuk et al., 1998), increased number of T-lymphocytes in comparison with baseline (Kuz’menko, 1998), concentration of circulating immune complexes, B-lymphocytes and immunoglobulin G decreased and the number of T-lymphocytes and IgA increased (Shliapak et al., 1996), decrease of CD8+ positive T-lymphocytes (Jin Z, Lin M, Xia J, Zhuang J, Yang R, Li X, et al., 2001), normalization of prior existing dismunnoglobulina and normalization of functional activity of neutrophiles (Briskin B.C. and et al, 2003), rehabilitation of functional activity of B-lymphocytes and phagocytic activity of neutrophiles (Bukatko B.N., 2003);

Increase of nonspecific body resistance (Tumanyac E.E., Termuryanc N.A., 1997);

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Normalization of lipidic metabolism indicators (increased concentration of high-density lipoproteins, decrease of triglycerides (Kuz'menko, 1998));

Normalization of the bioelectric brain activity (stabilization of α -rhythm) and disappearance of pathologically slow δ -waves monitored by means of electroencephalography (Tyshkevich et al., 1998), increase in spectral facility of electroencephalogram α -rhythm (Gubarec M.Y., 1989), and rehabilitation of initially disturbed interzonal and interhemispheric interrelations of basic electroencephalogram rhythms (Stolbikov A. E. and et al, 1991);

Activation of hemopoiesis in red bone marrow (Lebedeva N.N., Kotrovskaya T.I., 2002);

Normalization of rheological blood properties (lowering of blood viscosity, increase of erythrocytes deformation (Parshina S.S. and et al, 2003));

Normalization of coagulant and anticoagulative factors balance (normalization of antithrombin III level (Lopatina N.A. and et al, 2003), normalization of fibrinolytic activity and thrombocyte hemostasis (Bukatko V. N., 2003));

Normalization of vessel tone and microcirculation activation (normalization of endothelium vessel reactivity (Parshina S.S. and et al, 2003), normalization of rheogram indicators (Dikke G.B., 1999; Afanaseva T.N., Petrova V.D., 1995) and rheoencephalogram indicators (Tcarev A.A., Kudinova M.A., 1997));

Normalization of vegetative regulation, stabilization of sympathetic and parasympathetic parts ratio of vegetative nervous system (Dikke G.B., 1999);

Normalization of pro- and anti-oxidant systems ratio (Tumanyac E.E., Temuryanc N.A., 1997);

Activation of cell regeneration (increase in proliferation of fibroblasts (Polyakova A.G. et al., 1999))
Normalization of catecholamin and sexual hormones secretion (Tcarev A.A., Kudinova M.A., 1997; Zaporozhan V.N. et al., 1997);

Influence on endogenous opioid system (Radzievsky et al., 2001), activation of antinociceptive system (Kirova B.N., 2000);

Anti-stress action by suppression of excessive activity of symphato-adrenal system and activation of stress-limiting systems (Chuyan E.N., Temuryanc N.A., 2005);

Suppression of influenza virus reproduction inside the cells and viricidic effect (Podchernyaeva R.Y. et al., 2004);

Rehabilitation of mononuclear ability to secrete γ -interferon, which enables the decrease in possibility of cancer development for risk group patients (Sitko S.P. et al., 1993);

Cytoprotective action towards red marrow cells and liver during polychemotherapy (Karaeva N.P. et al., 2006);

Change in structure-dynamic characteristics of cell membranes (Semina I.G. et al., 2007);

Anti-inflammatory effect, based on stimulation of mast cell degranulation and measurement of phagocytes’ functional activity in the center of inflammation (Gapeev A.B, Chemeris N.K., 2007);

Inhibition of skin, liver, and brain aging processes (Rodshat I.V., 2007)

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6 Clinical trials

In the context of clinical approbation of «CEM-TECH» device, studies in several medical centers of Russian Federation were accomplished. For the purpose of examination and treatment, patients with the following frequently occurring diseases were selected: psoriasis, ischemic heart disease, stressogenic conditions, prostatitis, lung cancer, opisthorchiasis (helminthiasis), and periodontitis. Noise mode and background resonance radiation were used in the listed clinical trials.

Results of own trials with the use of EHF therapy of «CEM-TECH» are small, but integral part of the large number of trials and studies on EHF-therapy that was carried out in different institutions in different time periods, however, in all the cases, modes of EHF-influence were identical to the modes of «CEM-TECH» device.

7 User information on the product

User information on the product on «CEM-TECH» device is listed in the «Owner’s Manual» and Passport for the device.

8 Qualification of the person (or group of people) that realized clinical estimation.

Responsible for control and verification of the research data: D.Sc., M.D., Prof. Potekhina J.P.
Education: Higher Medical Education (Doctor’s Diploma, 1994). Dissertation thesis for candidate of medical studies degree defended in 2004. Professor of Biomedicine department of Lobachevsky Nizhniy Novgorod State Academy from 1997. Experience in the area of EHF-therapy – from 2004.

9 Conclusion

Presented review includes studies on EHF-therapy effectiveness with the use of all specified in the introduction modes (noise influence, fixed frequencies, and background resonance radiation). In-house studies on effectiveness of EHF therapy by means of CEM-TECH device were done with the use of background resonance radiation mode of EHF influence as well as with background resonance radiation mode, since availability of background resonance radiation mode is the distinctive characteristic of CEH-TECH device.

Analysis of clinical approbation shows that there are no additional risks, except for the risks that were analyzed in the Risk Management Journal №1/07 and stated in the Operating and Owner’s manual.

Basing on the conducted technical trials and many years’ experience of the device’s clinical use, certain conclusion on high effectiveness of CEH-TECH device for the large number of diseases can be done.

Protocols of clinical tests of CEM-TECH device

Psoriasis

The research was conducted on the basis of **Clinic of Skin and Venereal diseases of Siberian State Medical University** by c.m.s. V.S.Dmitruk, immunological researches were done in **Clinical laboratory of immunology and allergology faculty** of Siberian State Medical University under supervision of Ph.D., professor V.V.Klimov.

134 patients suffering from psoriasis, including 90 (67 %) patients with vulgar psoriasis in a progressing stage and 44 (33 %) persons with psoriatic arthritis, were surveyed. Patients were divided into three groups:

1st – 73 persons received EHF-therapy in combination with traditional therapy;

2nd – 17 persons received only EHF-therapy;

3rd – 44 persons received only traditional therapy (antihistaminic medicines, vitamins, calcium medicines, biostimulators, indifferent, and reducing ointments) (control group).

Groups were comparable in gender, age, and severity of the disease (Table1).

Table 1

Clinical characteristic of the patients with psoriasis

Characteristics		1st group (n=73)	2nd group (n=17)	3rd group (n=44)
1	Vulgar psoriasis	43 (59 %)	17 (100 %)	30 (68 %)
	psoriatic arthritis	30 (41 %)	-	14 (32 %)
2	Male	51 (70 %)	10 (59 %)	30 (68 %)
	Female	22 (30 %)	7 (41 %)	14 (32 %)
3	Widespread psoriasis	67 (92 %)	14 (82 %)	36 (82 %)
	Localized psoriasis	6 (8 %)	3 (18 %)	8 (18 %)
4	under 40 years	33 (45 %)	17 (100 %)	20 (45 %)
	over 40 years	40 (55 %)	-	24 (55 %)

Diagnosis of psoriasis in a progressing stage was established regarding clinical picture (appearance of new elements, peripheral papula growth, appearance of isomorphic reaction, psoriatic triads) and data of anamnesis. Psoriatic arthritis diagnosis was established also out of clinical picture, considering activity of pathological process according to M.G.Astapenko (1979), estimation of basic clinical displays of articulate syndrome according to N.K.Erov and co-authors (1985), if necessary, verification with the help of the research of rheumatoid factor and X-ray study was carried out.

Researches of the immune status:

1. Defining basic classes of antibodies (IgA, IgM, IgG) in blood whey was done by the method of radical immunodiffusion in gel (Manchini, 1965).
2. Defining subpopulations lymphocyte with homogeneous antibodies use was done by testing of subpopulations bearing antigens CD3, CD4, CD8, CD16, CD72 by immunofluorescence method.
3. The use of nitro blue tetrasol test (NBT) allowed increasing of bactericidal potential of cells and its reserve after neutrophil stimulation of bacterial polysaccharide or microbes (Klimov V.V. and coauthors., 1981).

Patients from the 1st and 2nd groups received EHF-therapy using CEM-TECH device. Duration of the treatment in the 2nd group was 10-12 days, in 1st and 3rd groups treatment was done during 18-21 days. EHF-therapy was conducted with earlier chosen FRI mode on biologically active

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points of meridians of thick gut GL4, stomach E-36. The therapy provided stimulating effect on protective forces of an organism, and also influenced specific points of skin RP6, GL11, VG20, according to reflexotherapy guide (G.Luvsan, 1986). Treatment technique of was as follows:

- 1 - 5 sessions – points E-36 and GL4 were influenced with EHF-therapy;
- 7 - 10 sessions –points RP6, GL11, VG20 were influenced with EHF-therapy.

Each point was exposed for 7 minutes. Course of treatment was 10-12 sessions a day.

Statistical processing the received results was done by means of Statistica 5.0 package of application programs. Test on conformity of distributions to the normal law was done by means of Shapiro-Wilka test. If distribution did not differ from norm, results were represented in the form of M+m where M is the average arithmetic, m is a mistake of a mean; groups were compared with the use of Student criterion. If distribution of quantitative data in groups differed from normal, Wilcoxon criterion was used for comparing of the connected groups, and for unconnected Mann-Whitney criterion was utilized. If p was less than 0,05, distinctions between the groups were considered statistically significant.

Comparing changes of immunological status of patients with psoriasis in the 2nd 3rd groups, practically identical dynamics (Table 2) took place. Statistically significant decrease of T- lymphocyte, having suppressor properties (CD8) was registered. Studying fermentative neutrophil granulocytes activity showed statistically significant reduction with induced variant of NBT-test in both groups.

Table 2

Comparison of immunological parameters dynamics in a progressing stage of psoriasis in patients receiving EHF-therapy in a mono-variant and traditional therapy

Parameter	2nd group (n=17) M+m	3rd group (n=30) M+m
CD 3, %	<u>56,0±0,9</u> 57,0±0,4	<u>56,2±0,9</u> 57,1±0,25
CD 4, %	<u>26,6±0,2</u> 31,9±0,45*	<u>26,3±0,15</u> 32,2±0,4*
CD 8, %	<u>22,9±0,25</u> 19,9±0,55*	<u>23,2±0,3</u> 20,2±0,3*
CD 16, %	<u>18,2±0,6</u> 17,2±0,5	<u>18,2±1,2</u> 18,0±0,65
CD 72, %	<u>14,8±0,4</u> 12,9±0,45	<u>13,4±0,3</u> 13,2±0,25
HCT spontaneous, %	<u>26,1±0,55</u> 23,7±0,5	<u>26,9±0,7</u> 23,1±0,3
HCT induced, %	<u>44,0±0,35</u> 40,0±0,25*	<u>46,1±0,3</u> 41,7±0,25*

* - p <0,05 when comparing immunological parameters before and after treatment in one group

EHF-therapy has positive influence on the majority of studied parameters of immune system of patients with psoriasis in a progressing stage. Thus, there are no statistically significant distinctions in orientation and degree of correcting action of EHF-therapy in mono-variant and traditional complex treatment. However, specified immunomodulating effect of EHF-therapy was reached within 10-12 days, while similar changes of the immune status at the patients receiving traditional treatment, were reached by the end of the course on 18-21 day.

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Inclusion of EHF-therapy in a medical complex helps to increase anti-inflammatory, analgesic, regenerative effect, and available infiltrate resorption. Expressed clinical effect has been seen in 78 % of the patients from two groups and in 61 % of patients from the control group.

Comparing the results of treatment of psoriatic arthritis in 1 and 3 groups of patients, it appeared, that combining EHF-therapy with traditional treatment has more expressed clinical effect (Table 3) than using traditional treatment or EHF-therapy alone.

Table 3

Efficiency of treatment of patients with psoriatic arthritis

	1st group (n=30)	3rd group (n=14)
Disappearance of pain syndrome	78 %	61 %
Disappearance of morning stiffness	65 %	41 %
Improvement of skin processes	87 %	72 %

Before treatment of patients with psoriatic arthritis, an expressed F-cellular immunodeficiency was observed. In the group that was receiving EHF-therapy, statistically significant increase in the quantity of mature T- lymphocyte (CD 3) and decrease in the quantity of «natural killers» (CD 16) was observed after the treatment; which can not be said in relation to the control group (Table 4).

Table 4

Comparison of the dynamics of immunological parameters of psoriatic arthritis

Parameter	1st group (n=30) M+m	3rd group (n=14) M+m
CD 3, %	<u>48,0±0,45</u> 56,8±0,35*	<u>48,6±0,9</u> 54,3±0,4
CD 4, %	<u>23,3±0,2</u> 29,0±0,25*	<u>23,7±0,3</u> 27,7±0,3*
CD 8, %	<u>22,1±0,15</u> 20,3±0,45	<u>22,0±0,3</u> 20,8±0,35
CD 16, %	<u>28,6±1,15</u> 24,7±0,6*	<u>28,5±1,0</u> 27,7±0,55
CD 72, %	<u>15,4±0,15</u> 12,5±0,45*	<u>15,7±0,15</u> 12,9±0,35*
IgA, г/л	<u>3,9±0,32</u> 2,6±0,22*	<u>3,75±0,3</u> 3,0±0,32
IgG, г/л	<u>13,7±0,35</u> 12,3±0,32	<u>13,6±0,45</u> 12,8±0,45
IgM, г/л	<u>1,86±0,25</u> 1,75±0,3	<u>1,92±0,25</u> 1,76±0,4
HCT spontaneous, % **	<u>28,6±0,4</u> 32,4±0,2*	<u>27,4±0,25</u> 28,2±0,35
HCT induced, %	<u>46,2±0,4</u> 38,4±0,25*	<u>44,5±0,35</u> 39,6±0,4*
Phagocytic reserve, % **	<u>17,6±0,25</u> 6,0±0,2*	<u>17,1±0,3</u> 16,2±0,3

* - p <0,05 comparing immunological parameters before and after the treatment in one group

** - p <0,05 comparing immunological parameters after treatment in experimental and control groups.

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Positive dynamics of clinical signs in the 1st group of patients with a progressing stage of usual form of psoriasis, receiving traditional therapy together with EHF-therapy, was shown 5-7 days earlier, than in the control group of patients receiving only traditional therapy. Comparison of the dynamics of immunological parameters in these groups is presented in table 5. Combining EHF-therapy with traditional treatment has more expressed immunomodulating effect, than using traditional treatment or EHF-therapy alone.

