

**SHUPYKNATIONALMEDICALACADEMY  
OFPOSTGRADUATEEDUCATION  
PONTIFICAL CATHOLIC UNIVERSITY OF PERU  
RADOM UNIVERSITY  
SCM «MEDICAL INNOVATIVE TECHNOLOGIES»**

**Chukhraiev N., Vladimirov A., Vilcahuaman L.,  
Zukow W., Samosyuk N., Chukhraieva E., Butskaya L.**

**COMBINED APPLICATION  
OF ULTRASONIC WAVES,  
MAGNETIC FIELDS AND OPTICAL FLOW  
IN THE REHABILITATION  
OF PATIENTS AND DISABLED PEOPLE**

**Edited by  
Chukhraiev N., Vladimirov A., Vilcahuaman L.,  
Zukow W., Samosyuk N., Chukhraieva E., Butskaya L.**

**KIEV, RADOM 2016**

**SHUPYKNATIONALMEDICALACADEMY  
OFPOSTGRADUATEEDUCATION  
PONTIFICAL CATHOLIC UNIVERSITY OF PERU  
RADOM UNIVERSITY  
SCM «MEDICAL INNOVATIVE TECHNOLOGIES»**

**Chukhraiev N., Vladimirov A., Vilcahuaman L.,  
Zukow W., Samosyuk N., Chukhraieva E., Butskaya L.**

**COMBINED APPLICATION  
OF ULTRASONIC WAVES,  
MAGNETIC FIELDS AND OPTICAL FLOW  
IN THE REHABILITATION  
OF PATIENTS AND DISABLED PEOPLE**

**Edited by  
Chukhraiev N., Vladimirov A., Vilcahuaman L.,  
Zukow W., Samosyuk N., Chukhraieva E., Butskaya L.**

**KIEV, RADOM 2016**

UDC 615.847.8+615.837

LBC: 53.54

### Reviewers:

prof. zw. dr hab. med. L. Tondiy (Ukraine), MD, Professor L. Tondiy  
prof. zw. dr hab. med. V. Gubenko (Ukraine), MD, Professor V. Gubenko  
prof. zw. dr hab. med. A. Kozhanova (Ukraine), MD, Professor A. Kozhanova

Chukhraiev N., Vladimirov A., Vilcahuaman L., Zukow W., Samosyuk N., Chukhraieva E., Butskaya L. Combined application of ultrasonic waves, magnetic fields and optical flow in the rehabilitation of patients and disabled people. Edited by Chukhraiev N., Vladimirov A., Vilcahuaman L., Zukow W., Samosyuk N., Chukhraieva E., Butskaya L. Kiev. Radom. – 2016. – 308 p.

UDC 615.847.8+615.837

LBC: 53.54

## Memory of the great scientist Professor Ivan Zakharovich Samosyuk dedicated.

The book presents modern data on the use of a resonant magnetic therapy, ultrasound and magnetic-laser effects. Describes practical techniques of the combined and the united use of these physical factors in the different sections of clinical medicine (neurology, cardiology, gastroenterology, gynecology, etc.).

The book also describes the modern principles of selecting impact zones, the rationale biorhythmological and resonance effects, the practical use of which is becoming increasingly important in physiotherapy and physiopuncture.

Most private techniques of magnet-laser-ultrasound therapy are described with respect to a new generation of devices of «MIT» series and the «MIT-11», which contains all three of these factors: ultrasound, magnetic field and laser radiation.

The book is intended for physical therapists, rehabilitation specialists, health resort, the doctors of narrow specialties, using methods of physiotherapy, as well as nurses rehabilitation centers, beauty parlor and a wide range of readers interested in the problems of sanitation.

Authors are grateful to Alla Tereshchenko, Yevheniya Gorlatenko and Olga Danilova for their assistance in the preparation for publication of the monograph.

© The Author(s) 2016.

This articles is published with Open Access. Medical Innovative Technologies, Kiev, Ukraine and Radomska Szkoła Wyższa w Radomiu, Polska, Radom University in Radom, Poland. Open Access This articles is distributed under the terms of the Creative Commons Attribution Noncommercial License which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.



Attribution — You must attribute the work in the manner specified by the author or licensor (but not in any way that suggests that they endorse you or your use of the work). Noncommercial — You may not use this work for commercial purposes. Share Alike — If you alter, transform, or build upon this work, you may distribute the resulting work only under the same or similar license to this one.

Zawartość jest objęta licencją Creative Commons Uznanie autorstwa-Użycie niekomercyjne-Na tych samych warunkach 3.0

Publishing House: Radomska Szkoła Wyższa w Radomiu, Radom University in Radom Str. Zubrzyckiego 2 26-600 Radom Tel.: +48 48 383 66 05 [med@rsw.edu.pl](mailto:med@rsw.edu.pl)  
Printing House: Radomska Szkoła Wyższa w Radomiu, Radom University in Radom Str. Zubrzyckiego 2 26-600 Radom Tel.: +48 48 383 66 05 [med@rsw.edu.pl](mailto:med@rsw.edu.pl)

ISBN 9781365244537

DOI <http://dx.doi.org/10.5281/zenodo.57246>

308 s. Liczba znaków: 478 000 (ze streszczeniami i okładką). Liczba grafik: 136 x 1 000 znaków (ryczwał) = 136 000 znaków.

Razem: Liczba znaków: 614 000 (ze streszczeniami, okładką i grafikami) = 15,35 arkuszy wydawniczych.

308 p. Number of characters: 248 000 (with abstracts). Number of images: 136 x 1000 characters (lump sum) = 136 000 characters.

Total: Number of characters: 614 000 (with abstracts, summaries and graphics) = 15,35 sheet publications.

## CONTENT

ABBREVIATIONS .....	8
INTRODUCTION .....	9
Modern principles of choice of impact zones in the physiotherapy treatment .....	10
Lets speak more detail on the possible areas of choice for PT .....	10
Zones of Zakhary'in-Ged and metameric segmental principle of choosing zones in physiotherapy .....	11
The systemic principle of the human body functions organization and the selection of treatment zones, based on this principle .....	15
Special and specific zones of influence and choice in the practice of physical therapy .....	21
Lumbar region .....	21
The area of cervical spine .....	21
The trans-cerebral techniques .....	22
Biological rhythms and bioresonance therapy .....	26
Ultrasound therapy .....	47
Basic terms and concepts .....	49
Features of action of ultrasonic waves on the body .....	52
The therapeutic effect of ultrasound waves* .....	53
The methods and techniques of treatment with ultrasonic waves .....	57
Ultrasound therapy (UST) .....	58
Ultraphonophoresis (UPPh) .....	58
Sonopuncture (SP) .....	61
A combination of other health factors with sonopuncture .....	65
The combination of the action of ultrasonic waves with other physical factors ...	65
Indications and contraindications to the use of ultrasound therapy .....	66
The main indications for ultrasound therapy .....	66
Main contraindications .....	67
Prohibited areas for ultrasonic therapy .....	67
Features of ultrasound therapy .....	68
Nota bene for doctor and patient .....	69
Magnetic-laser therapy .....	69
Therapeutic effects of magnetic laser therapy (MLT) .....	72
General principles of magneto-laser therapy .....	78
Here are some options for MLT and features of their use .....	79
Percutaneous magnetic laser irradiation of blood .....	80
The zone for exposure to magnetic percutaneous laser irradiation of the blood .	82
Parameters of the procedure of hemo-magnetic-laser-therapy .....	82
The combined and united use of physical factors .....	84
REFERENCES .....	88
PRACTICAL RECOMMENDATIONS FOR USE OF	

MAGNET-LASER-ULTRASOUND THERAPY IN CLINICAL PRACTICE AND THE SPA .....

Contraindications .....	92
K00-K93 Diseases of the digestive system.....	94
K50-K52 NONINFECTIOUS Enterocolitis and colitis .....	94
K29 GASTRITIS, DUODENITIS.....	96
K25 Gastric ulcer .....	98
K26 Duodenal Ulcer .....	98
K71 LIVER TOXICITY .....	100
K70 K70 CHRONIC HEPATITIS .....	102
K82.8 DYSKINESIA OF CYSTIC DUCT OR GALLBLADDER.....	104
K 86.0 CHRONIC PANCREATITIS.....	106
K81 CHOLECYSTITIS (non-calculus) .....	108
K 59.0 CONSTIPATION (Other functional intestinal disorders) .....	110
J00-J99 RESPIRATORY DISEASES .....	112
A15-A19 PULMONARY TUBERCULOSIS .....	112
J42 CHRONIC BRONCHITIS UNSPECIFIED.....	114
J18 PNEUMONIA.....	116
J.45 BRONCHIAL ASTHMA .....	118
J01 ACUTE SINUSITIS (ANTRITIS) .....	120
J01 ACUTE SINUSITIS (FRONTAL SINUSITIS) .....	122
J03 ACUTE TONSILLITIS.....	124
J00 ACUTE NASOPHARYNGITIS (RHINITIS) .....	126
J31.2 CHRONIC PHARYNGITIS.....	128
J37 CHRONIC LARYNGITIS AND TRACHEITIS .....	130
H65- H66 CHRONIC SUPPURATIVE OTITIS MEDIA.....	132
H81.0 MÉNIÈRE'S DISEASE, SENSORINEURAL HEARING LOSS .....	134
K00-K14 DISEASES OF ORAL CAVITY,.....	136
SALIVARY GLANDS AND JAWS .....	136
M19.2- M24.6 ARTHROSIS OF THE TEMPOROMANDIBULAR JOINT .....	138
N00-N99 DISEASES OF THE GENITOURINARY SYSTEM.....	140
F98 ENURESIS.....	140
N48.4 IMPOTENCE .....	142
N41.1 CHRONIC PROSTATITIS.....	144
N34 URETHRITIS AND URETHRAL SYNDROME.....	146
N11 CHRONIC PYELONEPHRITIS.....	148
N20-N23 UROLITHIASIS .....	150
O00-O99 PREGNANCY, CHILDBIRTH AND THE PUERPERIUM .....	152
O92.1 CRACKED NIPPLES.....	152
MAIN POINTS OF ACUPUNCTURE IN GYNECOLOGY.....	154
N61 MASTITIS.....	154

N70.1 CHRONIC ADNEXITIS.....	156
N71 ENDOMETRITIS .....	158
N94 ALGOMENORRHEA .....	160
N91.0- N91.1 AMENORRHEA.....	162
N73 INFLAMMATORY DISEASES OF THE PERITONEUM AND TISSUES OF THE SMALL PELVIS .....	164
N86 CERVICAL EROSION.....	166
N90.5 KRAUROSIS OF THE VULVA.....	168
N89 VAGINAL DISCHARGE.....	170
N97 INFERTILITY .....	172
O12- O14- O15 GESTATIONAL TOXICOSIS (GESTOSES).....	174
0- I99 DISEASES OF THE CIRCULATORY SYSTEM.....	176
I10 HYPERTENSIVE HEART DISEASE .....	176
I22 MYOCARDIAL INFARCTION.....	178
I49 EXTRASYSTOLE (OPTION 1).....	180
I49 EXTRASYSTOLE (OPTION 2).....	182
E10-E14 DIABETES .....	184
I20-I25 CORONARY HEART DISEASE .....	186
E06.3 AUTOIMMUNE THYROIDITIS .....	189
I63 ISCHEMIC STROKE.....	191
G43 MIGRAINE.....	194
N00-H59 DISEASES OF THE EYE AND ADNEXA.....	196
H47.0 OPTIC NERVE SUBATROPHY.....	196
H35 RETINITIS PIGMENTOSA .....	196
H00-H59 MYOPIA .....	198
H 36.0 DIABETIC RETINOPATHY .....	200
L00-L99 DISEASES OF THE SKIN AND SUBCUTANEOUS TISSUE.....	203
L40 PSORIASIS .....	203
L43 RED FLAT ZOSTER.....	205
L20-L30 DERMATITIS AND ECZEMA.....	207
B00 B00 INFECTION CAUSED BY THE HERPES VIRUS (HERPES SIMPLEX) .....	210
L20.8 NEURODERMATITIS .....	212
L94.0 LOCALIZED SCLERODERMA .....	214
SURGICAL DISEASES .....	216
K65 PERITONITIS .....	216
L91.0 KELOIDS (PREVENTION SUPPURATION).....	218
T79.3 POST-TRAUMATIC WOUND INFECTION, NOT ELSEWHERE CLASSIFIED .....	220
FESTERING WOUNDS.....	220
L02 ABSCESSSES, BOILS, CARBUNCLES.....	222

L03 PHLEGMON, FELON .....	222
E14.5 TROPHIC ULCERS .....	224
I80 PHLEBITIS AND THROMBOPHLEBITIS .....	226
A46 ERYSIPELAS .....	228
T20-T32 THERMAL AND CHEMICAL BURNS .....	230
M42 OSTEOCHONDROSIS .....	232
M54.4 4 LUMBAGO WITH SCIATICA .....	234
R52 CHRONIC PAIN SYNDROME .....	236
M60.0 MYO FASCIITIS .....	238
M62.8 MIOFIBROZIT .....	238
M79.0 FIBROSIS; FIBROMYALGIA; .....	238
M72.5 FASCIITIS .....	238
M00-M99 DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE .....	240
M 00 - M 03 INFECTIOUS ARTHROPATHIES .....	240
M05-M14 INFLAMMATORY POLYARTHROPATHIES (RHEUMATOID ARTHRITIS) .....	242
M15-M 19 DEFORMING ARTHROSIS .....	244
M10-M14 ARTHRITIS GOUTY .....	246
K07 DISEASES OF THE TEMPOROMANDIBULAR JOINT .....	248
K07.6 CALCANEAL SPUR .....	250
M 65.2 CALCIFYING TENDOVAGINITIS .....	252
M45. BEKHTEREV'S DISEASE (ANKYLOSING SPONDYLITIS) .....	254
M24 DUPUYTREN'S CONTRACTURE .....	256
M81 OSTEOPOROSIS .....	258
G00-G99 DISEASES OF THE NERVOUS SYSTEM .....	260
G51 NEURITIS OF THE FACIAL NERVE .....	260
G50 DAMAGE OF THE TRIGEMINAL NERVE .....	262
Ultrasound puncture .....	264
M79.2 INTERCOSTAL NEURALGIA .....	265
Ultrasound puncture .....	267
M79.2 NEURALGIA OF CERVICAL DEPARTMENT OF THE BACKBONE .....	268
M79.2 NEURALGIA OF THE LUMBAR SPINE .....	270
T75.2 VIBRATION DISEASE .....	272
M60 MYOSITIS .....	274
ULTRASONIC PUNCTURE IN MYOSITIS: .....	275
F00-F99 MENTAL AND BEHAVIORAL DISORDERS .....	276
F51.0 INSOMNIA .....	276
F32 DEPRESSION .....	278
F40-F48 NEUROTIC, STRESS-RELATED AND SOMATIFORM DISORDERS .....	280

E65-E68 OBESITY AND OTHER TYPES OF HYPERNUTRITION.....	282
F01.1 MULTI-INFARCT DEMENTIA .....	284
I 15 VEGETATIVE DYSTONIA (VD) ON HYPERTENSIVE TYPE.....	286
G21 PARKINSON'S DISEASE.....	288
F90 DYSTONIC HYPERKINESIA (TORTICOLLIS, .....	290
OROMANDIBULAR DYSKINESIA) .....	290
APPLICATION OF MAGNET-LASER ULTRASOUND	
THERAPY FOR HEALTH IMPROVING AND PREVENTIVE PURPOSES ...	292
Annex 1.....	294
Annex 2.....	296
Apparatus recommended for MLUST procedures	
and combined use with other physiotherapy methods .....	296
«HARMONY» system .....	296
Combined physiotherapy apparatus MIT-11 .....	297
Apparatus for physiotherapy combined MIT-MT.....	298
Apparatus for preparation of singlet-oxygen foams MIT-C .....	299
Apparatus for electrotherapy dual channel MIT-EF2 .....	300
Apparatus for electromyostimulation AEST-01.....	302
(8-channel version).....	302
The vortex foot bath «KUPAVA».....	303



## ABBREVIATIONS

AP — acupuncture points  
BAP — biologically active points  
CMF — constant magnetic field  
EMF — electro magnetic field  
EMR — electromagnetic radiation  
LILR — low-intensive laser radiation  
MF — magnetic field  
MLT — magnet laser therapy  
MLUST — magnet laser ultrasound therapy  
MPLT — multipurpose laser therapy  
MT — magnet therapy  
PMF — pulse magnetic field  
POL — peroxide oxidation of lipids  
PT — physiotherapy  
REG — rheoencephalography  
RMF — rotating magnetic field  
SBR — secondary biogenic radiation  
SP — sonopuncture  
UCSG — upper cervical sympathetic gangly  
UPhP — ultra phonophoresis  
UST — ultrasonic therapy  
US — ultrasound

## INTRODUCTION

In therapeutic sections of clinical medicine and rehabilitation is constant competition between physical factors and spa treatments on one hand and the medication on second side. Unfortunately, most of this competition ends in favor of the latter, not only because of the extensive advertising of drugs, and lack of good training doctors who can use modern methods of physiotherapy.

Undoubtedly, modern medicine has a significant arsenal of active medication which is make treatment of many diseases effective. However, the uses of drugs on a wide scale in some cases are causes of addictive, allergic reactions and also can make adversely affecting the patient's condition.

Advantages of the majority of physical factors consist in the fact that they stimulate the organ or functional system, normalizing its function, improving microcirculation and innervations and accelerating the biochemical processes taking place in the area affected by stimulating the immune system and the body's own forces to fight the disease or to prevent it without causing thus usually serious side effects. The above fully applies to the ultrasound (US) waves, magnetic fields (MF) and electromagnetic radiation (EMR). These «relationships» of the body and the physical factor are due to the fact that in essence the majority of the physical factors are is the part of the natural environment for the body.

These data suggest the need for equipment and procedures, wherever provided for therapeutic or prophylactic use of simultaneous or sequential effects on the human body the main above-mentioned preformed natural factors - EMR, MT and UT. It is expected that such a combination will provide a significant therapeutic effect than their separate use. The first experience of such a combination already known - magnetic treatment are one of the best combination with medication treatment, which is well established in the practice of physiotherapy.

For over the past five years, we have worked out various options for physiotherapy effects using EMR, MT, UT. For this purpose, a special company «MEDINTEH» in 1995 developed a unique device «MIT-11», allowing to carry out separately and combine the low-frequency ultrasound therapy, laser therapy or magnetic laser with different variants of their therapeutic modulation frequencies and simultaneous action on three areas - central and peripheral nervous system and the area of pathology.

The device was developed under the scientific supervision of Prof. Samosyuk Ivan Zakharovich and Chuhraev Nikolai Viktorovich. In the composition of the design team included Zenchenko Vitaly, Cholodenko Mamontov, Igor Popov, Elena Stanislavovna Strelkovsky. In the modernization and organization of serial production of the device took part Natalia Tishchenko, Dobrodomov Alexey Viktorovich, Artem A. Didenko.

Currently, the device is registered as medical devices in Ukraine, Russia and Kazakhstan. The device has the patents of Ukraine and Russia.

During clinical use of the device appeared some practical experience with the combined use of this few factors, which are set out in this manual.

The authors are sincerely hope that the proposed work will be useful not only for physicians, but also for a wide range of readers. Authors will greatly appreciated for all comments and suggestions on the improve of the content of the book.

The authors express their gratitude for the assistance to the publication of the monograph A.P. Tereshchenko, E.Y. Horlatenko and O.A. Danilova.

## **Modern principles of choice of impact zones in the physiotherapy treatment**

In the modern literature on physical therapy (PT), focuses on the study of the mechanism of action of physical factors, their parameters and the various theoretical aspects of the problem [4; 7; 10; 14; 16; 28; 29; 40; 47; etc.].

There is no doubt about the importance of these issues, but however, there is no adequate attention of researchers to the choice of impact zones, to the specificity of the response when stimulation of one or another area, the adequacy of the parameters and factors, the physiological parameters zone.

Chinese physiotherapy (physiopuncture) - Zhen-chiu therapy more than 3 thousand years ago raised questions (and successfully solves them) about the site of action (selection of points of acupuncture zones), the exposure time (optimum time of the procedure, with the accounting of the diurnal, monthly, seasonal and others. biorhythms) and the method of exposure, providing a adequate method and strength of stimulation by the physical factor (acupuncture, acupressure, moxibustion or warming, etc.). [30]. All these questions are relevant for modern physiotherapy.

### **Lets speak more detail on the possible areas of choice for PT**

One of the most simplest and effective ways to select zones in the PT are the impact on the zones of lesion. For example, when lumbalgia - pain zone, in the pathology of bronchopulmonary system - inhalation, in the diseases of the hepatobiliary system - on the area of the liver and gall bladder, changes in knee joints (gonarthrosis) - on the knee joints and others. This approach is widely used in the PT, however, it does not account for the pathogenic mechanisms of the disease and, therefore, does not enable more effective influence on the pathologic process. For example, in the development of gonarthrosis are very important role plays segmental formation of vegetative nervous system (L1-L3), the centers of which are trophic for the knee. Naturally, supplementary impact on segmental formation of vegetative nervous system are necessary education, besides the direct influence on the pathological center will be more effective. This

principle of choice in the practice areas of the PT called metameric or segmental (metameric-segmental) and is one of the most widely used.

In practice, the classic PT provides for the use of three main areas, the principle of the «three pillars»: cervical area, lumbar area and the zones which are known as Zakhary'in-Ged's zone. The choice of these areas is not random and confirmed by numerous clinical results and theoretically justified. Let us more detail on the importance of these areas in the practice physical therapy.

## **Zones of Zakhary'in-Ged and metameric segmental principle of choosing zones in physiotherapy**

Priority in the description of special zones on the human body belong to one of the founders of the Russian therapy GA Zakhary'in [46]. He were first who discovered clinically areas of the body with a modified structure and drew attention to this fact, that in the presence of a pathological process in the internal organs coming from them the pain is often projected in well-defined areas of the skin. The author gave a description of the phenomenon of pain palpatory - the determined by pressure and the frequent presence of hyperalgesia in these areas.