Table 5
 Comparison of the dynamics of immunological parameters in a progressing stage of psoriasis

Parameter	1st group (n=73) M+m	3rd group (n=30) M+m
CD 3, % **	$\frac{56,0 \pm 0,55}{60,8 \pm 0,35^*}$	$\frac{56,2 \pm 0,9}{57,1 \pm 0,25}$
CD 4, %	$\frac{26,6 \pm 0,8}{34,3 \pm 0,4^*}$	$\frac{26,3 \pm 0,15}{32,2 \pm 0,4^*}$
CD 8, %	$\frac{22,9 \pm 0,26}{19,0 \pm 0,5^*}$	$\frac{23,2 \pm 0,3}{20,2 \pm 0,3}$
CD 16, %	$\frac{18,2 \pm 0,9}{16,3 \pm 0,95}$	$\frac{18,2 \pm 1,2}{18,0 \pm 0,65}$
CD 72, %	$\frac{14,6 \pm 0,25}{12,7 \pm 0,45}$	$\frac{13,4 \pm 0,3}{13,2 \pm 0,25}$
HCT spontaneous, %	$\frac{26,3 \pm 0,5}{25,7 \pm 0,3}$	$\frac{26,9 \pm 0,7}{23,1 \pm 0,3^*}$
HCT induced, % **	$\frac{44,1 \pm 0,6}{36,1 \pm 0,35^*}$	$\frac{46,1 \pm 0,3}{41,7 \pm 0,25^*}$
Phagocytic reserve, % **	$\frac{17,8 \pm 0,35}{10,4 \pm 0,2^*}$	$\frac{19,2 \pm 0,25}{18,6 \pm 0,35}$

* - p <0,05 comparing immunological parameters before and after the treatment in one group

** - p <0,05 comparing immunological parameters after treatment in experimental and control groups.

Supervision over patients within 2 years has shown when combining EHF-therapy with traditional treatment, quantity of early (within the first 6 months after treatment) relapses has decreased by 23 % in comparison with the control group (Table 6).

Table 6
 Terms of exacerbation of psoriasis after the complex therapy
 with the use of EHF-therapy and without it

Terms of an exacerbation of psoriasis	1st group (n=30) EHF		3rd group (n=21) control	
	Quantity	%	Quantity	%
Within 6 months	3	10	7	33
6 months to 1 year	13	43	10	48
1 year to 2 years	14	47	4	19

As a result of combining EHF-therapy with traditional treatment, in patients with psoriasis, the disappearance of clinical attributes of progressing skin and joints disease was observed earlier. Positive clinical effect was accompanied by more expressed immunomodulating action, than if giving only traditional therapy. Positive dynamics of immunological parameters in patients receiving only

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EHF-therapy, confirms its immunomodulating action. No patient experienced negative side-effects from EHF-therapy. It is well combined with other kinds of treatment.

Cardiology

The research was done by O.E. Golosova under supervision of Ph.D., Professor E.F. Levitskiy. The research was done from 1997 to 1999 on the basis of Tomsk SRI of Balneology and Physiotherapy. Results of the research were presented in the dissertation for candidate of medical science degree (analogue of Ph.D.) and in methodic recommendations № 99/193 (approved by Ministry of Health, 25.05.2001).

Surgical treatment of ischemic heart disease (IHD) with multivascular lesion of coronary channel increases lifetime and improves its quality, and is also proved to be more effective, than medicament therapy (Agapov A.A., 1996). However, until now, coronary artery grafting involves increased risk of development of post-surgical complications (Zimin J.V., 1993; Jones R.N., 1981). Many researchers prove expediency of preoperational therapy used to stabilize stenocardia and compensate for blood circulation deficiency factors (Akchurin R.S., 1996; Chernyavskiy A.M., 1996). However, quite often patients are intolerant to medicament therapy.

Purpose of the research: to determine preoperational EHF-therapy for IHD patients.

80 IHD patients with stable exertional angina of III-IV functional class (FC) and with progressing stenocardia, with chronic blood circulation deficiency of I-IIA degree, rhythm disturbance in a form of ventricular arrhythmia of 1-4a gradation according to B.Lown, M.Wolf and supraventricular premature beats, with accompanying diseases such as essential hypertension of I-II degree, chronic bronchitis, osteochondrosis of various parts of a spinal cord) were supervised in Tomsk Scientific Research Institute of Balneology and Physiotherapy. Verification of IHD diagnosis was carried out in accordance with WHO criteria in Scientific Research Institute of Cardiology in Tomsk Scientific Centre of Siberian branch of Russian Academy of Medical Science.

All patients were men of 51-69 years. Using method of simple randomization there were formed two groups of patients of relevant age, weight of disease and accompanying pathology: basic group (50 person), undergoing preoperational EHF-therapy, and control group (30 person), not receiving preoperational EHF-therapy.

The period of supervision has been divided into preoperational (10-15 days) and perioperative (intraoperative and postoperative 7 days).

All patients underwent a full complex of therapeutic and functional trial including coronary ventriculography, echocardiography, daily monitoring of arterial pressure (AP), Holter electrocardiogram-monitoring, veloergometrical test before and after the treatment.

Operations for coronary artery grafting (CAG) were conducted in Cardio-surgery Department in Scientific Research Institute of Cardiology of Tomsk Centre of Science of Siberian branch of Russian Academy of Medical Science during 1996 -1998 by one surgery team.

Treatment of all patients in preoperational period included basic standardized therapy (nitrates of prolonged action, beta-blocks and calcium antagonists).

Patients of the basic group also underwent daily course of EHF-therapy for 10-12 days, including the influence on biologically active points (BAP) with CEM-TECH device with radiation frequency in a range of 60,9-61,21 GHz, individually set for each patient. Corporeal BAP (G.Luvsan, 1986) were chosen according to individual development of the disease. BAPs were influenced for 5 minutes each, up to 6 points per session.

Statistical processing of the received data was carried out by Statistica 6.0 package of applied programs. The conformity of distributions to the normal law was carried out by Shapiro-Wilka test. If distribution did not differ from the norm, the results were represented in the form of $\bar{M} \pm s$ where M is

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arithmetical mean, s is root-mean-square (standard) deviation, and comparison of groups was carried out by Student criterion. If distribution in groups differed from norm, to compare the connected groups Wilcoxon criterion was used, and for unconnected Mann-Whitney criterion was used. If p was less than 0,05 distinctions between the groups were considered statistically significant.

In both groups the results of stabilization of the patients’ condition in preoperational period characterized by reduction of frequency and intensity of stenocardia attacks, quantity of daily accepted nitroglycerine, blood circulation deficiency factors, decrease in duration of total daily myocardium ischemia, reduction of extrasystole, normalization of AP, and increase of tolerance to physical activity were noted.

Apparent antianginal effect of EHF-therapy in patients of the basic group revealed itself in the significant reduction of average quantity of stenocardia attacks by 71,5 % (p <0,01) a day and the decrease in average quantity of accepted pills of nitroglycerine by 83,6 % (p <0,01) a day in comparison with initial condition. Whereas at patients of the control group, the quantity of stenocardia attacks and accepted nitroglycerine has decreased only by 14,2 % and 20,1 % accordingly (> 0,05).

Antischematic effect in the basic group was expressed by statistically significant reduction of average quantity of episodes of pain and no-pain myocardium ischemia by 70,2 % and 54,2 % accordingly (p <0,001), and also general duration of a pain and no-pain myocardium ischemia by 54 % and 51,4 % accordingly (p <0,001). At the same time, there was 2 times increase in a walking distance in comparison with initial data, and statistically significant increase in capacity of threshold loading – approximately 10,2 Watt (p <0,01). Patients of the control group had no statistically significant changes in the given parameters.

Antiarrhythmic influence of EHF-therapy revealed itself in statistically significant reduction of average ventricular premature beats by 60,7 % (p <0,001) a day, supraventricular– by 45,8 % (p <0,001) a day in comparison with initial data whereas in the control group ventricular premature beats decreased by 23,3 %, supraventricular – by 17,4 % (> 0,05). Comparison of this data after treatment of patients from basic and control groups revealed statistically significant distinctions (p <0,01).

Besides, hypotensive action of EHF-therapy was revealed, shown by reduction of variability of AP during the day, as well as at night with the decrease in systolic and diastolic AP within a day by 38±2 and 35±2 mercury mm accordingly (p <0,05), that is possibly due to a decrease in sympathico-adrenal activity and renin system.

During the surgery, from all patients right auricle myocardium tissue samples were taken, determining sour polypeptide HSP-70 (pH 5,7-5,9) presence using immunoblot method and method of electrophoresis. Such polypeptide appear in chronic myocardial hypoxia (G.Mancia, 1989). In myocardium samples taken from patients of the control group HSP-70 fibers were determined that in electrophoregramm were shown as polypeptides with molecular weight of 72 kDa and had isoelectric points in a range of pH 5,7-5,9. Myocardium samples taken from patients of the basic group did not contain such polypeptide, what meant reduction in metabolic disorders.

It is known that reperfusional stress results in arrhythmia in perioperative period. The course of EHF-therapy reduced susceptibility of myocardium to arrhythmia, proved self restoration of sinus rhythm in 46 % of patients against 10 % in the control group, statistically significant decrease in frequency and weight of arrhythmia in perioperative period by 32,6 % (p <0,01), in comparison with the control group, and also decrease in threshold defibrillation by 16,8 joule (p <0,01). The stated decrease of a threshold allowed to conduct the procedure of a straight defibrillation, using low-energy categories that are less damaging to myocardium (Table 1).

Table 1

Parameters of the patients’ condition in perioperative period of CAG

	Quantity of the cases (%)
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Parameters	Basic group (n=50)	Control group (n=30)
Self restoration of heart activity	23 (46 %)*	3 (10 %)
Restoration steady sinus rhythm	45 (90 %)*	16 (53 %)
Extrasystole	3 (6 %)*	6 (20 %)
Ciliary tachyarrhythmia	2 (4 %)*	4 (13 %)
Ventricular fibrillation	2 (4 %)*	8 (27 %)
Defibrillation threshold (joule)	11,8±3,4*	28,6±4
Transient atrial ventricular blockade	0	2 (7 %)
Perioperative myocardium heart attack	0	4 (13 %)
Asystole	0	2 (7 %)
Inotropic support	25 (50 %)*	28 (93 %)

* - p <0,01

Improvement of metabolic processes of myocardium was revealed in an absence of perioperative myocardium heart attacks in patients of the basic group, and there was minimal need in inotropic therapy.

According to the results of questionnaire, it was stated that within 12 months after operation exertional angina has renewed at patients from the control group in 14 % of cases, in the basic – only in 4 %. Repeated myocardium heart attacks and progressing heart failure were observed only in patients of the control group, heart rhythm disorders were observed more often among patients of the control group (23 % of cases in comparison to 8 % in the basic group).

Thus, EHF-therapy with individualized adjustment of frequency improves clinical condition of IHD patients and helps to compensate for blood circulation deficiency. A course of EHF-therapy received by IHD patients in preoperational period of CAG, helps to improve metabolic processes in myocardium and reduces its susceptibility to arrhythmia. Results of supervision (in 1 year) show an decrease in frequency of stenocardia and arrhythmia recurrence, absence of recurrent myocardial infarction in the patients that received EHF-therapy, in comparison with the control group.

The research was carried out by c.m.s. O.E.Golosova under supervision of Ph.D., professor E.F.Levitskiy and Ph.D. T.D.Gridnev.

Stress conditions

Clinical test of CEM-TECH device in stress conditions were being performed since 1999 – 2005 on the basis of NII (SRI –Scientific-Research Institute) of traumatology and orthopedics, NGU named by N.I. Lobachevski prophylactory and Military-medical institute of The Frontier (Nizhny Novgorod).

Statistic analysis of the results was performed by the methods of nonparametric statistics, because the distribution of basic indexes differed from the norm. Statistica 6.0 packet of applied programs was used. For comparison of paired groups (before and after influence) Wilkinson criteria was used, and for unpaired – Manna Whitney criteria. If p was less then 0,05, than the difference between the groups was counted as statistically significant.

1st step

**THE CHOICE OF EXPOSITION FOR EHF-PUNCTURE WITH SEDATIVE EFFECT,
DIFFERENT BY THE DEGREE OF INTENSITY**

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Research task of the step: to experimentally prove the choice of *EHF-puncture optimal exposition for the purpose of rendering sedation on the organism* with the following confirmation of the received effect in the process of preliminary clinical tests.

For solution of the task series, researches were performed with the purpose of objectification of the right choice of influence.

50 healthy volunteers at the age from 18 to 57 participated in this work as being tested. Students and teachers of Lobachevski State University, Nizhniy Novgorod, on rehabilitation in preventorium after winter session were in this group.

All people, who took part in the research, were clinically examined (complaints and anamnesis collection) two times (before and after the influence). Psycho physiological test on the developed screening questionnaire, on the basis of Spielberg’s methodic and the hospital scale of anxiety and depression was done as well. If the sum of points on the scale anxiety was 9 and more, and on the scale of depression - 8 and more, there was made a resolution about the presence of psycho emotional disorder in the form of raised level of anxiety and depression, demanding corresponding correction. According to the results of the psychological test, the people being tested were divided into two groups. In the first group (30 people), there were people with diagnostically meaningful deviation in the psycho emotional status, in the second group (20 people), were practically healthy people.

Vegetative status of the people being tested was evaluated with the help of electropunctural reflex diagnostics according to Riodoraku methodic of vegetative test (Y.Nakatani, 1972). Data mathematic treatment was performed with the help of licensed program apparatus’ complex PAC “Point” (I.V. Boitsov, 1998). The data computer treatment of the research consisted in quantitative and qualitative evaluation the vegetative status index from the position norm – pathology.