Although up to the present time in many areas of the mechanism appearance Zakhary'in-Ged is not quite clarified, still in the pathogenesis of their formation is important anatomical and functional (metameric) connection between the skin and the internal organs through the segmental apparatus of the spinal cord. The reason for their occurrence are pathological changes at the level of the autonomic nervous system.

With modern positions, Zakhary'in-Ged zones can be interpreted as a zone with altered skin sensitivity and other tissues (muscles, bones) in the specific metameasure zone, the complex of vasomotor and motor-trophic reflexes, which is a kind of cutaneous projection of the metameasure of the diseased organ. In areas of Zakhary'in-Ged palpation revealed trophic changes, soreness, pain, the changes the electrical conductivity of the skin, sweating, the changes the skin temperature and disorder of surface sensitivity, the appearance of a hyper- or hypo-algesia.

In this case, the size of the zones, their resistance, the nature of the sensitivity of changes in the electrical conductivity and may be an important clinical factor in determining the dynamics of the disease.

However, the value of these areas is important not only for diagnosis, but also for a variety of physical therapy options. The impact of physical factor on particular Zakharyin-Ged zone allows selectively influence on the functional state of a particular organ. In fact we are able to make direct stimulation of the paths formed by disease, so we can speak about a kind of feedback principle: every internal organ is certain complies a specific area of the skin, and vice versa. Such feedback is, of course, realized through segmental apparatus of the spinal cord.

As it is known, the structure of the human body, to a degree, retains metameric principle that is essential for selecting and understanding the impact zones of PT mechanisms.

The generality of vegetative segmental innervation of internal organs and certain metameres (i.e., when the source of the innervation of an internal organ, and certain metameasure serve the same segments or the same autonomic forming) underlies metamericly-segmental principle of the PT.

Close ties between somatic and autonomic entities at the spinal cord level, create preconditions for switching pulses from a physical body at the autonomic department and vice versa. For example, the effect on metamers D11-L1 (D10-D12) can affect the functioning of the basic parameters of kidney and adrenal gland (see Fig. 1).

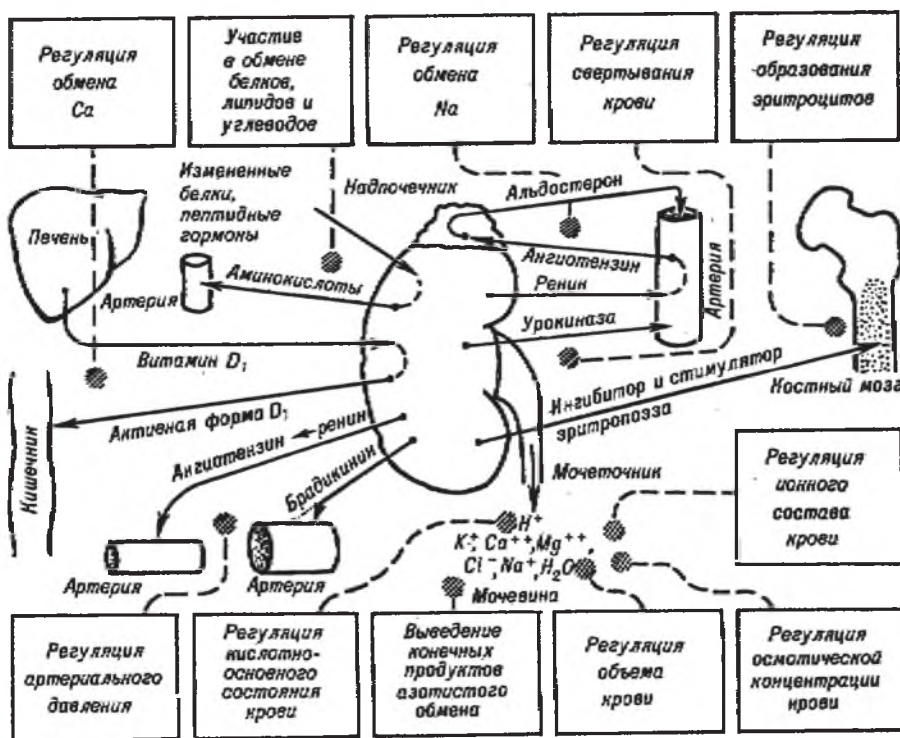


Fig. 1 Possible neurohumoral changes during stimulation of metamers associated with kidney function (as Yu.Natochinu 1985)

Possible neurohumoral changes during stimulation metameres related to renal function (for Yu.Natochinu, 1985)

This metameric principle of «small» physical therapy has been described yet, by M.N. Lapinski [23] and «disclosed» as classics physiotherapy by A. E. Shcherbak [34] and A. R. Kirichinskim [22]. It has found its application in the practice of acupuncture

in the form of a recommendation of folk doctors of the East on the use of the so-called points of signaling or the points heralds (this is nothing but the epicenter of zones Zakharyin-Ged) and sympathetic points (the latter are located in the same metameres that the internal organs and are recommended for the impact on them during diseases of ).

When a large capacity of the physical factor are using, the initial response of the organism are caused by the nervo reflex and humoral mechanisms. In the cases of the threshold value or above-threshold stimulus\*\* in response involved segmental unit with the inclusion of the autonomic nervous system, and through the last - internal organs, blood vessels, and others. Most likely, that the therapeutic effect of a zone Zakharyin-Ged, by heralds points (signal), trigger points, pain points just is based on a similar mechanism, ie, metameric segmental principle.

Table 1 shows the segmental innervation of the skin and internal organs, using which you can choose a more targeted area for PT.

*Table 1*  
*Segmental innervation of the skin and internal organs*

<b>Innervation area</b>	<b>Segments and nerves</b>
Face	Trigeminal nerve
Auricle	V, VII, IX, X pairs of cranial nerves, C2-C3
Back of the head, neck	C1-C3
shoulder girdle	C4
Radial half shoulder, forearm and hand	C5-C7
Ulnar half of the shoulder, forearm and hand	C8-D2
nipple line	D5

\*\*In this section, we do not dwell on the primary interaction of physical factors with biological substrate. These issues are widely debated in the literature (Bogolyubov V.M., et al., 1994; V.E. Illarionov, 1998; G.N. Ponomarenko, Enin L.D., 1998; Selitsky G.V. et al., 1998; G.N. Ponomarenko, 1999) and partially covered with respect to ultrasound, MP and EMF in other chapters. However, whatever the primary mechanism of action of physiotherapy, the subsequent reaction is developed with the inclusion of the nervous, endocrine and humoral immune and other systems. In the primary acception the physical factor is set to the impact zone, specificity, which determines the specificity of the response. Of course, for that particular response (no stress reaction!) Required value chosen stimulus (its power, frequency, wavelength, etc.), time and duration, the system state, which is directed impact. At low power, but adequate physical stimuli, they seem to play mainly the role of information and reference, which leads to the so-called bio-resonance therapeutic effect.

The lower edge of the costal arch	D7
The level of the navel	D10
The level of the inguinal ligament	D12-L1
The front of the thigh	L1-L4
The front surface of the tibia	L5
The back surface of the leg	S1-S3
The perineum, inner buttocks surface	S4-S5
Sympathetic innervation of the skin	
Face, neck	C8-D3
upper extremity	D4-D7
torso	D8-D9
lower extremity	D10-L2
Vegetative innervation of internal organs	
Heart	C3-C5, C8, D1-D3 (D4-D6)
Aorta	D1-D3
Lungs	C3-C4 (D1), D2-D5, (D6-D9)
Esophagus	D3-D5 (D6)
Stomach	(D6), D7-D8
Intestines	D6-D12
Rectum	S2-S4
The liver and gallbladder	(D7), D8-D10, L1-L2
The kidney and ureter	D11-L1 (D10-D12)
Bladder: walls	D11-L1
mucous membrane of the cervix	S2-S4
prostate gland	D10-D11 (D12, L5); S1-S2
Testicle and ovary	D10-L1, (L2)
Uterus: body	D10-L1
neck	S1-S4

However, the convergence of somatic and visceral afferent innervation occurs not only in spinal neurons and neurons of the reticular formation of the brain stem, hypothalamus, thalamus and cerebral cortex [2; 30]. These facts are the physiological basis for explaining the effectiveness of PT of the visceral pain and other pathologies. In these cases we are talking about multi-level principle of regulation of the nervous functions as a principle of the system [36].

## **The systemic principle of the human body functions organization and the selection of treatment zones, based on this principle**

In the process of evolution has been developed multiple security regulation of the same functional-dynamic system (a kind of a stability system with the presence of 3-5 or more levels of its regulation). These facts formed the basis of the teachings of PK Anokhin and his disciples [21; 36] about functional systems. Under the functional system, these authors understand the dynamic, self-regulating organization, which is selectively combining various organs and subsystems of the nervous and humoral regulation to achieve specific, useful for the organism results. An example of a multi-level organization of the system can serve as a breathing system.

In this system we can stand out:

- 1) the motor zone part of the cortex, which is providing a conscious (arbitrary) performing respiratory movements, cough;
- 2) the respiratory center\* of the medulla oblongata, which regulates involuntary (automatic) breathing;
- 3) segmental apparatus of the spinal cord, which is providing autonomic-trophic functions of both for the lung and the corresponding nerves and muscles;
- 4) the respiratory muscles and the nerves innervating them;
- 5) the lungs as an organ and the respiratory tract.

It is understood that the treatment of respiratory diseases, it is important to influence on various levels (not one) of the respiratory system with the possible focus on one or the other levels, depending on the cause of the disease.

No less indicative the use of systemic principles of sensitive (cortex $\longleftrightarrow$ brain stem, including eye bugor $\longleftrightarrow$ segments of the spinal cord spinal ganglia and peripheral nerve receptors) and motor function: the brain subcortex $\longleftrightarrow$ cortex $\longleftrightarrow$ the brain stem $\longleftrightarrow$ segments of the spinal cord $\longleftrightarrow$ peripheral nerves and osteo-muscular-articular apparatus.

Naturally, in the construction of treatment and rehabilitation programs should take into account the principle of organization of the nervous system.

For example, a multi-level, systematic approach to post-stroke rehabilitation helps patients «unite disparate functions» [11]. For example, electrical stimulation of paretic muscles (spasticity predominantly antagonists) not only prevents the malnutrition, but also has a positive effect on brain neurodynamics. Effects on subcortical and stem structures (electric, central electroanalgesia, endonasal electrophoresis delargina or vitamin E on Dimexidum et al.) helps to reduce muscle tone, which is apparently due

---

\*Chemoreceptors respiratory center subtly react to changes in gas composition of blood, tissue metabolism and reflexes from proprioceptors of the vagus nerve and respiratory muscles. This level of regulation of respiration is called the metabolic system of regulation of respiration.



to the gradual recovery of cortical-subcortical relations, and active influence on the reticulo-spinal ways of the regulation of the muscular tone.

Regarding the increased muscle tone it should be noted that, in many diseases of the central nervous system (CNS) spasticity becomes one of the main obstacles to the restoration of motor function [6; 7].