The radiation by EHF signal in the noise mode with low frequency modulation was performed on the points C.7 or MC.6 (depending on the basic condition of psycho emotional status). In the experiment, exposition for 20 minutes was used. Meanwhile, constant monitoring of the cerebral cortex bioelectrical activity was being performed with the help of electroencephalography (EEG). Besides, every person was tested with imitation of EHF influence (placebo control).

The encephalogram registration was performed according to the standard methodic before and during the time of EHF-puncture performance by “Neurocartographer” (MBN, Moscow) in 19 standard branches with functional loads, with the following visual evaluation and computer treatment of the indexes (EEG spectral power in the basic frequency ranges). Electrodes were situated according to international scheme 10-20 with the use of bipolar and monopolar assembling.

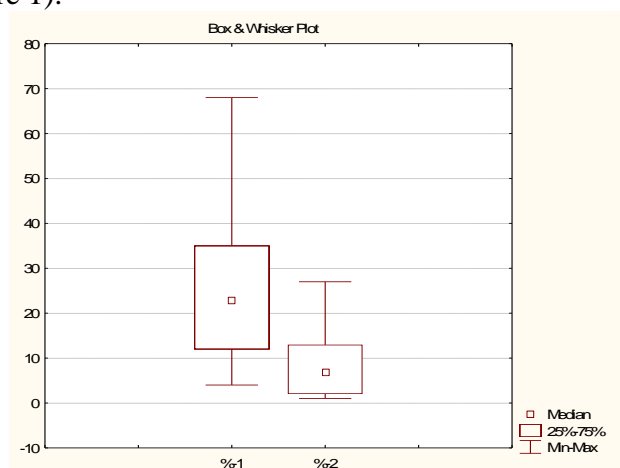
Control of vegetative status condition was performed with the help of neurophysiologic evaluation of its dynamic according to the data of computerized neurofunctional diagnostic “POINTS” (FAST- ANH Centre of the Russian government, Moscow, 1996) by Riodoraku methodic of vegetative test. This method is based on the registration of dynamic changing of spinal neurons activity in response to light stimulation with a standard electrical impulse of the skin (testing signal voltage – 12V, current power 200mcA). With interpretation of the receipt indexes, correlation between vegetative skin regulation in the area of concrete dermatomes and viscera, muscles and sinews was performed. According to the results of diagnostic research, the comparative analysis of the indexes responsible for activity of the symptomatic and parasymptomatic VNS departments was performed.

According to the results of neurovegetative diagnostic, deviation of the peripheral VNS department tone from eytoria condition to the side of predominant symptomatic and parasymptomatic influence was defined. This data was evaluated inside each group, as well as between the groups. Mathematically, the grade of the vegetative deviations of the oversegmental and segmental levels was expressed in points (from 0 to 5), where 5 points was considered as a norm.

Final diagnostic procedure at the end of the treatment course evaluated the grade of the disordered vegetative indexes restoration and treatment efficiency.

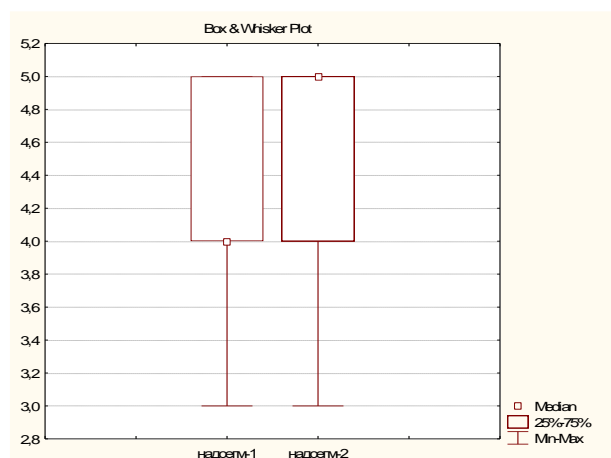
According to the analysis of the examination receipt results, 11 people from the first group proved to have sympathotonia as organism vegetative tone type of disorder. In the second group, there was no vegetative status disorder.

At the end of the performed EHF-therapy, it was pointed by Wilkinson’s criteria that people from the first group had statistically meaningful change in the following parameters: the deviation from eytonia condition by median was reduced from 23 to 8 % ($p=0,0002$), that proves harmonization of the peripheral VNS department tone. Besides, the distance between the last tone indexes of the peripheral VNS department was shortened: before the treatment it was 68-4%, while after the treatment it was 28-2% (picture 1).



Picture 1. Dynamics of peripheral VNS department tone of the patients from the first group in the process of rehabilitation in %.

Point evaluation of regulating influence of oversegmental VNS department in the process of EHF-influence has registered some positive dynamics in the form of median index change from 4 to 5 points ($p=0,007$) and shortage of deviation sparseness before and after the treatment from 1-5 to 3-5 points. The dynamics of the oversegmental VNS department condition in the treatment process is shown on picture 2.



Picture 2. Dynamics of oversegmental VNS department condition of the patients from the first group in the process of EHF-puncture.

Patients from the second group had dynamics of the vegetative indexes in the process of rehabilitation, which proved to be statistically insufficient.

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At the comparison between the two groups by Mann Whitney’s criteria at the end of the restoration treatment, the presence of statistically significant differences in all three indexes being studied ($p < 0,05$) was revealed.

Dynamics of psycho emotional status and peculiarities of brain bioelectrical activity depending on different exposition of EHF-puncture.

Evaluation of the received effect was performed on the basis of clinical psychopathologic analysis and was verified with the help of electroencephalography data.

Clinically, it was noted that all tested people from the first group had reduction of psycho-emotional tension, and sleep and mood improvement took place.

According to Wilkinson’s criteria, statistically meaningful decrease of anxiety level ($p < 0,01$) and depression level ($p < 0,05$) was pointed. People from the first group with diagnosed disorder of psycho-emotional sphere proved to have especially prominent effect. People from the second group, where the indexes of “anxiety” and “depression” differed insufficiently from the norm, had less essential dynamics of the measured indexes.

Interpretation of electroencephalogram results was performed in the following sequence: visual evaluation of EEG counting age changes, bringing out the histograms of EEG rhythm indexation with mathematic computer analysis (spectral power of the main rhythm).

Initial electroencephalograms of the tested people were characterized by moderate disorganization of alpha activity with its spreading to the frontal part of the brain, by hypersynchronization (sometimes with decrease of the alpha-rhythm index and amplitude), by growth of the slow waves index in the background and during making functional tests, by the decrease of reaction on light irritants.

In the process of EHF-puncture, beginning **from the 4-th minute**, growth of the alpha activity index and amplitude was pointed mostly in the occipital and vertex parts. Decrease of the alpha activity index in the frontal parts with normalization of zonal rhythm distribution, with better expressed modulations on the background of moderate reduction of the slow waves index (in all the characteristics $p < 0,05$). Placebo-influence didn’t cause any significant changes.

The analysis of EEG-reactions showed that peripheral exposition of weak electromagnetic fields of EHF-range, as distinct from the placebo-influence, causes reorganization of spatial-temporal organization of the cerebral person’s activity.

The received results proved EHF-puncture influence on the restoration of functional interaction of two nonspecific brain systems (reticular and hypothalamic), that appears in normalizing influence on bioelectrical brain activity and helps psycho-emotional rehabilitation of the patients.

At the end of the performed research it became possible to formulate the following statements:

1. EHF-puncture in the condition of acute or chronic stress is able to render sedative action.
2. It is registered that EHF-puncture has positive influence on restoration of functional interaction of two nonspecific brain systems (reticular and hypothalamic) that shows itself in normalizing influence on bioelectrical brain activity beginning from the 4-th minute of radiation, that helps to restore vegetative and psycho-emotional organism disorder.
3. The maximum expressed result is registered in 10 minutes after the beginning of EHF-puncture action. The following growth of radiation exposition to 20 minutes doesn’t render any sufficient influence on the brain bioelectrical activity.
4. EHF-puncture should be mostly applied to the people who have expressed symptoms of psycho-emotional sphere disorder. If there are some insignificant deviations from the norm, there is no any sufficient influence on psycho-emotional status in the presence of EHF-puncture procedure.

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Project leader

Ph.D. A.G.Polyakova

2nd step

**EHF-PUNCTURE IN COMPLEX RESTORATING TREATMENT OF
STRESS CONDITIONS**

Prospective clinical tests were performed with taking patients of orthopedic profile (135 people) at the age of 18-65 years, who were on rehabilitation in Nizhegorodsky NII (SRI) of traumatology and orthopedics (FGU “NNIITO Roszdrava). They had expressed disorder in psycho-emotional sphere, which had resulted in long term chronic stress factor. Patients were divided in experiment and control groups by the method of simple randomization. In the main group (I), there were 77 patients. Those patients were given basic therapy together with EHF-puncture according to the developed methodic. The comparison group was composed from 58 patients of different in age and sex with analogous pathology, which were getting only basic therapy (II group).

Treatment

CEM-radiation in the noise mode was used, exposition for 10 minutes on point MC.6 (ney guan), the course consisted of 7-10 procedures (depending on the grade of clinical points expression).

The influence is performed with the help of noise radiator (53-78 GHz) in the mode of indeterminate radiation with 10 minute exposition on each point in impulse mode with impulse length 1-3 msec., with multimode reorganization of impulse frequency from 0,1 Hz to 20Hz with the step of 0,1 Hz. Impulse EHF power at the radiator outlet was no less than 0,01mW. The device provides simultaneous work of two radiators, or one of the two which is chosen. The device’s supply is performed by four elements 316 or its analogue SIZE “AA” type or by net adapter for 9V.

Radiator is placed on the point MC6 (ney guan). Recommended influence exposition is 10-30 minutes. The device turns off automatically, that is why it can be left on the spot of action if patient felt asleep. The course of treatment includes 10 procedures, which are performed every day. If needed, one more course can be performed (7 procedures) with the interval from 2 weeks to 2 months, and also supporting procedures are performed (once a week).

According to physiological interpretation of acupuncture channels, heart channels (C) and enteric channels (YG) show psycho-emotional disorder, including the highest nervous action (Bachman G., 1959). Besides, heart channel is cholinergic (parasympathetic), and enteric channel is andrenergic (sympathetic).

Examination

For objectification of patients’ psycho-emotional sphere disorder, Spielberg’s questionnaire and hospital scale of anxiety and depression (by Khanin U.A., 1976) were used. Counting was done by simple summing of the points, which were chosen by the patients themselves. For examination of patients’ vegetative status, Kerdo’s calculation of vegetative index (VI) was used, according to formula:

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VI = AP (diast.) / NHB, where

AP (diast.) - value of the diastolic arterial pressure of the patient,

NHB - number of heart beats of the patient per minute.

The test was performed twice (before and after the end of the treatment course). Estimation of the received effect was performed on the basics of clinical-psychopathologic analysis and was verified by using vegetative index dynamics.

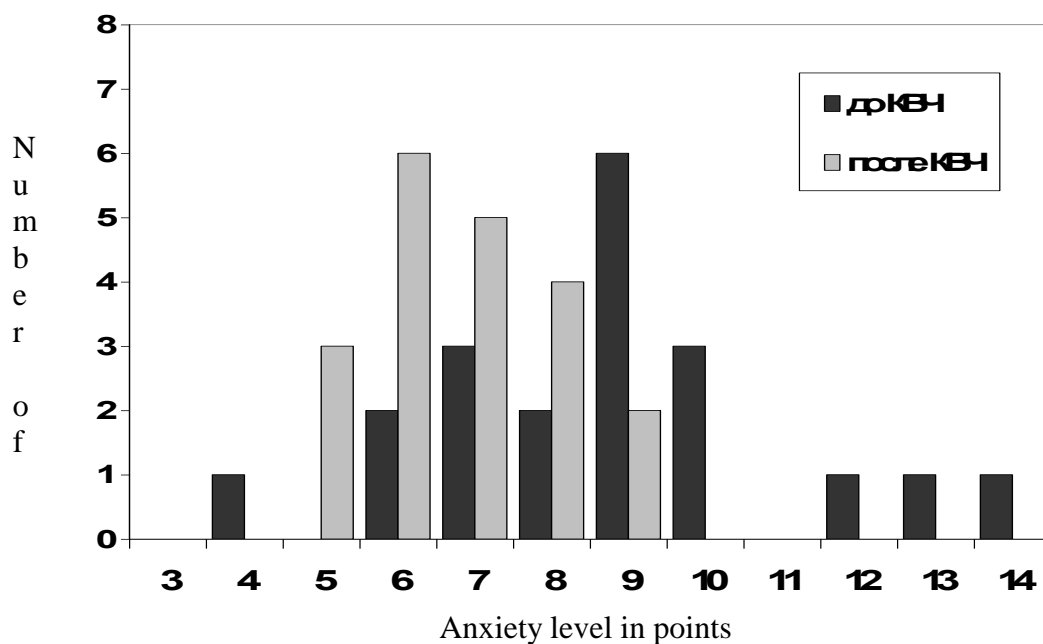
The vegetative status of tested people was evaluated with the use of Kerdo’s index and electro-punctual reflex diagnostics by methodic of Riodarku’s vegetative test (Y.Nakatani, 1972). Examination data processing was performed with the help of licensed program apparatus complex PAK “POINT” (I.V.BOIZOV, 1996).