A number of modern electrophysiological studies performed in patients with spasticity have shown that the latter is not a result of a breach of any single system or a neurophysiological mechanism, as determined by a set of violations at different levels of functional motor system, although it is realized mainly on the segmental level (hyperactivity of spinal a-motoneuron change in neuronal excitability annular spinal cord circuits pathological increase polysynaptic reflexes etc.) [4; 5].

In patients with the pathology of central nervous system, such as cerebral palsy, is necessary the effective reduction of muscle tone, possible through the use of multi-level (system) of the principle of the regulation as follows:

- by influence on the motor parts of the brain cortex, subcortical and stem structures;

- by influence on segmental apparatus of the spinal cord\* and the autochthonous muscles of the trunk (the latter is provided by a bilateral innervation from the formations of striopallidarum system, so there is practically absent paralysis of the trunk muscles) and

- The third level of impact - on the paretic limb.

This approach is implemented professor V.I.Kozyavkinym [7] in the treatment of cerebral palsy. He named it the polysegmentary method. The therapeutic effect of this manipulation by the adequate methods provided on all parts of the spine and the muscles (autochthonous muscles, segmental apparatus of the spinal cord and structures of the brain stem, by the manipulation of the cranial-cervical junction) and general kinesitherapy.

The importance of combining different variants of kinesitherapy and certain physical factors (perhaps in subthreshold doses in order to avoid increasing the tone of spastic muscles) in cases spastic paresis, due to the fact that the corticospinal tract provides both function of efferent (organization of movements and the regulation of muscle tone) and functions of afferent neural pathways (delivery information the cortex, subcortical structures, the cerebellum and the reticular formation of the peripheral sensory receptors and spinal motoneurons) [6].

Application of physical factors (eg, magnetic therapy (MT) of a certain frequency - iono-parametric MT) for MR patients with diseases of the central nervous system

\*A.M. Shelyakin et al. (1996), used to treat cerebral paralysis with the presence of hyperkinesis using the method of transcranial direct current stimulation, marked increase in the efficiency of these patients by 6 times compared with conventional methods. These authors recommend micropolarization spinal cord in alternation with epidural electrical stimulation of his spinal cord injury.

also contributes to the normalization of ion exchange processes in the neuron. As a result therapy decreases of the cell  $Ca^{2+}$  blocking calcium channels, leading to a decrease in excitation of motor neurons and consequently to reducing spasm and spasticity of the flexor muscle [44; 14].

According to some authors antispastic effect of MT is superior of many known antispastic drugs [10]. But, the majority of drugs tend to act on any one link pathologic system [4; 5].

For example, Baklafen acts on the reception of GABA- $\beta$  causes a reduction of the  $Ca^{2+}$ , but does not normalize the pre- and postsynaptic disinhibition in neurons [5].

A major shortcoming of antispasmodic medications is that they cause an increase in the paretic weakness of muscles, which greatly reduces the effectiveness of the treatment of patients with post-stroke movement disorders [4].

System and multi-level approach is needed not only in patients with motor disorders which are the results CNS diseases, but also in patients with lesions of the peripheral nervous system. Thus, the effects on the motor system in patients who are suffered from consequences of injuries of nerve trunks, polyneuropathy, should be implemented at the following levels: affected (denervated) muscles, nerve trunk or nerve trunks which are damaged; segmental level, that is, segments of the spinal cord, neurons which form respective nerve axons; suprasegmental centers, i.e. afferent centers of the brain, the effects on which contribute to a more rapid regeneration of peripheral nerve structures.

Very important in these cases is also to impact on the healthy side of body, because by the impact on the communication of the intersegmental left and right spinal segments are stimulated segments of the affected nerve structures [8].

Such an approach in the PT may be called as system multi-level , it provides exposure to different levels of functional systems and contributes to «unite disparate functions» [41]. This approach can be implemented only by the methods of physical therapy and physiopuncture and virtually impossible by drug therapy.

System multi-level principle of PT explains the possibility of compensatory reactions of the organism in various pathological conditions and is the basis of the sanogenesis.

It also gives the doctor a basis for the selection of optimal areas of exposure: in some cases is enough to impact on the unit of the segment of spine and the affected organ, others - requires to impact on stem of the brain or cortical parts of the brain, or a combination thereof.

Analyzing the current approaches in the choice of impact zones at PT show us that it is necessary to consider the dualistic base (system and anti-system) of the principle of the regulation of any function. There are many dual phenomena in biology : decompensation and compensation; assimilation and dissimilation; stress and protection; adaptation and maladjustment; the predominance of sympathetic

tone and parasympathetic division of the ANS; pain and analgesic system; depression and euphoria and others.

At the same time, in many cases it is preferred to impact by PT not on the diseased system, but on the physiologically intact anti-system.

These data have been used successfully in the treatment of pain syndromes, when using a low-frequency electrical stimulation of the skin with short pulses (TENS), which excites the predominantly antinociceptive system and thereby suppress pain. It is also important to understand that the activation of neurons in the pain system can be caused not only by harmful stimulus, but also by artificial (after long-term use of certain medications) or by the natural inhibition of the activity of the system which make the analgesic effect: violation of serotonin metabolic processes, synthesis of opiate peptides, changes in emotional tone and al.

The mechanism of occurrence of pain of central origin (inhibition of the activity of antinociceptive system) is the basis of the appearance of pain in the masked (hidden), depression, and disappearing in the appointment antidepressants or adequate physiotherapy methods (electric, central electroanalgesia et al.).

Unfortunately, it must be noted that the on using of the principle systemic and anti-systemic in PT, in the European medicine, there is little demand and it was little studied. Such can not be said about Eastern medicine where these principles are widely used in the rules and the theory of 5 Elements («U-SHIN»). These rules are clearly defining the relationship of various organs and systems, such as the heart and liver, the liver and spleen, and others. The knowledge of these rules help the physician to freely navigate in the selection of systems (and anti-systems) in each case and, in addition to the impact on the pathological system, choose the a system that can help for the «sick» systems. Figure 2 shows the scheme of «relationship» between the main organs (systems, meridians), which regulates their influence on each other.

If we are referring to the so-called organ-trophic principle of PT, when the impact of physical factors take place directly on the projection of the required organ or some part of it, it should be noted some progress in this regard.

For example, when in the case of detection of initial pulmonary tuberculosis, as shown by our study [31], effective is the use of low-frequency ultrasound on a projection of focal changes in the lung together with TB chemotherapy. N.V. Karmazin [18] has convincingly proved the immunomodulatory prospects of the impact of various physical factors on the spleen. The influence of physiotherapy techniques on the blood are becomes classical [43]. We study and have good results by direct stimulation by the physical factors of the endocrine glands [6, 47a, 33].

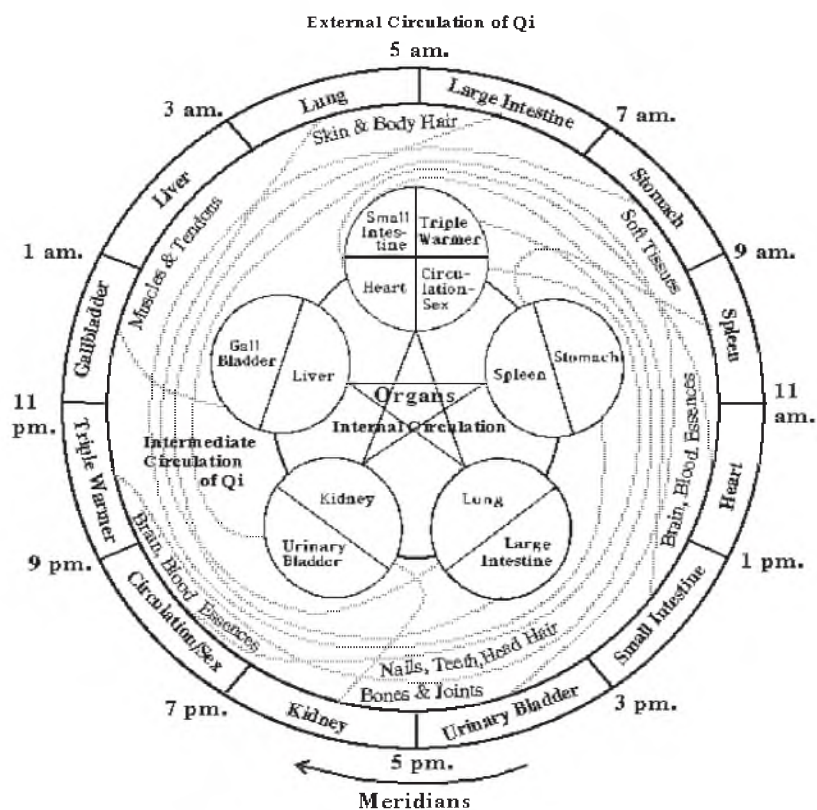


Fig. 2 «Interactions» between the main bodies (systems, meridians), which regulate their influence on each other (according to the theory of «U-SHIN»)

It is worth recalling that in the Vedic medicine the impact on the so-called chakras (which are the mostly projection on the skin of the endocrine glands) for the purpose of stimulation, were given special importance to the choice of a specific color (electromagnetic radiation of a certain wavelength).

So, for «sexual chakra» (sex glands, the first chakra, the area of the womb) need to act in red, on the chakra, located midway between the vagina and the navel (stimulation of the adrenal gland, the second chakra) - orange; on the chakra, located midway between the navel and the xiphoid process (the projection of the solar plexus, the third chakra) - yellow; on the thymus (4th chakra) - green; thyroid (5th chakra) - light blue; pituitary (6th chakra) - dark blue; epiphysis (7th chakra) - purple or white. In order to reduce the definite function of gland is require the effect of opposite color (by contrast to Goering) , which is causing the opposite reaction (photoreactivation). For example, if the thyroid gland has hyperfunction is good to wear amber (yellow), and this color is make the contrast to the light blue color , which is stimulating the gland.

*Table 2.*  
*Innervation zones and associated symptoms*

Vertebrae	Organs & Systems	The symptoms and pathological conditions
C1	The sympathetic nervous system, the brain, the pituitary gland, inner ear	Headaches, neurosis, migraine, hypertension, sleep disturbance
C2	Eyes, optic and auditory nerves, temporal bone	Allergies, fainting, diseases of the eye and ear
C3	Cheeks, face. The nerves of the teeth, the outer ear	Neuralgia, neuritis, acne
C4	The nose, lips, mouth, eustachian tubes	Hearing impairment, enlarged adenoids
C5	throat ligament	Sore throat, tonsillitis, laryngitis
C6	The muscles of the neck	Forearm pain in the neck, shoulders, back of the head
C7	Thyroid, shoulder and elbow joints	Hypotension, disturbance of mobility in the shoulders and elbows
D1	Hands, wrists, hands, esophagus,	Trachea asthma, cough, pain in the arms and hands
D2	Hands, wrists, hands, esophagus	Trachea arrhythmia, coronary heart disease, chest pain
D3	Bronchi, lungs, pleura, chest, nipples	Asthma, bronchitis, pneumonia, pleurisy
D4	The gall bladder and ducts	Stones gallbladder, jaundice, abnormal fat digestion
D5	Liver, solar plexus	Jaundice, liver disease, bleeding disorder
D6	Liver, solar plexus	Gastritis, ulcers, indigestion
D7	Pancreas, duodenum 12	Diabetes, ulcers, upset chairs
D8	The spleen, diaphragm	Hiccups, respiratory and digestive disorder
D9	Adrenal glands	Allergies, weakness of the immune system
D10	Kidneys	Kidney disease, fatigue, weakness
D11	The kidneys, ureters	Chronic kidney disease, impaired urination
D12	Small and large intestines, fallopian tubes	digestive disorders, infertility, diseases of the female genital organs
L1	The appendix, cecum, abdominal cavity	hernia, constipation, colitis, diarrhea
L2	Appendicitis, cecum, abdomen, upper thighs	Appendicitis, intestinal cramps, pain in the groin
L3	Sexual organs, urinary QSP, knee	The disorder of the bladder, impotence, pain in the knees
L4	The prostate gland, lower leg, foot	Sciatica, lumbodynia, pain in the knees, feet
L5	Legs, feet, toes	Swelling and pain in the ankle, flat feet

Sacrum	Thighs, buttocks	Pain in the sacrum
Coccyx	The rectum, anus	Hemorrhoids violation of pelvic organs

## **Special and specific zones of influence and choice in the practice of physical therapy**

In physiotherapy, as noted above, along with the impact on the area of local pain or area of lesion, are using a choice of zones based on the system multi-level, and system-antisystemic metamericly segmental principles. Used as famous methods of PT, as and continue to develop new methods of PT with special or specific treatment zones.

As previously mentioned the area of cervical spine and lumbar area, are widely used in the PT.

### ***Lumbar region***

Importance of the lumbar region, the impact on which are recommended in the treatment of many diseases due because most physical factors are provide effective impact to the kidney and adrenal glands.

Figure 2 shows a certain degree of a possible reaction of these bodies on the stimulation of zones of spinal, which are responsible for their innervations. It becomes clear why the lumbar region is one of the «pillars» of the physiotherapy treatment.

### ***The area of cervical spine***

Effects on the region of the neck also on the region of the sympathetic chain neck, primarily for upper cervical sympathetic ganglion (UCSG), are shown in various brain diseases. This is due to the specificity of these zones with respect to the brain function, its metabolism, and cerebrospinal fluid hemodynamic. It is known from classical neurology that autonomic centers of the spinal cord segments (C8-Th2) are the main source of autonomic (sympathetic) providing a head in general and cranial nerves particularly including blood vessels, vascular plexus of the brain ventricles and others. UCSG fibers is the peculiar manager of innervations in humans, they come from vegetative segments (C8-Th2) of the spinal cord.

From the latter (UCSG), the conductor of the autonomic sympathetic afferentation, are settling in perivascular plexus external and internal carotid arteries, after contacting with the vegetative nodes (pterygopalatine, ear, ciliary and submandibular) are sent to the face and brain structures. Moreover, individual fibers from the autonomic node come into back roots of C1-C4 and then through the cervical inter-ganglion branch go to the Th1-Th4. It turns out a kind of feedback: C8-Th2 segments form UCSG, and

from there on the said fiber arrives feedback, in fact, to the same segment. Indeed, the cervical region is a single whole.

It should also be emphasized that there is the second way of autonomic sympathetic ensure of the head and the skull contents is the vegetative perivascular plexus of vertebral artery.

Therefore, the only source of sympathetic innervations of the head, are the lower cervical and upper thoracic segments of the spinal cord, lateral vegetative horns and through these paths are sent innervations to the brain and other entities of the head. This explains the importance of the impact on the neck and area of the collar. However, will speak greater detail on UCSG function and possible mechanisms of action of physical factors in its stimulation.

Even in 1930 E.A. Asratyan [3] noted changes in formation of food conditioned reflexes in dogs after the UCSG extirpation. These data were later confirmed by other investigators [27; 38; 51]. The series of experimental studies and clinical observations have shown the role of the sympathetic nervous system, and in particular UCSG in auto regulation of cerebral blood flow [9; 54].

It is known that venous, neurogenic, metabolic and myogenic factors are plaing a leading role in the mechanisms of regulation of the cerebral circulation, including . At the same time, in neurogenic regulation the major role belongs to the noradrenergic intracerebral system (the brain stem structure, blue spot, and others.), which has a significant impact on the UCSG. The hypo- or overproduction (secretion) CSF in pathology UCSG are associating with the change in blood flow in the choroid plexus of the ventricles of the brain [50; 52].

These findings have been confirmed by long-term experiments with electrical stimulation UCSG [49]. There are studies (53), indicating a change in the content of RNA, the activity of RNase in sub cellular structures of the brain and the disappearance of noradrenalin in the pineal gland after removal UCSG.

Inadetailedexperimental work, G.A. Sokolovaetal. [37]haveshownainfluence of the UCSG regulation on the energy metabolism of the brain and the cortex. The authors emphasize that only if a continuous energy supply, in synapses can be intense protein synthesis, polypeptides, neurotransmitters and other metabolites, as well as the taking part of the synapses in the nerve impulses.

These data largely explain the importance of using of the PT influence threw the segments C8-Th2 and area of the UCSG , for actively influence the circulation of the blood and the energy processes in the brain . It should also be noted that the cervical region, and these segments are a source of sympathetic innervations (through star node) of the chest, including the heart. Not surprisingly, the impact on the neck and collar area is one of the most popular in the PT, that is one of her «whales».

## *The trans-cerebral techniques*

The impact on the area the scalp and face by the variety of physical factors are became constantly use in the practice of PT. Some of them (electric, central electroanalgesia, endonasal electrophoresis and electrophoresis on Bourguignon) have become classics, other options (effects on specific areas of the scalp) is actively developed.

The impact on the area of the scalp is different both in terms of the adequacy of the choice of physical factor, of the choice of parameters and the area of influence.

For example, the technique and methods endonasal Bourguignon are unique for the reason that the drug electrophoresis through these zones can pass the blood-brain barrier drug. Of course, these data are taken into account in clinical practice, however, their further improvement also requires the study of the possibility of expanding the number of drugs used in these procedures, and options which can include combined endolyumbalno injection, endonasal injection, the medical drugs for severe neurological diseases and others.

Particularly noteworthy technique transcerebral impact when, depending on the use of physical factors and its parameters can be obtained diverse therapeutic effects: analgesic effect [1; 20; 26], vaso regulating effect [13; 24; 35], immunomodulatory effect [21; 25], the hormone regulatory effect of [11] antidepressant effect [39], and others.

The promising for the techniques transcerebral physiopuncture is a «sighting» impact on the necessary areas of the cerebral cortex (motor, sensory, etc.) [19] or other functionally important structures. For example, the impact on the parasagittal region and the projection of a large brain tank.

The choices of these areas are due to the following facts. The projection of the parasagittal region is corresponds to the superior sagittal sinus, and here there is a significant concentration of the arachnoids villi, localized top (large) upper the anastomotic vein (vein of Trollyara), the parietal emissaries vein. These anatomical structures are directly related to venous circulation and resorption the cerebrospinal fluid of the brain [5]. Said zone is important in other aspects. Thus, according to Oriental medicine, there is localized (the epicenter of the parasagittal areas) the important energy band-to-point T (XIII) 20, which corresponds to the 7 chakra (Vedic Medicine) [30].

The functional significance of this area is confirmed by modern research. In a literature review about the melatonin and its role in Neuroimmunology, S.K. Evtushenko [45] draws attention to the fact that in the embryological period in this area are pawned the pineal gland (epiphysis). The role of the prostate is now intently studied by many scientists. However, it is already known that the gland secretes two important hormones - Epithalamion and Melatonin. The source of melatonin, are serving the serotonin of the pinealocytes, which constantly and in a larger amount than in other organs were found in the mammalian pineal gland.



Melatonin pharmacologically less active than serotonin, but its sedative effects on the CNS is more pronounced. The activating effect of serotonin, caused by the excitation of serotonergic systems reticular formation of the caudal portion of the midbrain and the bridge. These nuclei, in turn, are sending the long descending axons in the spinal cord. Probably, this serotonergic system plays the most important role in the modulation of nociception, and in conjunction with the hormones of the pineal gland are influence on the person's mood (depression to a great extent depend on the dysfunction of the pineal gland).

These facts also explain the results of the high efficiency white light and phototherapy in the treatment of many depressions.

Epiphysis actively affects the biorhythms of the organism, immune status and function of the pituitary. Interestingly a well-known fact that of the influence of light on the synthesis of melatonin and serotonin in the pineal gland depends on the state of the peripheral sympathetic innervation, these light effects are not observed when was resection of the both superior cervical sympathetic ganglia [48; 55]\*.

The dependence of the functional activity of the pineal gland from lighting is an important prerequisite for the targeted use of light exposure in order to normalize its functions. In this case, if the line photic stimulation of the pineal gland is difficult because of its depth of occurrence in the brain (pineal gland is anatomically located in the rear of the III ventricle), the impact of it can be mediated through the zone embryological associated with it, that is, parasagittal region. It is possible, that the pulsed laser radiation in the infrared range can sometimes directly affects on the epiphysis (penetration depth of about 7 cm).

Consequently, the impact on the parasagittal region in the treatment of many diseases, especially depression, in our view, is well founded.

Selection projection zone cisterna magna, c. serebromedullaris for laser stimulation, EHF-therapy, etc. is also associated with the importance of education. It is known that the cisterna magna of the brain is an important regulator of movement of the cerebrospinal fluid, but, for example, skull trauma often involved in the pathological process. Normalization of its functions, reduction of reactive (inflammatory) changes is an important precondition for the normalization of the CSF dynamics. It should also be borne in mind that in the projection of cisterna magna, c. serebromedullaris are laid important brain stem structures, including the reticular formation. Stimulation of these structures is directly related to the processes sanogenesis.

Speaking about the specificity of the areas of influence, we have remembered about the high sensitivity to physical factors the zones of palms [17], of the feet [42], the ear [30], and others.