Results

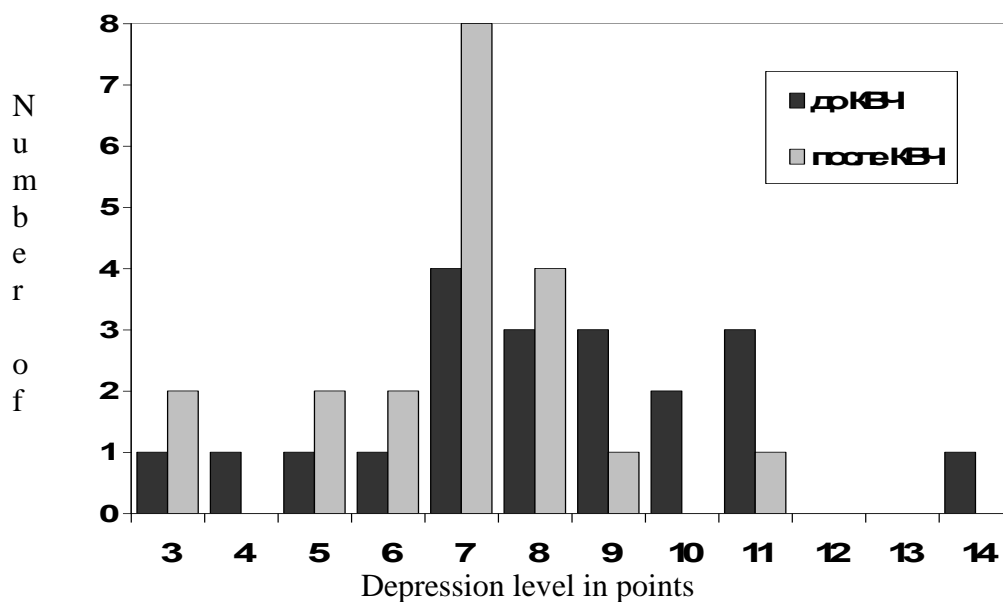
Clinically, before the treatment all patients had anxiety-depressive syndrome and insomnia that developed in the background of expressed locomotor disorder with sudden limitation of moving activity and pains.

After 2-3 EHF-puncture sessions, patients noticed reduction of psycho-emotional tension, sleep and mood improvement. By Wilkinson’s criteria, statistically significant decrease of anxiety level ($p=0,01$) and depression level ($p=0,03$) was noticed. Dynamics of the points meaning by PAK Reodarco at the scales of “anxiety” and “depression” of the patients from the main group is shown on pictures 1 and 2.

As we can see from the data, all patients from the main group were noticing positive effect, and especially apparent effect felt by patients, who had expressed initial psycho-emotional sphere disorder. In those cases, when the indexes of “anxiety” and “depression” didn’t significantly differ from the norm, objective dynamics of the measured indexes was less essential. Deferential analysis of both indexes means that there is a positive dynamics of anxiety level as more labile symptom.

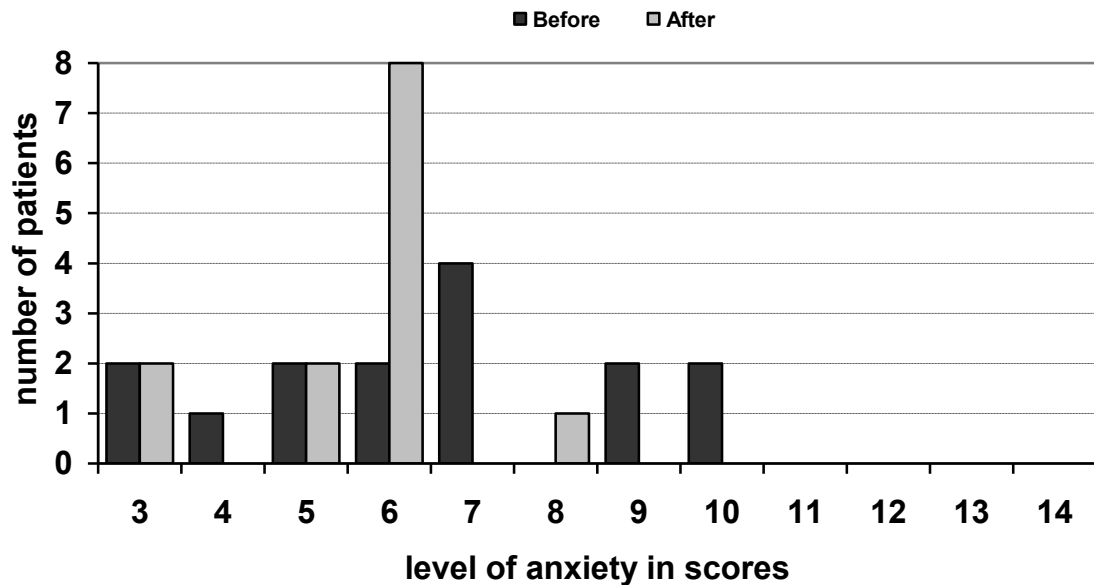


Picture. 1. Dynamics of “anxiety” level of the main group of patients during the process of EHF-puncture

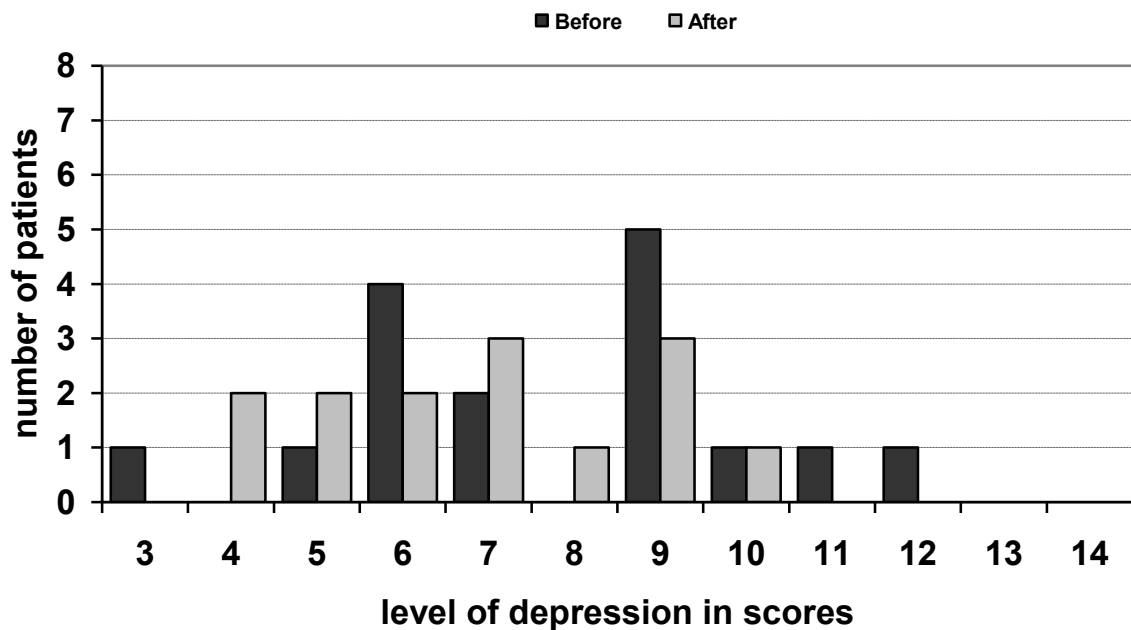


Picture. 2. Dynamics of “depression” level of the main group of patients during EHF-puncture process

Patients of the comparison group, who were given only basic therapy, proved to have less demonstrative results (pictures 3, 4) and less statistically significant ($p=0,02$) than in the main group.



Picture. 3. Dynamics of anxiety level of the comparative group patients before and after the basic therapy course



Picture. 4. Dynamics of depression level of the comparative group patients before and after the basic therapy course

According to vegetative index analysis, it was found out that most of the patients (96%) had sympathocotonia (Kerdo’s index>1,0). The repeated results at the discharge from the hospital gave positive dynamics among all treated patients of the main group: 65 out of 77 people had decrease of Kerdo’s index to 1,0, other patients had <1,0 (vagotonia). In the control group, only 60% of people had analogous result. Subjectively, those patients noted mood normalization in

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the background of general improvement. The received results mean that there is a positive influence of EHF-puncture on patients with domination of sympathetic VNS part tone.

In the process of treatment, after 2-3 procedures of EHF-puncture, patients had quick and expressed sedation (falling asleep during EHF-puncture procedure).

Thus, as a result of this clinical test CEM-TECH device, its positive influence on vegetative and psychological status of the patients with long term stress factor was demonstrated. Its application in complex with basic therapy led to clinical results that were statistically significantly more expressed than when only basic therapy was applied.

Project leader

Polyakova A.G.

Prostatitis

Research was done by A.G. Matveev under supervision of Doctor of medical science, Professor E.F. Levicky. Research was carried out from 1997 to 1999 on the basis of Tomsk SRI of Balneology and Physiotherapy. Results of the research were presented in dissertation for defending candidate of medical science degree (Ph.D. analogue).

Research objective: establish EHF- therapy effectiveness in background resonance radiation mode for chronic prostatitis.

Research object was a sample of 233 patients with chronic prostatitis (CP) of different aetiology in the stage of medium exacerbation or incomplete remission, aged from 18 to 55, with disease length from 3 months to 20 years, remaining under observation and treatment in andrology department of Tomsk RI of Balneology and Physiotherapy Clinic of MH RF. In a random manner, patients were separated in 3 groups:

1 – patients receiving EHF-therapy in background resonance radiation mode according to rectal methodology – 93 persons;

2 – patients receiving EHF-therapy in background resonance radiation mode on biologically active point (BAP) VC 3 suprapubic area – 30 persons;

3 – placebo-control: patients receiving EHF-therapy imitation on biologically active point (BAP) VC 3 suprapubic area – 100 persons.

Groups were comparable by age, severity of clinical course, and length of the disease.

Treatment was done with EHF-therapy CEM-TECH device. Emitter was adjusted with plaster on BAP meridian of urinary bladder VC 3. Treatment, according to rectal methodic, was done with the use of specially engineered rectal nozzle attached to emitter. Procedures were conducted every day for 10-15 min, altogether 10 procedures.

In addition, all patients received Atabekov remedial gymnastics, digital massage of prostate gland every other day or every day for 1-1,5 min. 10 procedures, “pearl” baths for 10-15 min. 10 procedures, hand massage of lumbosacral area.

All patients, received for treatment, were given the following research complex:

1. Estimation of intensity degree of pain and dysuric syndromes, character and severity of copulative function disturbance, somatic complaints, nervous-psychotic disease onsets. Intensity of clinical syndromes was estimated in percentage: 0% - onsets are absent, 25% - onsets are insignificant, 50% - onsets are mild, 75% - onsets are expressed, 100% - onsets are strongly expressed. Intensity of subjective indicators was estimated according to 4 scores scale: 0 – symptom is absent, 1- symptom expressed insignificantly, 2 – symptom expressed mildly, 3 – symptom expressed strongly.

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2. Rectal digital research of prostate gland (PG) and accessory genital glands. Palpistic data about the size, consistency abnormalities and PG sickliness were evaluated according to the developed 4 scores scale. Size: 0 – normal, 1 – some enlargement, 2 – mild enlargement, 3 – expressed enlargement. Consistency: 0 – normal, 1 – insignificant change, 2 – mild change, 3 – expressed change. Sickliness: 0 – none, 2 – mild, 3 – expressed.
3. Microscopic and cytological research of prostatic secretion. Estimation of leucocytes content (amount in the visual field of microscope) and concentration of circulating immune complexes (CIC).

Statistical treatment of findings was done by means of application package Statistica 5.0. Test for conformity of distribution to normal law was done by means of Shapir-Wilk test. If the distribution did not differ from normal, than results were shown in the form of $M \pm s$, where M – arithmetical mean, s – standard deviation, while group comparison was done by means of Student criterion. If the quantitative data distribution in groups was different from normal, or qualitative ordinal data was estimated, than median was used for the description of central distribution tendency, Vilcocon criterion was used for comparison of related groups, while Mann-Witni criterion was used for non-related groups. If p was less than 0,05, than the difference between the groups was considered statistically significant.

Our observations showed that EHF-therapy has expressed anesthetic action. In the 1st group, pain syndrome was liquidated in 98% of the cases, in the 2nd group in 90%, while in the control group – only in 67% of the cases. Besides, rectal methodic showed greater effectiveness towards dysuric syndrome. Decrease of dysuric occurrences in patients of the 1st group was observed on the 1-5 treatment day, whereas in the 2nd group, decrease of dysuric occurrences was observed only on the 5th-7th day. Complete liquidation of dysuric syndrome in both test groups happened on the 8th-10th day from the beginning of treatment.

Under EHF-therapy action, spontaneous excretions from urethra and prostaticorrhea occurrences were stopped in 95% of the patients from 1st and 2nd group, also rehabilitation of normal frictional period, enhancement of spontaneous as well as adequate erections were observed. In control group, this positive dynamics was recorded only in 65% of the patients.

Besides, expressed anti-inflammatory action of EHF-therapy and its normalization action on indicators of local immunity were observed.

Changes in basic indicators in the treatment process are shown in table 1, and on figures 1 and 2.

Table 1

Indicators	EHF rectal (n=100)		EHF puncture (bioresonance) (n=30)		Placebo-control (n=93)	
	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Expressivity of pain syndrome (%)	62±3,5	1,4±0,1 (p<0,001)**	67,6±5,6	2,8±2 (p<0,001)*	60,4±3	11±2 (p<0,001)
Expressivity of dysuric syndrome (%)	50±3,4	5,1±0,1 (p<0,001)	48,2±6,5	6,5±3,7 (p<0,001)*	46,4±3,4	9,8±2,1 (p<0,001)
Expressivity of sexual disorders (%)	23,6±3,7	6±0,2 (p<0,001)	27±6,4	5,6±2,8 (p<0,001)*	34,8±3,8	17±2,5 (p<0,05)
PG size (in scores)	Median 2	Median 0 (p<0,001)	Median 2	Median 0 (p<0,001)*	Median 2	Median 1 (p<0,05)
Leucocytes	28±2	3±1	25±3	6±1	22±2	8±1

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content in prostatic secretion (in the visual field)		(p<0,001)**		(p<0,001)*		(p<0,001)
CIC content in PS (standard units)	---	---	18,3±0,5	9,7±0,4 (p<0,001)*	17,8±0,5	14,6±0,8 (p<0,05)

The results of pair group comparison, before and after treatment, are shown in brackets.

* - when comparing with control group p<0,05.

** - when comparing groups 1 and 2 p<0,05.

In the whole, after the end of treatment course, more expressed positive long-term dynamics of patients’ condition in test groups was observed in comparison with the condition in control groups. However, more significant decrease of subjective and objective disease occurrences was detected in patients receiving EHF-therapy according to rectal methodic, which can be connected with positive action of transrectal bioresonance EHF-therapy on PG neuromuscular apparatus and normalization of PG drain function.

Analysis of remote results of treatment showed the preservation of medical effect during 1,5 years or more in 94% of patients from the 1st group, during 1 year in 87% of patients from the 2nd group, and during 1 year in 56% of patients from the control group.