Particularly sensitive to the the influence of physical factors, include magnito-laser, the area of carotid sinus, exposure to it can cause significant therapeutic effects (Fig. 3)

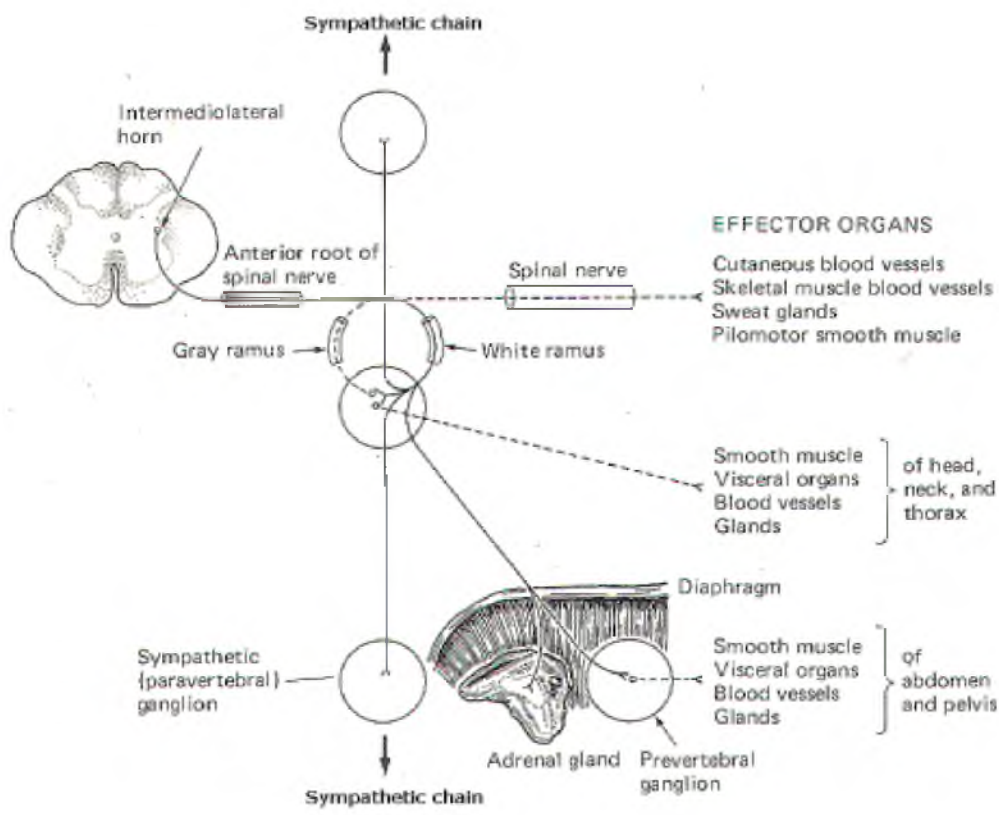


Fig.3 Distribution scheme of reflexes arising, at the excitation carotid receptors.

The hardware diagnostic methods help in the choice of impact zones in the PT: they help to identify areas with low electric resistance and high potential, «interested» vascular pool REG or Doppler [9] and others.

Interesting in this regard are variants of acupuncture (system, meridian) diagnostics (method Nakatani, Akabane, Nogier, hardware pulse diagnosis, and others.), they allow to reveal on the preclinical level the true pathological system, thereby defining the zone of influence [30]. This last fact is particularly important in the prevention of exacerbations of the disease and to monitor the effectiveness of treatment.

Thus, the modern PT has ample opportunities in the choice of treatment zones. It is important that every medical specialist has mastered the basic ones and skillfully used in clinical practice, bearing in mind that each zone has «individual» characteristics and requires adequate physical factor.

## Biological rhythms and bioresonance therapy

It is known that the functioning of the body, its systems, organs, tissues, cells and subcellular structures has rhythmic character with the presence of a large number of oscillating processes from the periods of daily, monthly, seasonal, annual and perennial biological rhythms till microsecond periods repeating the processes inside the cell. The main characteristic of rhythm is considered to be the frequency of the repetition process. V.P. Lysenyuk (1999), summarizing the literature data, gives the following classification rhythms depending on the period and recurrence (Table. 1).

In today's presentation of biological rhythms is «... swinging shift and intensity of processes and physiological reactions, which are based on changes in the metabolism of biological systems, due to the influence of external and internal factors. The external factors include: changes in illumination (photoperiodism), temperature (thermoperiodism), perhaps the magnetic field, and the intensity of cosmic radiation, tides, seasonal and solar-lunar influence. Internal factors is neurohumoral processes in particular, genetically fixed rate and rhythm. « [BME, 1976, vol. 3, p. 157].

Probably biorhythmology can be described as the science of the nature and relationships of internal (endogenous) rhythms with external (exogenous) environmental rhythms environment.

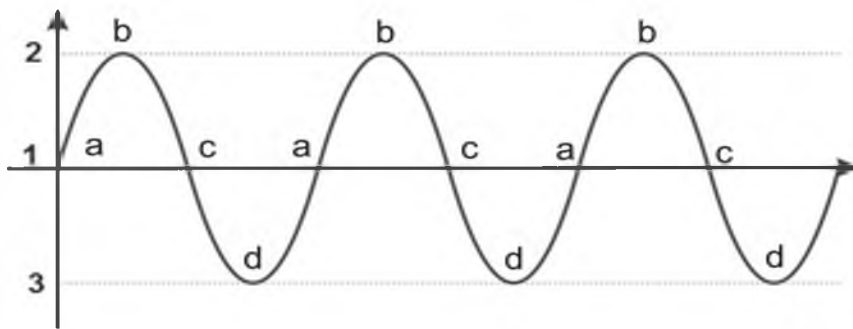
Traditional Oriental medicine, based on the recognition of the unity and harmony of the deep relationship, between man and the surrounding nature. When an assessment of the human condition and its treatment tactics, connects with cosmic influences and terrestrial natural factors. Cosmic processes, solar flares and magnetic storms generated by them in the world, the movement of weather fronts and weather changes correlate with the incidence of colds, cardiovascular accidents (hypertensive crises, heart attacks, heart and brain), with the disregulatory aggravation and mental illness. It is expected that the solar activity and related geomagnetic disturbances cause misalignment of internal body rhythms with the rhythms of the environment (A.K. Podshibyakin et al., 1970). It is not excluded that the role of pacemaker can perform frequency of geomagnetic field 0,1-0,006 Hz, varies with solar activity (Y.S. Nikolaev et al., 1982). Founder of heliobiology A.L. Chizhevsky (1965) wrote: «At any given moment the organic world is under the influence of the space environment and the most sensitive way reflects itself, its features changes or fluctuations that occur in it. We are surrounded by the flow of cosmic energy, which flow to us from distant nebulae, stars, meteor showers, and it would be totally wrong to consider only the sun's energy the only creator of life on earth. The living cell is the result of cosmic, solar and telluric influences, and is the object, which was created by the voltage of creative abilities of the entire universe. «

It is the rhythm of natural phenomena appeared the background against which proceededevolutionary processes that, in turn, ledtothe emergence biorhythmological

activity in living systems as a mechanism adaptation to ever-changing conditions of life.

Indeed, right now reliably it is shown that the body is a dissipative (open) self-organizing system to external influences, exchanging with the environment of matter and energy, ie information, but the ability to maintain functioning at a certain constant level, called «homeostasis.»

However, the concept of homeostasis from today's perspective, this is not a strict constant of an index, and its fluctuations within certain limits. For example, fluctuations in serum glucose from 3.1 to 5.5 mmol / l during a day is legal, and the fluctuations in total cholesterol in serum of different individuals 3,9-6,5 mmol / l, and It is normal. Schematically homeostasis level can be represented as a kind of corridor (Fig. 4).

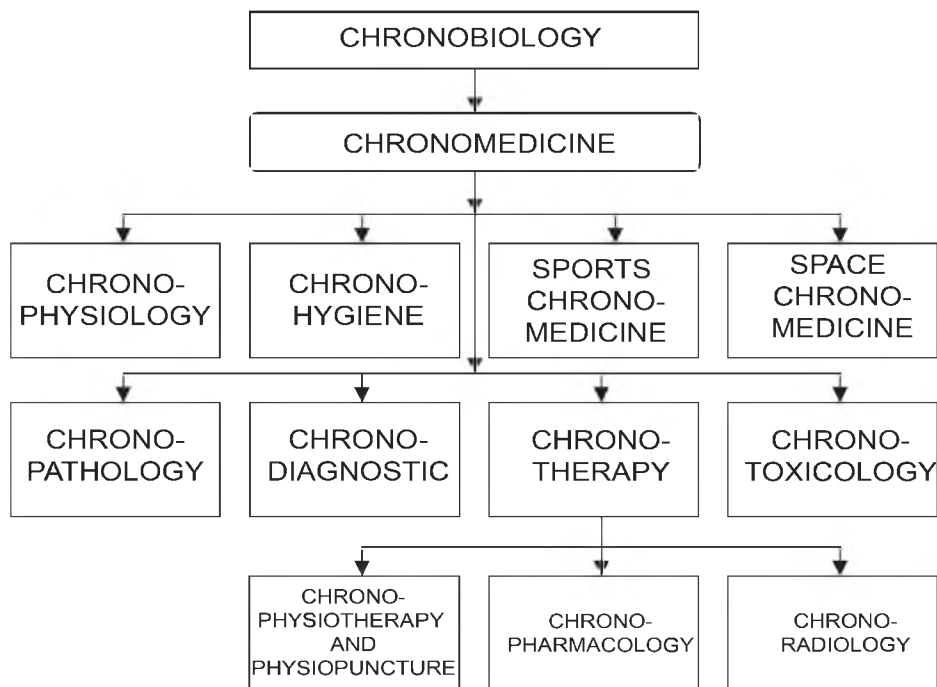


*Fig. 4 1- the average (mean) value of parameters, which vary with respect to certain changes (e.g., average serum glucose - 4.3 mmol / l); 2 - upper limit of the corridor - the maximum permissible velichinakako any function of the system; 3 - the minimum permissible value of the same function; and - knots in performance or function values (Anacrota); in - decline in value or decrease in function (catacrota); b, d - a plateau, that is, the achievement of the indicator or certain level of function: b - the maximum, g - the minimum value.*

The fluctuation of certain functions, system components, and others within certain limits, respectively, and is the «homeostasis», ie the ability to maintain function at an optimal level for the body. Stable inclusion indicators higher or lower than the corridor may be indicative of the inability of the system to compensate for, and the development of pathological changes in the form of hyper- or hypo function condition of the body or system. This principle «works» in diagnostic system «Ryodoraku» I. Nakatani and others. Themselves oscillations (rhythms) in physiological limits are necessary in order that the cells (the system) are periodically moved from one extreme physiological state, which is dominated by anabolic processes, in another, wherein the catabolic processes dominate.

Knowledge of one or other of biorhythms has not only theoretical interest, but also of practical importance, especially for physiotherapy and physiopuncture. It is

no accident subsection «chronomedicine» stands out in modern medicine as part of chronobiology (Fig. 5).



*Fig. 5 The Components of the chronomedicine in a section of chronobiology.*

In the modern tactics of the physiotherapy and physiopuncture (acupuncture, reflexology) - the choice is not only zones and method (method) the impact, but also the optimal time of the medical procedures.