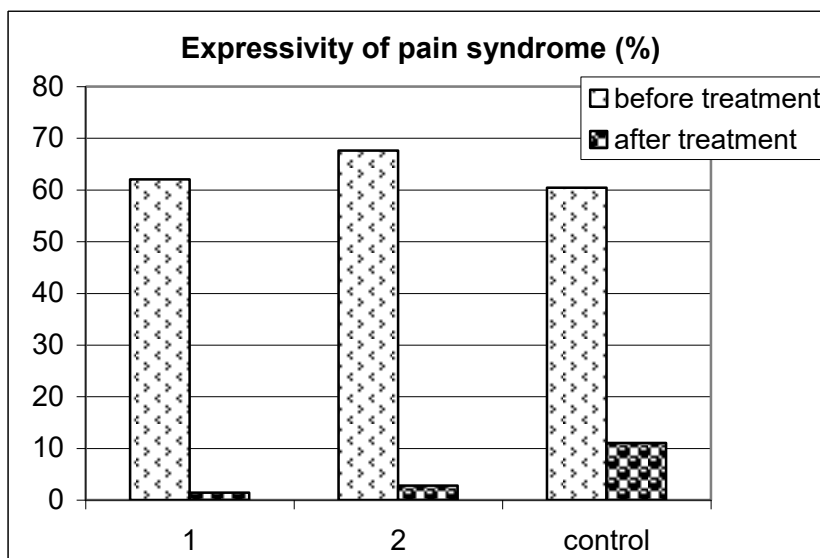


Figure 1

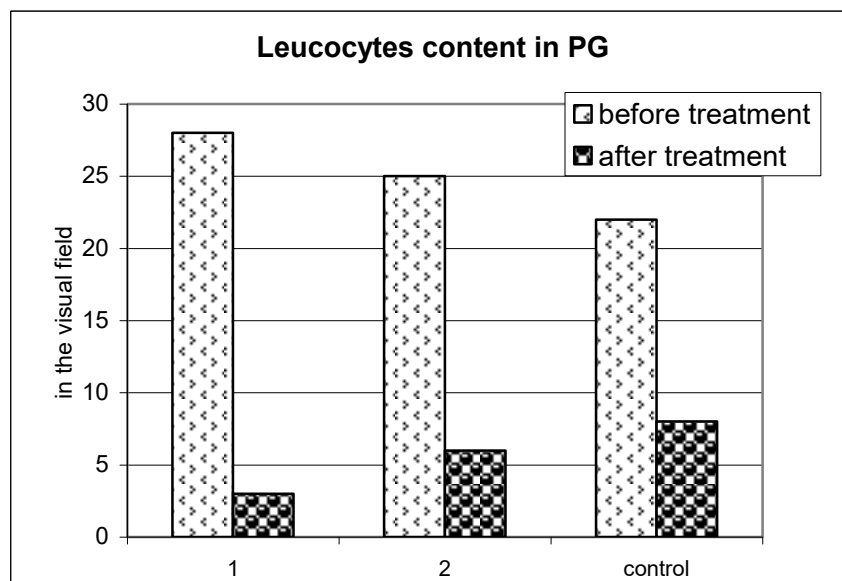


Figure 2

Thereby, high effectiveness of EHF-therapy in bioresonance mode during chronic prostatitis was shown. EHF-therapy has expressed anesthetic action, it eliminates inflammatory occurrences, improves functional activity of prostate gland, leads to correction of immunologic disturbances and sexual function stimulation.

Research was done by M.D., Ph.D. A.G. Matveev, under the direction of Doctor of Medicine, Professor E.F. Levicky.

Oncology

The research was carried out by c.m.s. Kolmatsuy N.B. on the basis of **Tomsk Regional Oncologic Clinic** (the head doctor – c.m.s. E.A.Gubert), **Central Research Laboratory** (head – Ph.D., professor A.N.Baykov) and **Departments of Physiotherapy and Balneology** (head – Ph.D., professor E.F.Levitsky) the **Siberian State Medical University**.

82 men with carcinoma of lung in the age of 38 to 73 years were treated in radiological branch of Tomsk Regional Oncologic Clinic from January 1998 till December, 1999. Cancer diagnosis in each case was established on the basis of radiological, endoscopic and morphological research methods. All patients were defined the degree of prevalence of tumor process, the morphological variant of tumor was established.

All patients were divided into the following groups according to the form of the undertaken antitumoral treatment:

1 – 13 persons: received combined polychemotherapy (PCT from 2 up to 4 medicines, as a rule Cyclophosfan, antibiotics anthracyclines etc.);

2 – 19 persons: received PCT and EHF-therapy;

3 – 14 persons: received remote gamma-therapy («Agat-C» device with two counter fields of radiation, with single focal doze 2 g, and total focal doze 40-50 g, duration of treatment course depending on the doze of radiation was 20-30 days);

4 – 36 persons: received remote gamma-therapy and EHF-therapy.

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EHF-therapy was conducted using CEM-TECH device with individual selection of frequencies in a range of 59-63 GHz (FRI mode). Influence was made consistently on following biologically active points: VC21, VC17, V13, V17, G14. Each point was influenced for 5-7 minutes, general time of the procedure did not exceed 30 minutes. EHF-therapy was carried out daily, 30 minutes prior to carrying out specific antitumoral treatments within 10 days.

Efficiency estimation of treatment was done in conformity with recommendations of experts of WHO on standardization of treatment of oncologic patients (1979).

Hematologic ainspection of patients was spent prior to the beginning of treatment and after termination of antitumoral therapy course.

Statistical processing of the received results was done by the package of applied programs Statistica 5.0. Check on conformity of distributions to the normal law was spent by Shapiro-Wilka test. If distribution did not differ from norm, the results were represented in the form of $\bar{M} \pm m$ where \bar{M} – the average arithmetic, m – mistake of a mean, and comparison of groups was spent by Student criterion. If distribution of quantitative data in groups differed from normal, to compare connected groups used Wolcocson criterion, and for unconnected – Mann-Whitney criterion. If p was less than 0,05, distinctions between groups were considered statistically significant.

Radiotherapy of patients with lung cancer of III-IV stage was accompanied by general (dizziness 57 %, general weakness 43 %, rise in body temperature 29 %, appetite disorders 71 %, and nausea 14 %) and local (pneumonitis 14 %, hemoptysis 7 %) ray reactions. All patients complained of pains when swallowing, difficulty of food passing that corresponded to the phenomena ray esophagitis.

Inclusion in a complex of radiotreatment of patients of EHF-therapy helped to reduce general and local ray reactions. Dizziness was observed in 43 % of the patients, appetite disorders in 19 %, rise in body temperature in 20 %, which is less often, than in group of the patients received only remote gamma-therapy. Patients, in addition receiving EHF-therapy, had less expressed manifestations of beam esophagitis (Table1). In group of the patients received only remote scale-therapy, 7 % had the fourth stage ray esophagitis, and radiotreatment had to be terminated. The use of EHF-therapy allowed continuing the course of radiotreatment.

Table 1

Distribution of patients with lung cancer, receiving radiotreatment,
depending on expressiveness of ray esophagitis

Stage of ray esophagitis	3d group (n=14)– only remote gamma-therapy	4th group (n=36) – remote scale-therapy and EHF-therapy
I	22 %	53 %
II	57 %	39 %
III	14 %	8 %
IV	7 %	-

The results of subjective assessment of general condition of patients with lung cancer show a tendency of more expressed improvement of health state after a course of combined ray and EHF-therapies in comparison with group of the patients receiving only ray therapy (Table 2).

Table 2

Distribution of patients with lung cancer before treatment depending on general condition by criteria
of WHO

General condition disorders by criteria of	Patients before treatment (n=50)	Patients receiving only radio therapy (n=14)	Patients receiving radio and EHF-therapy

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WHO			(n=36)
0 degree	-	-	-
1 degree	14 %	36 %	47 %
2 degree	68 %	50 %	42 %
3 degree	18 %	14 %	11 %
4 degree	-	-	-

Polychemotherapy for patients with lung cancer was accompanied by early and late toxic reactions. Displays of early toxic complications were nausea (46 %), vomiting (23 %), diarrhea (8 %), and general weakness (62 %). Late reactions were characterized by basically developing leukopenia (8 %).

Table 3

Distribution of the patients with lung cancer before treatment depending on general condition by criteria of WHO

General condition disorders by criteria of WHO	Patients before treatment (n=32)	Patients receiving only PCT (n=13)	Patients receiving PCT and EHF-therapy (n=19)
0 degree	-	-	-
1 degree	6 %	8 %	5 %
2 degree	56 %	54 %	58 %
3 degree	38 %	38 %	37 %
4 degree	-	-	-

Combining EHF-therapy and PCT helped to reduce symptoms of early complications (nausea up to 15 %, appetite disorders up to 22 %). 11 % of patients had analectic effect of EHF-therapy.

After the course of PCT in a complex with EHF-therapy, the subjective condition did not differ from those patients that received only PCT (Table 3). It can be connected with the expressed toxic influence of antineoplastic medicines.

By objective criteria of tumor process development no statistically significant distinctions in the surveyed groups of patients were revealed (Table 4).

Table 4

Distribution of patients depending on objective effect of treatment by criteria of WHO

Criteria of WHO	1 group - PCT	2 group – PCT and EHF	3 group – radio therapy	4 group – radio and EHF-therapy
Full remission	-	-	7 %	6 %
Partial remission	8 %	11 %	36 %	36 %
Stabilization	46 %	47 %	43 %	44 %
Progressing	46 %	42 %	14 %	14 %

Patients with lung cancer of III-IV stage undergoing radiotherapy experience deterioration of functional neutrophil activity. Combined use of radiotherapy and EHF-radiation positively influenced morphological functional neutrophil status (Table 5).

Table 5

Morphological functional blood neutrophil status of patients with lung cancer of III-IV stage and its change depending on various schemes of treatment

Parameters	Patients before treatment	Radiotherapy	Radio and EHF-therapy
Quantity of neutrophil,	19,8±1	12,9±1,3*	24,2±1,4 **

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expressing Fcγ -receptors, %			
Quantity of neutrophil, expressing C3b- receptors, %	22,1±1,1	15,0±3,2*	26,5±1,7 **
Quantity of active neutrophil, %	43,3±1,3	36,1±3,9	49,0±1,2 **
Parameter of completed neutrophil phagocytosis, %	62,1±1,1	37,0±4,3*	54,3±1,6 **

* - p <0,01 comparing groups before and after the treatment

** - p <0,01 comparing groups of the patients receiving different treatment

The increase in quantity of active neutrophil in patients that were receiving radio and EHF-therapy, testified the occurrence of functionally more mature forms of segmental neutrophil in peripheral blood in patients with lung cancer. It is possible to assume that EHF-influence, by normalizing receptor activity of cells, helps to restore their functional activity. It can be connected with stabilizing influence of EHF-radiation on cell membranes damaged by radiation and their albuminous structures.

Comparing multifunctional neutrophil status in patients receiving PCT and PCT together with EHF-therapy, no statistically significant distinctions were revealed.

Thus, combination of radio and EHF-therapies considerably reduced general and local radio reactions in patients with lung cancer of III-IV stage, expressiveness of ray esophagitis, and protected cells of granulocytic hematosis sprout, helped to normalize function of mature segmental neutrophil in peripheral blood. Combining of polychemotherapy and EHF-therapy in these patients did not cause neither improvement of health state, nor changes morphological functional neutrophil status in comparison with group of the patients receiving only PCT.

Opisthorchiasis

Research on efficiency of EHF-influence in BRR mode at opisthorchiasis (experiments and clinical tests).

The research was done by c.m.s. O.A.Poddubnaya, E.I.Beloborodova, I.L.Purlik under supervision of Ph.D. E.F.Levitskiy on the basis of Tomsk SRI of Blneology and Physiotherapy of Federal Agency of health and social development together with Department of zoology of invertebrate biology-and-soil faculty of Tomsk State University and Department of pathologic anatomy of Siberian State Medical University, experiments in vitro (on sexually mature marits of *Opisthorches felineus*) and in vivo (chronic opisthorchiasis model) on the effectiveness of EHF-influence in BRR mode were conducted.

The results of the research are precented in monography of Poddubnaya O.A. and others. Modern methods of non-madicament treatment of opisthorchiasis. Tomsk, 2007.

Opisthorchiasis - helminthiasis, caused by parasitizing in hepatic courses and in pancreas ducts by helminths - cat liver fluke - *Opisthorchis felineus*. Opisthorchiasis, caused by cat liver fluke is rather frequent in Russia. High sickness rate is registered in Tomsk (841,1 out of 1 thousand cases) and Tyumen (645,9 out of 1 thousand cases) reions [10]. Nowadays, opisthorchiasis is considered to be a general disease of an organism affecting many organs and systems. Complex of pathogenetic factors including toxic, mechanical, neurogenetic, and secondary infectious leads to system affection of digestion organs and wide variety of clinical picture. Nevertheless, a symptom complex affecting organs of hepatobiliary system with various functional disorder in it is considered to be dominating

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[E.I.Beloborodova, M.I. Kaluzhina, U.A. Tilichenko and others. - Tomsk: Tomsk University, 1996. - 116 p.].

The problem of development of new approaches to treatment of chronic opisthorchiasis is very pointed nowadays. Medicament dehelminthization does not guarantee elimination of functional disorders, and sometimes, it causes development of side-effects. Therefore, the development of non-medicament methods of treatment of this category of patients is especially important (i.e. herbal medicines and physiotherapy). Nowadays, Ecosol, rather (85,5 %) effective vegetative drug is used for treatment of opisthorchiasis [Ecosol: Methodic aid / Authors: M.E. Mozhelin., D.V. Kadukov. – Tomsk: «Gart», 2001.- 20 p.] the medication is practically harmless, though it has several contra-indications.

In Tomsk Scientific Research Institute of Balneology and Physiotherapy of Federal Agency for Public Health and Social Development together with Subdepartment of Zoology of invertebrate animals of Diosoil Department of Tomsk State University and Department of Pathological Anatomy of Siberian State Medical University, experimental researches on the efficiency of EHF-influence in BRR mode in vitro (on sexually mature marits of *Opisthorches felineus*) and in vivo (chronic opisthorchiasis model) were conducted.

Experiments in vitro

Opisthorches were cultivated using G.V.Kandinsky method. Previously optimal conditions of culturing were worked out on 200 opisthorchiasis (Hanks environment).

Influence of an agent containing substance with recorded EHF-radiation of frequency-wave characteristics of opisthorchiasis using CEM-TECH EHF-therapy device, in comparison with such anthelmintic drugs as Ecosol and biltricide, was studied.

200 sexually mature marits of *Opisthorches felineus* were used placed in 4 Petry cups with culturing environment 50 individual in each. The tested agents (bactericide, Ecosol or background resonant radiator), were placed in three cups with the fourth serving as a controlling one (influence-free).

Dynamic supervision was conducted within 10 days. Viability of opisthorchiasis was assessed by following criteria: motion activity, response to brush irritation and change in colour. To assess viability of opisthorchiasis on a three-point scale was used: 3 points for good activity and response to irritation and absence of change in color, 2 points for satisfactory activity and reaction to irritation, partial change in color, 1 point for weak activity and weak reaction to irritation, significant change in color, 0 points for no activity and response at all, full change in color. Helminthicide effect was assessed in case of marit destruction.

Statistical processing of the received results was made using methods of nonparametric statistics, such distribution of basic parameters differed from normal. Package of applied programs Statistica 6.0 was used. For groups compairment Mann-Whitney criterion was used. If p was less than 0,05, the distinctions between groups were considered statistically significant.

Such anthelmintic agent as bactericide, showed significant anthelmintic effect with the mass destruction of marits on the 2-nd day of experiment, and on the 4-th day the destruction opisthorchiasis has reached 100 %. Viability of all individuals in this case decreased by 2-1 times, change in color (full and partial) happened on the 2nd day of supervision, these changes were quickly progressing, resulting in destruction of opisthorchiasis. Ecosol anthelmintic action was not as fast: on the 3-rd day of supervision, 18 of 50 marits (36 %) were killed with decrease in viability criteria up to 2-1 times, on the 6-th day- 44 out of 50 (88 %) were killed, and on the 8-th day the destruction has reached 100 %. In control group, the destruction of opisthorchiasis also took place, thought, possibly, because of unfavorable influence of artificial conditions.

The result of in vitro experiment of the efficiency of anthelmintic agents on the discussed question coincides with the data represented in the literature. The results of this experience are

presented in Table 1. The comparative analysis of anthelmintic action of the investigated factors showed that BRR-influence is similar to Ecosorol ($p=0,51$) and is statistically significantly differs from the control group ($p=0,047$).

Table 1

Anthelmintic efficiency of the investigated factors

Group	% of marits destruction, days of supervision								
	2	3	4	5	6	7	8	9	10
Biltricide	72	92	100						
Ecosorol	16	36	56	72	88	96	100		
BRR	16	48	56	60	72	80	88	96	100
Control group	0	8	12	24	32	44	72	78	80

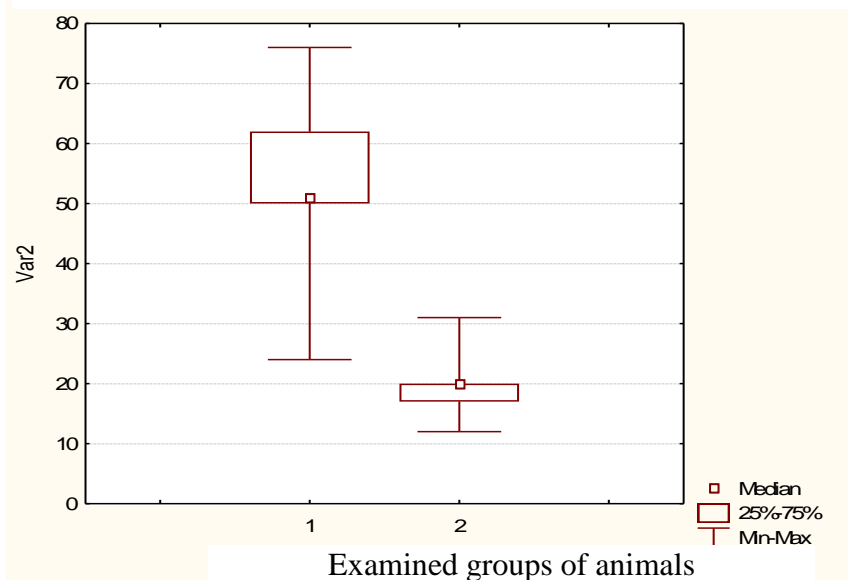
Experiments in vivo

In order to check the results of anthelmintic efficiency of the investigated factors received in in- vitro experiment, series of experiments in-vivo were conducted, with 40 golden hamsters (*Cricetus padus*), infected by opisthorchiasis. Hamsters were infected by feeding them within 7 days with a crude fish (*Leuciscus idus*), caught in the river Tom and microscopically investigated to eliminate metacircaries. Then, the usual diet within 30 days was used. Hamsters necropsy was made in 30 days after infection.

After control necropsy, two of them were proved to be infected - 90 and 95 marits were found. Other 38 have been divided in two groups of 19 animals each. The first group was getting 1,0 ml of 1 % water solution of Ecosorol, entered 3 times a day through the metal probe, for 7 days. The second group was treated using CEM-TECH background resonant radiator device with the written down spectrum of opisthorchiasis radiation which was placed in water and remained there for 7 days.

After the treatment, hamsters necropsy was made and the actual quantity of opisthorchiasis was counted, which statistically significantly differed in the investigated groups ($p=0,016$) (Fig.1).

Fig. 1. Comparison of the quantity of opisthorches located after treatment



The analysis of the received data proves high anthelmintic efficiency (up to 78 %) of BRR-influence when using it as a medical factor in in-vivo experiment.

Clinical tests

106 patients were clinically supervised with diagnosis: chronic opisthorchiasis, chronic cholecystitis (cholangiocholecystis), biliary dyskinesia with prevalence of hypomotor disorders. In clinical picture, the majority of the surveyed patients suffered from of dysfunction of bile-excreting system (nausea - 87 %, heartburn - 89 %, bitterness in mouth - 72 %, weight and feeling overfill in the area of right hypochondrium - 93 %, constipation - 68 %), asthenic syndrome (headaches, indispositions, general discomfort, sleep disorders - 64 %), attributes of vegetative dysfunction (cardiology, excessive sweating, emotional lability - 57 %) prevailed.

All patients received complex treatment including special diet, physiotherapy exercises, coniferous baths, and intragastric electrophoresis of bile-excreting phytomedicines. Average duration rate is 12-15 days.

Efficiency estimation criteria of the conducted treatment were data of clinical and paraclinical researches (ultrasound investigation of bile-excreting system, duodenal intubation, microscopic and biochemical research of bile, data of general and biochemical analysis of blood).

Patients were divided into three groups by simple randomization method, as a result, groups appeared to be comparable by age, gender, duration, severity of the disease, and the presence of concomitant diseases.

BRR-therapy was conducted by means of CEM-TECH device in one of two ways. Way №1 – a radiator was placed on patient’s body (fixed by adhesive plaster) in a projection of liver (area of right hypochondrium), following media clavicular lines, below the right costal arch on 1–1,5 sm, for the period of 7 days (radiator was removed for the period of general water procedures reception, during carrying out intragastric electrophoresis, and for the sleep period). Way №2 – a radiator was placed in a liquid (drinking water), which is in 1,5 seconds was ready to the use. It was prescribed for 100-150 ml 3-4 times daily, 30-40 minutes prior to meal, within 7 days. The choice of the therapy way depends

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on specific features: hyper-sensitization of medical adhesive plaster, with presence of damages in zone of possible localization – way №2 was used, with absence of the listed features –way №1 was used. After preliminary comparison on the efficiency of offered ways, no statistically significant differences were revealed.

Statistical processing of the received results was done by means of Statistica 6.0 package of applied programs. The conformity of distributions to the normal law was checked using Shapiro-Wilka test. If distribution did not differ from norm, results were represented in the form of $M \pm s$ where M – an average arithmetic, s – mean square (standard) deviation. Groups were compared by means of Student criterion. If distribution in groups differed from norm, connected groups were compared using Wilcoxon criterion, unconnected groups were compared with Mann-Whitney criterion. If p was less than 0,05, distinctions between groups were considered statistically significant.

The first group (35 persons) has been treated with additional use of EHF-therapy with written down spectrum of electromagnetic radiation of sexually mature marits of opisthorches.

Clinical tolerance of medical course was estimated as good. 99 % of the patients did not have clinical complaints after treatment. Effect of the treatment (absence of eggs opisthorches in bile) accrued in 68 % (24 patients) right after the course of treatment, and in up to 85 % (30 patients) 12 months later. All treated patients improved parameters of contractile functions and volumetric characteristics of bilious bubble: volume of cystic bile portion has decreased from $81,3 \pm 5,2$ up to $68,3 \pm 3,6$ ml ($p < 0,05$), in 6 months this parameter has decreased up to $49,9 \pm 4,8$ ml and remained within the limits of norm up to 12 months. Retentivity of therapeutic effect lasted from 6 (90 % treated) to 12 (58 % treated) months.

Patients of the second group (31 people), together with complex treatment, received anthelmintic therapy with Eosorol, which was prescribed on the 3-4 day of treatment in 6g 3 times a day in 30-40 minutes after meals, within 7 days. After treatment, 91 % of patients’ complaints have disappeared, 62 % eggs of opisthorches in bile have disappeared. The volume of cystic bile portion has decreased from $79,8 \pm 4,2$ to $68,4 \pm 3,8$ ml ($p < 0,05$). Retentivity of therapeutic effect lasted from 6 (85 % treated) to 12 (43 % treated) months. Comparing these results with the results of treatment in the first and third groups, no statistically significant differences were revealed.

Table 2

Efficiency of the conducted treatment

Studied parameter	Terms of efficiency estimation			
	Before treatment	After treatment	In 6 months	In 12 months
Absence of complaints and references	Group of 1 : 0 %	99 %	90 %	58 %
	Group of 2 : 0 %	91 %	85 %	43 %
	Group of 3 : 0 %	89 %	56 %	24 %
Absence of eggs Opist.fel. in bile	Group of 1 : 0 %	68 %	83 %	85 %
	Group of 2 : 0 %	62 %	85 %	87 %
	Group of 3 : 0 %	17 %	14 %	11 %
Volume cystic bile (ml)	Group 1: $81,3 \pm 5,2$	$68,3 \pm 3,6$	$49,9 \pm 4,8$	$56,3 \pm 4,1$
	Group 2: $79,8 \pm 4,2$	$68,4 \pm 3,8$	$51,2 \pm 4,8$	$57,2 \pm 3,9$
	Group 3: $78,6 \pm 5,2$	$69,3 \pm 4,4$	$61,2 \pm 3,2$	$65,7 \pm 6,5$

Patients of the third group (the control group included 40 patients) did not have anthelmintic therapy. The majority of patients have improved contractile functions parameters and volumetric

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characteristics of a bilious bubble. Insignificant anthelmintic effect (considerably smaller, than in the 1st and 2nd groups, $p < 0,001$) is possible to be explained by improvement of drainage function bile-excreting system. Comparison of treatment efficiency in different groups of patients is shown in Table 2.

Thus, antiopisthorchiasis effect of BRR-therapy following the offered technique is similar to Ecosorol. The advantage of EHF-method consists in non-medicament antiopisthorchiasis therapy that helps patients to avoid side-effects of medical products and allows to treat patients that intolerant and allergic to these medications. Sufficient background antiopisthorchiasis effect as well as beneficial effect on the parameters of functional biliary activity was revealed. No patient experienced adverse side-effects from EHF-therapy.

Economic effectiveness of the developed medical complexes is expressed in reduction of terms of hospitalization in comparison with traditional methods, from 18-21 to 12-14 days, which allows to lower treatment costs. Also, duration and frequency of aggravations occurrence within a year of supervision in more than 70 % patients allows to reduce periods of disablement. Social efficiency is expressed in greater availability of this type of treatment and in improvement of patients' life quality in connection with reduction of aggravations frequency.

Prescription of complex treatment including BRR-therapy to patients with chronic opisthorchiasis, helps to decrease the number of complications and side-effects and to improve treatment effectiveness, by increasing terms of remission, reduction of early relapses connected with dyskinetic disorders in bile-excreting system, improvement of intrahepatic hemodynamics and biochemical structure of a bile. Received results allow us to recommend the offered way for non-medicament antiopisthorchiasis with chronic opisthorchiasis in out-patient and stationary conditions.

Stomatology

Further, you can see a report on the conducted research work in the context of financing program by State Fund for assistance of small enterprises in the scientific-technical sphere.

144 somatically unburdened patients with generalized paradontitis with average stage of difficulty were under examination in stomatologic clinic “Zhemchug”, Saint Petersburg (head physician – academic RAMTS, Ph.D. of Medical Sciences I.G. Makarievsky). Examination was conducted from February 28th to August 1st 2006 (with the use of CEM-TECH device), and from April 1st to May 30th 2007 (with the use of hydro-isolated radiator). Age of the patients was from 30 to 65 years, 66 males and 78 females.

In the first series of clinical studies, 47 patients (23 males and 24 females) participated. They were separated by randomization method in two groups: main – 25 people, and control – 22 people. Quantity of patients in the subgroups was: 17 people with paradontitis at the remission stage and 8 people with acute condition of paradontitis in the main group; in the control group, the quantity of patients was 16 and 6 people accordingly. In this series of studies, CEM-TECH device with radiator, acting from the side of skin coverlets, was used.

In the second series of clinical studies, where test sample of specialized CEM-TECH device for stomatology (with oral radiator) was used, total number of patients was 97 people (43 males and 54 females). Patients were also selected by randomization method and divided in two groups: the main group included 56 patients and the control group included 41 patients. Each group, by analogy with the first series of studies, consisted from two subgroups: patients with paradontitis in the remission stage and in the acute condition stage. In the main group, the first subgroup had 39 people and the second group had 17 people in it. In the control group, the first subgroup included 28 people, and the

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second group included 13 people. Thus, in the first series of clinical studies, 32% of the patients with acute condition of paradontitis were in the main group, 27% of the patients (the difference is statistically insignificant) were in the control group. In the second series of studies, 30% of the patients with acute condition of paradontitis were in the main group, 33% of the patients (the difference is statistically insignificant) were in the control group. Parts of the patients with acute condition of paradontitis out of the whole number of patients in the first and second series of studies were also practically the same: 30% and 31.5% accordingly.