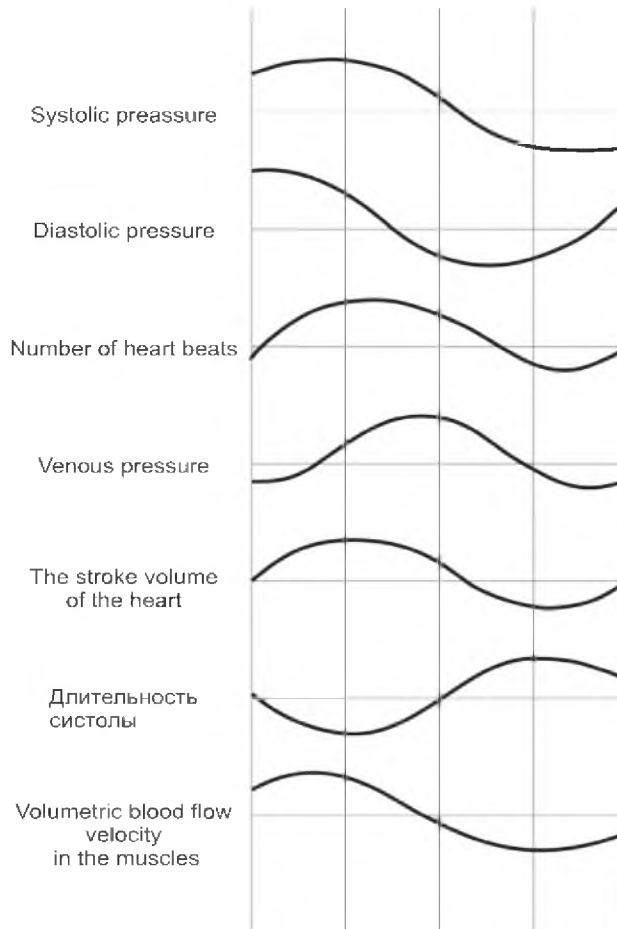
Effective therapy is possible only at the individualization of therapy for each patient, which involves a detailed study of the original condition of the body, under which the patient's condition should be understood in a certain period of time (especially in the period of treatment) with strict regard to its individual features of the disease, the prevalence of a particular syndrome et al. the entire complex of therapeutic measures is built on the basis of these data, including and physiotherapy. To understand the cyclical course of many diseases is important to the teachings of the doctors of the Ancient East about the time of activity and passivity meridians (Table. 3).

Table 3.

*The impact on the actual sedative, tonic-point and on the point accomplices according to the hourly relationship of the rhythm (for I. Manaka, I. Urquhart, 1979, with amendments)*

Meridians	Activity period		Refleuence period		Inaction period		
	Time, h	Sedative point	Time, h	Toning point	Time, h	Toning point	Point-to-aider
Lungs	3-5	P(I)5	5-7	P(I)9	15-17	P(I)9	P(I)9
Large intestine	5-7	GI(II)2	7-9	GI(II)11	17-19	GI(II)11	GI(II)4
Stomach	7-9	E(III)45	9-11	E(III)41	19-21	E(III)41	E(III)42
Spleen & Pancreas	9-11	RP(IV)5	11-13	RP(IV)2	21-23	RP(IV)2	RP(IV)3
Heart	11-13	C(V)7	13-15	C(V)9	23-1	C(V)9	C(V)7
Small intestine	13-15	IG(VI)8	15-17	IG(VI)3	1-3	IG(VI)3	IG(VI)4
Bladder	15-17	V(VII)65	17-19	V(VII)67	3-5	V(VII)67	V(VII)64
Kidneys	17-19	R(VIII)1	19-21	R(VIII)7	5-7	R(VIII)7	R(VIII)3
Pericardium	19-21	MC(IX)7	21-23	MC(IX)9	7-9	MC(IX)9	MC(IX)7
Three cavities of the trunk	21-23	TR(X)10	23-1	TR(X)3	9-11	TR(X)3	TR(X)4
Gallbladder	23-1	VB(XI)38	1-3	VB(XI)43	11-13	VB(XI)43	VB(XI)40
Liver	1-3	F(XII)2	3-5	F(XII)8	13-15	F(XII)8	F(XII)3

The modern interpretation is consistent with the notion of circadian (daily, about daily) rhythms. This evidence about the hourly daily activity of meridians coincides with modern data on the functional activity of internal organs and body systems. Thus, the aggregate data of work accident and emergency Kiev and the region show that in the morning (3 hours and 30 minutes-6 hours), the most frequent calls to patients with bronchial asthma attacks, in the evening (17-20h)-k patients with renal pathology in the 23-3 h night dominated by calls to patients with pathology of the gallbladder and liver. It actually corresponds to the time of maximum activity of the meridians of the lung, kidney, gall bladder and liver. Features of the functioning of organs and systems of the body throughout the day associated primarily with the change of day and night (Fig. 6).



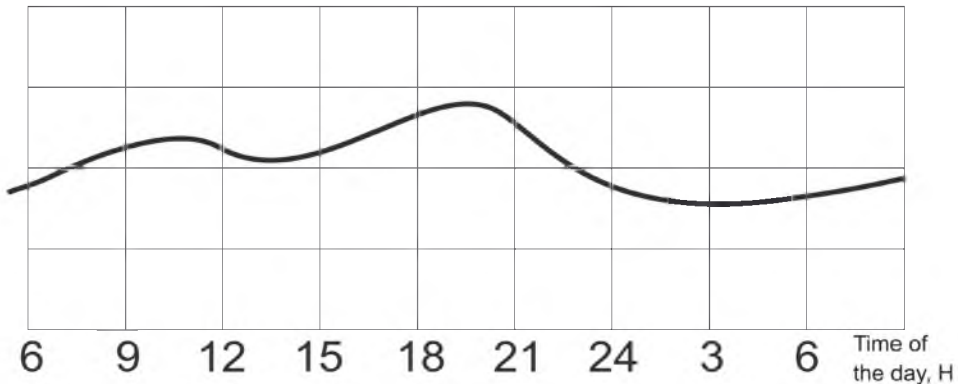
*Fig. 6 Daily rhythms (oscillation about the average daily level) of the cardiovascular system ( Zaslavskaya R.M.1979)*

It is obvious that there is no need for the work of all organs and systems of the body throughout the day. The nature of the process of evolution has provided the activity or inactivity of a system (the body) in most suitable time frame for the body. It is clear, from this point of the channel activity of the large intestine (5-7 h), since the active work (hunting for the primitive people, for animals - with the start of the day) digestive tract must be emptied. Then became too active the gastric channel (7-9 hours), presumably, this time was the most frequent for ingestion of food, which evolutionarily had established. Then, in the subsequent hours after ingestion will run channel spleen, pancreas, etc., are explicable maximum activity at certain hours of other meridians.

Thus, the liver is most active at night channel (1 to 3 hours), that is, while the parasympathetic nervous system (trophotropic) dominates over sympathetic, the liver's role in these processes is well known. Was found the empirical data which confirm doctors about the lung channel activity from 3 to 5 hours, as it is in these

hours ( $\pm 1$  hour) is most pronounced predominance of the parasympathetic part of the autonomic nervous system. Are known role of the meridian of the lungs, in the occurrence of asthma attacks.

Interest in the characteristics of the daily functioning of organs and systems in recent years has increased significantly among European doctors. This is due to the need to research the people performance rhythm. (Fig. 7).



*Fig. 7 The daily rhythm (medium type) human performance (by N. Aghajanian, 1980)*

Information about the rhythm of the body's functions are of great value to medical practice, because they may refuse from a generic approach to the prescribing of 1 tablet 3 times a day.

R.M. Zaslavskaya et al. (1987) showed that each patient has its own rhythm in blood pressure rise. By installing it, your doctor may prescribe a drug for 1-1.5 hours before the expected «jump» in a more doses, but only once a day. The average rate dose of such a scheme is 2.5-3 times less than usual. A.Reinberg-one of the founders chronopharmacology-straight points to the dependence of the therapeutic effect and toxicity of drugs on time of day. There are also other evidence of periodic increasing or decreasing the activity of the organs and body systems.

Knowing these facts optimally select time of the appointment of a drug, and in relation to physiopuncture (reflexology) and time of the session. For example, in asthma treatment is important to arrange so that the maximum concentration of drug in the blood was observed by the time the intended attack, which may prevent it. When used in such cases, reflexology (prolonged exposure in the form of micro-needles, tsubo, magnitoforov et al.) The patient can massages the own imposed micro-needles in day before the alleged astma-attack to prevent it.

Folk doctors of East believed that acupuncture sessions carried out on the eve of the attack - a «to meet the tainted energy,» that is, to prevent attack by harmful energy



dissipation. In classical acupuncture it is considered that the greatest sedative effect on the meridian is reached during the period of its activity, and the maximum toning, during low tide, that is to say in the next 2 hours after a period of activity passed, or in the period of inactivity.

D.M. Tabeeva (1980) gives the following example. If after the diagnosis by acupuncture revealed that patient needs to toning the channel of heart meridian, for the patient with heart disease is best to do an session of acupuncture in 13-15 hours, or 15-17 hours, rather than 11-13 hours. If patient needs to sedation the channel of heart meridian, is best to do an session of acupuncture in 11-13 hours. In the Table. 2 presents data on the effect on the sedative and tonic points, hourly according to the relationship of rhythm.

The knowledge about the rhythm of the organs and systems of the body helps the doctor to accurately select the optimum time of treatment. In some cases it is possible to prevent the attack (eg, asthma), in the other - to find the optimal time to strengthen the function of a specific organ or system. For example, for the treatment of chronic colitis with constipation optimal time physiotherapy-morning hours (7-9 hours).

For maximum sedative and tonic effect at regularly recurring attacks, such as migraine, at one and the same time (23 hours), you should not wait for this time to work on the point VB (XI) 38 (the optimal time for sedation in the meridian of the gallbladder).

In this case, it is advisable to use the recommendation «to meet the tainted energy» because attack is easier to prevent than to stop. Therefore, in such cases are requires the individual income.

Knowledge about activity and inactivity of the meridians (organ systems) has a certain value in both - in the European medical tradition and in the diagnosis of acupuncture. For example, research on blood glucose contents conducted on the maximum channel activity of the spleen and pancreas (9-11 hours) and revealed upper bound glucose standards. Reasons for exclusion of diabetes in such cases, no, because during the activity of the channel, is marked spontaneous lowering blood glucose to the lowest performance. The same applies to the study of functions of the stomach where the conclusions about the reduced or increased its functions without taking into account the time of the research are difficult.

If for any length of time (week, month, year), the patient at a particular time has deterioration of heart or occur heart seizures , for example, from 11 hours and 30 minutes till 12 hours, it can be assumed the violation of function of the channel of heart. It is known that the development time (maximum severity or worsening) of a disease depends on compensatory possibilities of the system. Thus, diseases that occur with signs of hyper-function (excess), will be sharply active in the hours of maximum daily activity of the system, and diseases that occur with signs of hypofunction (lack of) are more pronounced in the hours of minimum activity of the system.

Thus, knowledge of the characteristics of the daily activity of organs and systems of the body not only helps diagnose diseases (including conduct acupuncture diagnosis), but also to choose the optimal time of a medical treatment and physiotherapy. Currently, more than 300 known physiological processes undergoing daily rhythmic fluctuations. Biorhythms are not limited to daily fluctuations, and as outlined above, known month (lunar), seasonal, related to solar activity and other changes biorhythms.

Consideration of these rhythms, which are mainly to the rhythms of the average frequency, meso and macro-rhythms, is paramount in choosing the time of treatment or prevention of a disease at a particular time of day, week, month, season, etc. For example, for the prevention of exacerbations disease liver and gallbladder preferred spa or physiotherapy in the winter, the cardiovascular system - in the spring, broncho-pulmonary - in summer, kidney - in autumn, etc.

However, there are also high-frequency rhythms, characterized by rapid changes of oscillatory processes in an atom, molecule, cell, organ, system, etc.