Patients from both groups in the first and the second series of the studies received complex treatment according to a common scheme, described later, however the complex of treatment-prevention events in the first group included CEM-therapy, and patients in the control group received just traditional therapy.

Traditional scheme of complex therapy included (medicaments were prescribed in regular doses):

1. Consultation with patients, teaching the rules and skills of oral hygiene.
2. Professional oral hygiene, including removal of dental deposits in upper-gum and reachable on before-surgery period under-gum.
3. Medicament therapy:
 - antibiotic therapy (rulid or summamed for 10 days);
 - antifungal (prevention) therapy – together with antibiotic therapy course (nistatin);
 - hyposensibilisation therapy (tavegil, calcium gluconate);
 - nonstroid anti-inflammatory therapy (nise);
 - antibacterial therapy against anaerobic microorganisms (metonidasol);
 - stimulating therapy (insadol);
 - systematic enzyme-therapy (vobenzyme);
 - medicaments for normalization of metabolic processes in bone tissue;
 - antioxidant therapy (klamin);
 - vitamin therapy (komplevit or dekamevit);
 - entersobcia (poliphepan);
 - immune-correcting therapy (imudon).
4. Local anti-inflammatory treatment:
 - abluion of pathologic pockets and irrigation of the oral cavity by 0.1% of hereogeksidin bigmokonat;
 - applications on gums with “Metrogil Denta” gel;
 - mouth washes with elixirs (elam, fitodent);
 - use of treatment-and-prevention tooth pastes;
 - adhesive pastes for the protection of gum and prevention of blocking medicaments in it (“Solkoseril dental adhesive paste”).

5. Open (surgical) treatment. All patients from both groups received flap surgery with plastics of bone sockets, with the use of procedure for regeneration of parodontium tissues and correction of the gingival edge. On all patients, surgical intervention was done in single-stage in all parts of the dentition (dentitions) that needed to be operated.

After the formation of soft-tissue flaps and de-epitalisation of pathologic sockets, the following was conducted:

- removal of sub-gingival dental deposits, pathologic granulations and residual fibers, and also, softening root cement;
- operative site treatment with 3% hydrogen peroxide solution on turundas with the following irrigation with 0,1% chlorine-gexidine bi-gluconate osteogenes solution;
- insertion of reparative osteogenesis optimizers into the bone sockets;

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- laying of flaps in situ and their fixation by vertical mattress or inside-papillary sutures with the use of vicryl №00;
- bandaging (repin).

Physiotherapy, with the exception of local hypothermia for the period of 2-3 after-surgery days, was not used for the reason of not complicating the estimation of CEM-influence effect in the main group of patients.

6. Orthopedic treatment.

- Selective teeth grounding-in with Schuyler. It was done in two series of studies on all 130 patients from both groups that were receiving orthopedic treatment, as after the check-up they were diagnosed with traumatic articulation.

- Teeth splinting was also conducted on all of the patients from both groups, including when the clinical indications of functional teeth overload was absent, to prevent functional teeth overload.

Statistical analysis showed that statistically significant difference in all of the above listed parameters, characterizing the structure of groups and subgroups, and used methods of treatment in the first and the second series, is absent.

CEM-therapy

In the first series of studies, all patients from the main group received CEM-therapy course, according to the method of I.G.Makarevsky and co-authors (2005), besides getting treatment in a compliance with the above listed scheme. Length of the course was 14 days: 1 week before the surgery and 1 week after the surgery.

Patients of the control group were getting only traditional treatment.

The method of CEM-therapy used on the patients from the main group is described below.

A. EHF-therapy. “CEM-TECH” device was used in the noise regime. The number of course was 10. As a rule, in order to decrease the length of the procedure, two emitters were used: one was tightly attached to the device, and another was connected to the device with a cable. Emitters were influencing both parts of the jaw simultaneously.

Method of influencing: emitters were slowly (with the speed of 8-10 cm per minute) and continuously moved on the face skin surface in the projection of teeth roots, from the most distally situated teeth to the middle line and back. The force of pressing the emitter to skin was regulated (according to the sensations of a doctor and a patient) in the way that secures the full (without empty space) contact of the emitter’s surface with the skin, but at the same time, to avoid sensation of pain in the area of influencing. The length of the procedure for one part of a jaw (in the case of working with two emitters simultaneously – the whole time of influence) was: 5 minutes in the pre-surgery period, and 10 minutes in the post-surgery period.

B. BRR-therapy. The number of courses was 10. After EHF-influence that was intended to suppress inflammatory reaction in the parodontium tissue, parodontium BRR-therapy was conducted. Its main purposes were suppression of pathogenic micro-flora and rehabilitation of normal microbial balance in the oral cavity, energization of factors of non-specific protection of tissues in the oral cavity and the whole body, and strengthening immune system against infective agents of inflammatory processes in parodontium.

Method of influencing: the emitter was consistently fixed with court plaster to the face skin in three points. First point was corresponding to the projection of central cutting teeth and was situated on the middle line. The other two points were situated in the middle of the sections that were connecting the first point with distal projection in the teeth row on the corresponding part of the jaw. In each point, after recording the spectrum of electromagnetic radiation from the subjected tissues (for 1 minutes), emitter was left for 10 minutes for BRR-influence.

In the second series of studies, all patients from the main group, besides getting treatment according to the described earlier scheme, received the course of intra-oral CEM-therapy using the

I.G.Makarievsky and co-authors (2005) method. The course was 14 days long, it included 1 pre-surgery week and 1 post-surgery week.

Patients of the control group were getting only traditional treatment.

CEM-therapy method used on the patients from the main group is described below.

EHF-therapy: «CEM-TECH» device was used in the regime number 3. The number of courses was 10. As a rule, in order to decrease the length of the procedure, two «CEM-TECH» devices with experimental intra-oral emitters, connected with the device’s cable, were used. Emitters were influencing both parts of the jaw simultaneously.

Method of influencing: emitters were slowly (with the speed of 8-10 cm per minute) and continuously moved on the outer surface of jaw’s alveolar appendix along the transitional fold, in the projection of teeth roots, from the most distally situated tooth to the middle line and back. The force of pressing the emitter to skin was regulated (according to the sensations of a doctor and a patient) in the way that secures the full (without empty space) contact of the emitter’s surface with the mucous tunic, but at the same time, to avoid sensation of pain in the area of influencing. The length of the procedure for one part of a jaw was: 5 minutes in the pre-surgery period, and 10 minutes in the post-surgery period.

Intra-oral CEM-influence was supplemented with BRR-therapy, which was done according to the methods fully analogous to the described earlier (conformably the first series of the studies).

In patients in the supervised groups, the condition of parodontium tissues was estimated before, right after the treatment, and also in the closest periods. It was done with help of clinical indicators (color and density of gum, it’s stomatorrhagia, teeth mobility), and also with contemporary standard objective methods of checkup: determination of iodine number according to Svarkov, determination the hygiene index according to U.A. Fedorov-V.V.Volodkina and RMA, determination of the depth of dentogingival sockets and analysis of radiography data (jaw orthopantomography and interproximal intra-oral roentgenograms according to Raper).

All results from clinical studies were statistically manipulated with the use of non-parameter methods (Mann Whitney criterion and Wilkinson criterion). Statistica 5.0 software was used.

First series of studies

During checkup of the patients in the clinic right after the surgery, the following picture was seen: soft tissues edema, sickness feeling in the area of intervention and in the area of regional nodes, alveolic appendix mucous tunic extravasation, and hypertension in the hard tooth tissues. Along with wounds healing, pain reactions were decreasing.

In a whole, the dynamics of the process was seen in the following way.

In the main group, pain reaction in the 1st post-surgical day was seen in 16 (64%) of the patients, by the 2nd day, in 12 (48%) patients, by the 3rd day – in 5 (20%) patients, by the 5th day it disappeared completely.

In the control group, pain reaction appeared more significantly and was seen on the 1st day in 19 (86%) patients, by the 2nd day – on 13 (59%) patients, by the 3rd day – in 9 (40%) patients, by the 5th – in 4 (18%) patients, by 7th – in 2 (9%) and fully disappeared completely by the 8th day (in all of the cases $p < 0,05$).

The dynamic of regional lymphadenitis, in a whole, complied with the dynamic of pain reactions. In the main group, the reaction from the side of regional lymphadenitis took place on the 1st post-surgery day in 14 (56%) patients, on the second day – in 8 (32%) patients, on the 3rd – in 3 (12%) patients, by the 5th day it disappeared completely.

In the control group, analogous reactions were seen on the 1st day in 17 (77%) patients, on the 2nd day - in 10 (45,5%) patients, on the 3rd – in 5 (22,7%), by the 5th day - in 2 (9%), and disappeared completely by the 7th day ($p < 0,05$).

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Soft tissues edema (in lips, buccal, auriculotemporal, intraorbital, submaxillary, genial regions) in the main group on the 1st post-surgical day occurred in 21 (84%) patients, on the 2nd day – in 11 (44%), on the 3rd day – in 6 (24%), by the 5th day it disappeared completely.

In the control group, edemas were seen on the 1st day in 22 (100%), on the 2nd day – in 14 (63,3%), on the 3rd – in 8 (36,6%), and it disappeared completely by the 7th day (in all of the cases $p < 0,05$).

Post-surgical edema and hyperemia of the gingival border with different degree of manifestation (statistically, reliable differences were not detected) were seen in 100% of the patients in 1-2 day. However, further dynamics of this clinical indicator in the main and control groups varied significantly.

So, in the main group, edema and gum hyperemia remained by the 3rd day in 19 (76%) patients, by 5th – in 11 (44%), by 7th – in 1 (4,5%), and by 10th day disappeared in all patients.

In the control group, stated effects took place on the 3rd day in 20 (90%) patients, on the 5th – in 13 (59%), on the 7th – in 7 (32%), and by the 10th day they wended up completely. Thus, by the time of the removal of stitches, practically all patients from the control group had all clinical indicators of residual inflammation activity in the parodontium tissues, which has not been seen in the main group.

In the post-surgical period, the appearance (or strengthening of already present before the surgery) hypertension of hard tooth tissues was seen in the main group in 17 (68%) patients, and in the control group in 18 (81%).

Dynamics of normalization of mineralization processes and remineralization of hard tooth tissues along the use of CEM-therapy or it’s absence was statistically differing ($p < 0,05$). So, in the main group, out of 17 patients, that were suffering from post-surgical hypertension, the full elimination or considerable decrease of clinical manifestation of the stated pathology was observed after 14-15 days in 8 (47%) patients, 21-22 days – in 3 (18%), 28-29 days – in 2 (12%), 35-36 days – in 2 (12%). 2 (12%) patients had hypertension for the whole period of observation (3-5 months). In the control group, the analogical effect was reached on 14-15 day in 6 (33%) patients, on 21-22 day – in 2 (11%), on 28-29 day – in 4 (22%), on 35-36 day – in 2 (11%), on 28-29 day – in 4 (22%), on 35-36 day – in 2 (11%), on 42-43 сутки – in 1 (5,5%). 3 (17%) patients had hypertension existed for the whole period of observation (3-5 months).

The difference in the initial percentage of patients that had post-surgery hypertension in the main (68%) and control (81%) groups could be explained by positive influence of post-surgical course of CEM-therapy on trophic processes in parodontium and hard tooth tissues, which in part of the cases allowed to prevent the development (progressiveness) of this pathology, and in the rest of the cases it contributed to it’s rapid treatment.

In the main group, most of the patients – 18 (72%) out of 25 did not have alveolic appendix mucous tunic extravasation. In this sub-group of the patients, in just 4-5 days after the surgery, stitches started to come through, and by the 7-9 day (i.e. 2-4 days earlier than usually) the full wound epithelization occurred. Patients noticed comfort feelings and the improvement of the somatic status in a whole. The rest 7 (28%) of the patients had alveolic appendix mucous tunic extravasation, though, they were less expressed (on average on 30-40% less in area extent) in comparison with patients in the control group. In this subgroup, epithelization was occurring more slowly, only by 10-12 day (i.e. in regular time period).

In the control group, the absence of intra-mucous extravasations and faster, in comparison with regular (in the periods, analogous stated for the correspondent sub-group) was seen in 8 (36%) patients. In the rest of the cases, intra-mucous extravasations of different diffusion patterns took place and the complete wound epithelization occurred by 11-13th day, i.e. practically in the regular expected period.

So, the results of clinical studies on the use of alternate CEM-influence on biologically active zones of patients, suffering from generalized paradontitis of the 2nd degree of complication, earnestly

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show us that the use of this type of influence contributed to smother passing of post-surgical period, faster elimination of the pain syndrome, edema of the soft tissues, occurrences of regional lymphadenitis (on average, 2-3 days earlier in comparison with the patients of the control group).

In the main group, by the time of stitches removal (7-8 day), patients did not have any signs of remaining inflammatory reaction in the parodontium tissues (edema and gum hyperemia), wounds healed in most of the patients (72%), the overall condition and work ability were rehabilitated in 100% of the patients.

In the analogous time period, 32% of the patients, so, practically every third patient had signs of remaining inflammatory reaction in the parodontium tissues, which was completely stopped only by 10th post-surgery day. Along with that, full wound epithelization happened in most patients (64%) only by 11-13th day, including 2 patients, whose wounds healed by the secondary pull, caused by wound border separation, which was not seen in the main group.

The above listed facts let us conclude that pre- and post-operational CEM-therapy clearly influences regeneration processes in the parodontium tissues, and shortens the period of wound healing by average of 2,4 days ($p < 0,05$).

The dynamics of objective indicators of parodontologic status of patients before and after the conducted course of medical and operational treatment (Aynamo sample, hygiene index, radiographic signs of bone sockets reduction) confirms anti-inflammatory and antimicrobial effect of pre- and post-surgical CEM-therapy effect as an element of complex treatment of patients suffering from generalized paradontitis of the middle stage of complication.

On the whole, the data, received from clinical research, allows us to state that CEM-influence (even conducted from the side of skin coverlets, i.e. on the range of no less than 1cm from pathologic center and with optional disposition of the emitter, not adapted for direct contact influence on oral cavity organs and tissues) has positive impact on the course of post-surgical period and on the closest and immediate treatment results.

Second series of studies

During checkup of the patients in the clinic right after the surgery, there was seen the following picture: soft tissues edema, sickness feeling in the area of intervention and in the area of regional nodes, alveolic appendix mucous tunic extravasation, and hypertension in the hard tooth tissues. Along with wounds healing, pain reactions were decreasing.

In a whole, the dynamics of the process was seen in the following way.

In the main group, pain reaction in the 1st post-surgical day was seen in 29 (52%) of the patients, by the 2nd day, in 15 (27%) patients, by the 3rd day – in 8 (14%) patients, by the 5th day – in 3 (5%) patients.

In the control group, pain reaction was seen on the 1st day in 37 (90%) patients, by the 2nd day – on 32 (78%) patients, by the 3rd day – in 26 (63%) patients, by the 5th – in 17 (41,5%) patients, by 7th – in 8 (18,5%) and in 3 (7%) patients by the 8th day (the difference is statistically significant in all of the cases $p < 0,05$).

The dynamic of regional lymphadenitis, in a whole, complied with the dynamic of pain reactions.

In the main group, the reaction from the side of regional lymphadenitis took place in 19 (34%) cases.

In the control group, analogous reactions were seen in 28 (68%) cases ($p < 0,05$).

Soft tissues edema (in lips, buccal, auriculotemporal, intraorbital, submaxillary, genial regions) in the main group occurred in 31 (55%) cases.

In the control group, edemas were observed in 36 (88%) cases ($p < 0,05$).

Post-surgical edema and hyperemia of the gingival border with different degree of manifestation (statistically, reliable differences were not detected) were seen in 100% of the patients in

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1-2 day. However, further dynamics of this clinical indicator in the main and control groups varied significantly.

So, in the main group, edema and gum hyperemia remained by the 3rd day in 15 (27%) patients.

In the control group, stated effects took place on the 3rd day in 27 (66%) patients. Thus, by the time of the removal of stitches, practically every third patient from the control group had all clinical indicators of residual inflammation activity in the parodontium tissues, which has not been seen in the main group.

In the post-surgical period, the appearance (or strengthening of already present before the surgery) hypertension of hard tooth tissues was seen in the main group in 17 (30%) patients, and in the control group in 26 (63%).

The difference in the initial percentage of the patients, suffering from post-surgical hypertension in the main (30%) and control (63%) groups, we explain as positive influence of pre-surgery course of CEM-therapy on trophic processes in parodontium and hard tooth tissues, which in part of the cases allowed to prevent the development (progressiveness) of this pathology, and in the rest of the cases it contributed to it’s faster recovery.

In the main group, most of the patients (45 or 80%) did not have alveolar appendix mucous membrane hemorrhage. In this subgroup of the patients, in 4-5 days, stitches started to come through, and by 7-9 day (2-4 days earlier than usual) full epithelization occurred. Patients noticed comfort of sensations and improvement of the somatic status as a whole. The rest 11 patients (20%) had alveolar appendix mucous membrane hemorrhage, they were less expressed (30-40% smaller by area) than in the control group. In this subgroup, epithelization happened more slowly, only by 10-12th day (in the usual time period).

In the control group, the absence of intra-mucous membrane hemorrhage and faster epithelization, in comparison with the usual period (analogous period, stated for corresponding subgroup), took place in 17 (41,5%) patients. In the rest of the cases, intra-mucous membrane hemorrhage of different distribution and full epithelization occurred by 11-13th day, i.e. usual time period.

We would like to emphasize that we did not count edemas of around-jaw soft tissues, hypertension of hard teeth tissues, and moderate pain sensations as complications. These conditions are normal effects of surgical trauma. “True” complications, such as after-surgery bleeding, wound suppuration, extensive hematoma, wound dehiscence, were not observed in the main group. In the control group, in 3 (7%) patients, on the 2-3rd day after surgery, partial wound dehiscence (in the area of 3-4 teeth) took place.

In the nearest periods after the treatment (3-6 months), all patients had remission of generalized parodontitis. However, differently expressed gingival hemorrhage at reconnaissance in the area of operated teeth (positive Aynamo probe) were observed in 5 (23%) patients of the control group and in 4 (16%) of the main group. After examination, all patients received professionally controlled oral hygiene. Patients with the positive Aynamo probe were additionally getting treatment of the repeated course of vitamin and antioxidant therapy, oral rinsing.

Thus, clinical tests results on the use of differently directed CEM-influence on biologically active zone of the patients with generalizes parodontitis of middle severity stage, convincingly proof that the use of stated influence contributed to smoother passing of post-surgery period, faster liquidation of the pain syndrome, soft tissue edema, cases of regional lymphadenitis (on average, 2-3 days earlier, in comparison with patients of the control group, $p < 0,05$).

In the main group, by the time of stitches removal (7-8th day), doctors did not see any indications of residual inflammatory reaction in parodontium tissues (edema and gingival hyperemia), and at the same time, in 81% of the patients, wounds were fully epithelized, overall condition and capacity to work were restored on 100%.

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In the analogous time period, in 35% of the control group patients (practically in every third patient) signs of residual inflammation in parodontium were remaining, they were cupped only by the 10th day after the surgery. At all that, full wound epithelization in the majority of the patients (58,5%) happened on the 11-13th day, including 3 patients, whose wounds were epithelized by secondary tension, because of wound dehiscence, which has not been seen in the main group.

Above stated facts contend that pre- and post-surgical CEM-therapy distinctly affects regeneration processes in the parodontium tissues and shortens wound healing periods by 4 days ($p < 0,05$), on average.

Dynamics of the objective indicators of parodontologic status of the patients before and after the course of medicament and operative treatment statistically proves anti-inflammatory and anti-microbial effect of CEM-therapy as an element of complex treatment of patients with generalized parodontitis of the middle stage of severity (Table 1).

Table 1

Reserched indicators	Group of patients	Examination results (M±s)		
		Before treatment	During treatment	Nearest period
Positive Aynamo probe (persons)	Main	25 (100%)	Not specified	4 (16%)
	Control	22 (100%)	Not specified	5 (23%)
Hygien index (standard units)	Main	2,72±0,15	3,1±0,18	1,32±0,09
	Control	2,69±0,12	3,4±0,14	1,76±0,11
Schour-Massler Index (%)	Main	63,71±4,23	14,43±1,78*	7,37±0,91*
	Control	61,55±4,12	23,14±2,11	11,25±1,22
Iodine number according to Svarkov	Main	3,25±0,33	2,14±0,29	1,44±0,37
	Control	3,12±0,26	2,39±0,36	1,78±0,42
Depth of tooth - gum recess	Main	4,31±0,38	Not specified	1,52±0,09*
	Control	4,20±0,31	Not specified	2,13±0,25
Rentgenologic signs of bone cavity reduction (persons)	Main	-	Not specified	18 (72%)
	Control	-	Not specified	14 (64%)

* - $p < 0,05$ when comparing with indicators of the control group

On the whole, received from clinical tests data allows us to assert that CEM-influence, conducted in the framework of complex therapy, with intra-oral access, by straight contact influence on pathologic areas, localized in the tissues of jaw alveolar appendix has expressed treatment-and-prophylactics effect. At that, the effectiveness of intra-oral CEM-influence is significantly (no less than on 30%) higher than unsighted local CEM-therapy from the side of skin coverlets.

Conclusions

- CEM-therapy in EHF and BRR regimes has distinct (affirmed by the objective indicators) positive influence on the course of treatment, its immediate and closest results of complex (conservative – surgical – orthopedic) treatment of patients, suffering from parodontitis of middle stage of severity. This therapy effectively suppresses infectious and inflammatory reactions, both on pre- and post-surgery stages of treatment, statistically shortening periods of wound healing, providing (in comparison with the control groups) more expressed reducement of the depth of

- residual dentogingival cavities and increased reduction frequency of pathologic bone cavities.
2. Specially developed hydro isolated intra-oral oscillator CEM, allows influencing pathologic areas in straight contact regime, which significantly increases effectiveness of EHF-therapy, and as a result, the effectiveness of complex treatment of generalized parodontitis of the middle stage of severity in comparison with the existing CEM-TECH device, completed with on-skin oscillator. If the use of CEM-influence from the side of skin coverlets shortens terms of wound healing by 2,4 days on average, decreases of the depth of residual dentogingival cavities by 0,61 (40%) and reduces the frequency of pathologic bone cavities growth (72% against 63,6%) in comparison with the control group, than, with sighted intra-oral CEM-influence on the parodontium areas the above listed indicators increase, correspondingly, to 4 days, 85/57% and 14,7%. So, the use of specialized intra-oral emitter allows (in comparison with CEM-influence from the side of skin coverlets) average growth of treatment effectiveness of no less than 30%. On the whole, with inclusion of CEM-therapy in the scheme of treatment of generalized parodontitis of the middle stage of severity, CEM-influence from the side of skin coverlets increases overall treatment effectiveness by 15-17% on average, and CEM-influence with the use of intra-oral emitter – by 22-24%.
 3. Intra-oral oscillator for stomatology use is reliable, compact, light-weighted, handy, and can be use by medical staff as well as by patients themselves. Intra-oral oscillator and power cable can be left in humid conditions, including oral cavity and solutions of disinfection solutions (licensed for stomatology use – 6% hydrogen peroxide solution, 3% chloramin solution, 2,5% glutaric aldehyde solution, 1% “Lisafin” solution and others) for long periods of time (total – no less than 1200 hours).
 4. Inclusion of CEM-therapy with the use of specialized device with intra-oral oscillator in the scheme of complex treatment of patients with generalized parodontitis of the middle stage of severity, reduces overall treatment period for 4 days on average, correspondingly, allows to decrease the length of medicament course, including anti-bacterial therapy, by 3-4 days (on 25–35%). This considerably decreases risk of the development of complications and side-effects and reduces treatment costs (no less than by 20-25%).

APPENDIX 2

List of defended dissertations

From 1996, the following dissertations, where CEM-TECH device was used as therapeutic agent, were defended.

The list of the defended theses with use of the CEM-TECH device

№	NAME	THESIS	The code of a speciality and speciality	The dissertati on	Year
1.	Matveev Andrey Gennadevich	Electromagnetic radiation of a millimetric range in a complex-therapy of chronic prostatitis	14.00.34 – Balneology and physiotherapy	Ph.D. thesis	1999

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2.	Golosova Olga Evgenjevna	EHF-THERAPY in preparatory period of operation coronary artery grafting	14.00.34 – Balneology and physiotherapy	Ph.D. thesis	1999
3.	Abdulkina Natalia Gennadyevna	Optimization of methods of physiotherapy in rehabilitation of patients with diseases of peripheral nervous system	14.00.34 – balneology and physiotherapy	doctoral thesis	2000
4.	Dmitruk Vadim Stepanovich	EHF-THERAPY in complex treatment psoriasis	14.00.34 – balneology and physiotherapy 14.00.11 – skin and venereal illnesses	Ph.D. thesis	2000
5.	Kolmatsuyi Natalia Borisovna	EHF-RADIATION in preventive maintenance of functional status disorders of blood neutrophil in carcinoma of lung undergoing antitumoral therapy	14.00.34 – physiotherapy and balneology 14.00.16 – pathological physiology	Ph.D. thesis	2000
6.	Pointov Oleg Nikolaevich	Chronotherapy with EHF radiation in patients with average ladder muscle syndrome	14.00.34 – physiotherapy and balneology 14.00.13 – nervous illnesses	Ph.D. thesis	2000
7.	Mirutova Natalia Fedorovna	Electromagnetic and mechanical fluctuations in treatment of radiculitis neurological manifestations of osteochondrosis a backbone, before- and after-operational period of diskectomies	14.00.34 – balneology and physiotherapy 14.00.13 – nervous illnesses	doctoral thesis	2000
8.	Filippova Tatyana Vasilevna	Electromagnetic radiation of a millimeter range in complex treatment of arterial hypertension	14.00.51 – regenerative medicine, sports medicine, balneology and physiotherapy	Ph.D. thesis	2001
9.	Mavlyatdinov a Inna Maratovna	Low-frequency EHF-THERAPY in complex treatment of patients with neurological displays of lumbar osteochondrosis	14.00.51 – regenerative medicine, physiotherapy exercises and sports medicine, balneology and physiotherapy 14.00.13 – nervous illnesses	Ph.D. thesis	2003
10.	Alaytseva Svetlana Vladimirovna	Opportunities of prediction and estimation of efficiency of electromagnetic radiations influence and variable magnetic field in patients with neurological presentations of lumbar osteochondrosis	14.00.51 – regenerative medicine, physiotherapy exercises and sports medicine, balneology and physiotherapy 14.00.16 – pathological physiology	Ph.D. thesis	2004

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11	Dostovalova Olga Vladimirovna	Influence of physiobalneotherapy on adaptable organism opportunities of participants of confrontations	14.00.51 – regenerative medicine, physiotherapy exercises and sports medicine, balneology and physiotherapy 03.00.13 - physiology	Ph.D. thesis	2004
12	Perminova Evgenie Vladimirovna	Electromagnetic waves millimeter and infra-red range in complex treatment atopic dermatitis in children	14.00.51 – regenerative medicine, physiotherapy exercises and sports medicine, balneology and physiotherapy 14.00.11 – Skin and venereal illnesses	doctoral thesis	2005
13	Korostelev Jury Ivanovich	Electromagnetic radiation of a millimeter range in rehabilitation of Chernobyl liquidator with arterial hypertension at sanatorium stage	14.00.51 – regenerative medicine, physiotherapy exercises and sports medicine, balneology and physiotherapy	doctoral thesis	2006
14	Polyakova A.G.	EHF- and laser-puncture in complex medical rehabilitation of patients with joint and spine pathology (clinical- experimental research)	14.00.51 – regenerative medicine, physiotherapy exercises and sports medicine, balneology and physiotherapy	doctoral thesis	2004

Responsible for control and verification of present studies:

D.Sc., M.D., Prof. _____ Potekhina J.P.

Project coordinator

C.t.s., corresponding member of RAMTS, RANS d.member _____ A.
Kozhemyakin