Each organ is a complex rhythmic structure, characterized by a set of oscillating processes, differing in frequency and amplitude.

The presence of oscillatory processes allows the development of new functional and dynamic links, depending on the specific needs of any organ system, or whole organism, which is important in the formation of adaptive reactions.

In general, to get the maximum effect it is necessary to achieve resonance effect (it must be remembered that the organs and systems resonate not only to fluctuations in external factors that coincide with the natural frequency, but also on the fluctuations which are in multiple regard to them).

A popular explanation of the resonance effect can serve as a classic example of two tuning forks. If you take two tuning forks of the same sound «la» or «si» and one of them is set stationary and the second to give the sound and put side by side, the sound starts after a few seconds of the first. This is the original variant of the same resonance tuning forks, which does not occur if the tuning forks have of different sound - «B» and «C», etc.

The biological response is a result of the sharp increase in the amplitude of the fluctuations in the biological system when subjected to forced vibrations at a frequency of the system outside; gradually approaching the one that is the system has inside.

To achieve «resonance effect», when external oscillatory processes (physical agents) coincide with the internal, it is an important and quite solved task.

It has been established that most disease begins from the arrhythmias with possible formation of the subsequent pathological process of functional system, and then certain organic changes.

According to modern concepts in the development of the pathological process can be divided into 3 stages passing:

- 1) Violations of the information or information and energy level of interaction.
- 2) The emergence of a temporary error or disruption of the rhythm of the work.
- 3) Metabolic and destruction of structures.

Therapy without frequency modulation acts mainly on the last stage, which is undoubtedly important.

However, normalization of body work rhythm, tissues, cells, or an integrated system is important in the treatment process for the recovery of their functional state. In these cases, it seems essential to choose the frequency characteristics of such effects, which would be made close to the frequency of oscillatory processes in the affected organ, tissue or system.

In such cases, you can expect resonance: changes in the functional system of the body with its characteristic frequency and the impact frequency. Naturally, such a coincidence frequency characteristics (response) will contribute to more rapid recovery of function, and subsequently of the structure of the affected organs.

Consequently, the selection of appropriate frequencies during physiotherapy or physiopuncture is an important component in the treatment process. It is known that the low-frequency processes which are predominate, are reflecting the state of the functional-dynamic system and its metabolic status in the organs and systems of the human body.

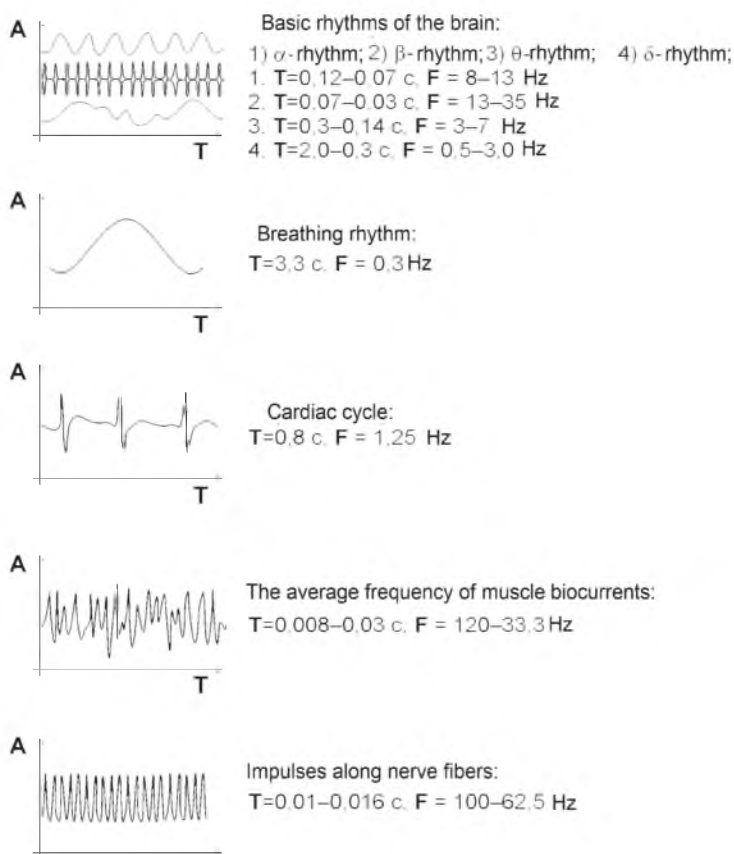
Figur. 8 shows some of the endogenous rhythms of human grouped by E. Kushnir (as amended).

For example, on the electroencephalogram the basic rhythm of a healthy person - alpha rhythm, its frequency ranges from 8 to 13 Hz (10 Hz on the average). In certain diseases of the central nervous system, when the percentage of the alpha rhythm is reduced as compared with the other (delta, beta, theta) rhythms and the modulation frequency it is recommended to use  $10 \text{ Hz} \pm 0,7$ .

It has been observed that when the violation of cortical impact neurodynamics, we can take the red laser range (0.63 m) to the point MC (IX) 6, with early said modulation frequency results in recovery of the alpha rhythm in the occipital and parietal lobes of the brain for 3-4 session, while with frequency modulation when to achieve this effect it is needs minimum of 8-10 sessions of laser puncture. With this in mind at all diseases associated with impaired cortical neurodynamics, we recommend setting the modulation frequency of 9.4 Hz and act simultaneously on three areas:

- in the medulla oblongata area using magneto-red emitter;
- the corresponding spinal segments using magnetic infrared laser emitter;
- in the area of the affected organ using an ultrasonic emitter.

When peripheral paresis or paralysis (neuropathy), also recommended the use of low frequency (18, 37.5, 75 or 10-100 Hz), because higher frequencies are limiting for learning neuro-muscular system.



*Fig. 8 Some human endogenous rhythms.*

When the low-frequency pulse make action is necessary to remember, that the length of the main enzymatic processes does not exceed 3-25 seconds (necessary dark period). Therefore, the minimum interval between the pulses of the impact should be at least 0.001 seconds in order not to interfere in the already running enzymatic reactions. This corresponds to a frequency up to 1000 Hz (V.E. Illarionov, 1994).

The materials of the French association «soft» lasers «The Lazer Focus» (1982) contains information about what the root of many rhythmic processes in the body is «functional» (Universal) frequency - 1.2 Hz (1.14 Hz), the multiplicity to which are detecting in many functional systems. This is the rhythm of cardiac activity, 72 hits in 1 minute (1.2 Hz  $\times$  60 = 72). The modulation frequency of 1.2 Hz is recommended for use in the treatment of focal infection, and twice as likely (2.4 Hz) -for treatment of rheumatic diseases and the impact on sedative acupuncture points. Alpha - rhythm and rhythm tremor affecting capillary blood flow and vascular elongation - 9.4 Hz.

The same frequency is most effective when used in traumatology and for tonic effect on the acupuncture points it affects (enhances) the capillary blood flow.

18Hz-effectively when subjected to signal on points (heralds) and for excitation of the energy channels (V.E.Illarionov, 1994);

37.5 Hz, the frequency of physical blocking calcium channels - in diseases of the neuromuscular system and for influence on the point of entry meridians;

75 Hz - the frequency and the frequency of analgesic effects and for influence on the point of exit meridians on the meridian;

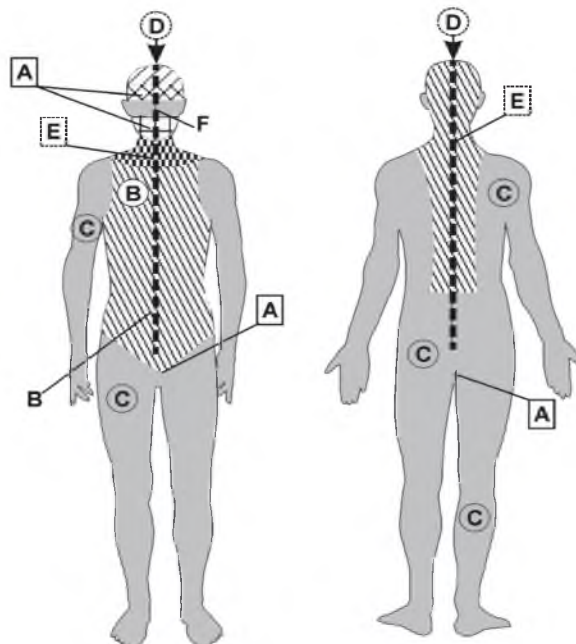
1-10 Hz in the case of treatment chronic disease and to stimulate regeneration;

10-100 Hz expedient to apply in the case of organic pathology of the central nervous system and, if necessary, to cause vasodilation large diameter (Z. Garnuszewski, 1995).

The effects of modulated the impact of low frequencies to be used mainly in the distal acupuncture points, points signaling, and sympathetic points.

These recommendations are consistent with the classical ideas about the phenomenon of the propagation velocity of PSC (propagated sensation along the channels) along the meridians component of 3.3-3.6 cm / s (Zhang Jin, 1979). The relatively low rate of spread of the phenomenon of PSC (slow wave processes) requires adequate exposure, that is, the use of lower frequencies, calculated in units or tens of hertz. Exposure to high frequencies (hundreds of hertz) will not be perceived as the meridian system frequency fluctuations, that is, the response of the system when exposed to high frequencies or continuous radiation will actually be the same type.

On the basis of various sources and the experience of the «MIT-11» device can recommend the following frequencies for local action (Figure 9):



*Fig. 9 Frequencies therapeutic effect for various areas of the body by P. Nogier (1987)*

U = 1,2 Hz (universal basic frequency);

A = 2.4 Hz, the mucous membranes of the lips, nose, inner ear canal, perineum (the mucous membranes of the genitals and rectum), the front surface of the chest (on the collarbone), the stomach;

C = 9.4 Hz triangular and navicular fossa, and anthelion antitragus the ear, upper limb with shoulder girdle, lower extremities with pelvic girdle;

D = 18 Hz, front and rear median lines (meridians);

E = 37.5 Hz, middle and lower third of the curl of the ear, the front of the neck from the lower jaw to the clavicle, head (forehead and nose to the eyebrows) and the rear surface of the head, paravertebral zone to the lumbar (L3 vertebra level);

F = 75 Hz base of the ear lobe, the person (on the level of nasolabial junction and the entire lower jaw).

Keep in mind that the selection of the modulation frequency in the treatment of various diseases is individual.

The probability of the high rate of assimilation directly tissues and cells of the patient's body is higher than the peripheral structures. In this regard, the obvious fact that the local area (the area affected organs) necessary to act with high modulation frequencies (from 10 to 100 Hz) and the acupuncture points on the distal - low frequency (1 to 10 Hz).

Such an approach, according to our information, is optimal for the treatment of many diseases, especially chronic course.

Table 4 shows the resonant frequency of the therapeutic influence in some pathological disorders.

*Table 4.*

*The resonant frequency of the therapeutic influence, in some pathological disorders.*

Frequency, Hz	Diseases, conditions, syndromes, symptoms
1,2	The universal or basic frequency (the frequency of «superdelta» - the frequency of the heart rhythm). The main indications: diseases of the cardiovascular system, especially accompanied by heart palpitations, inflammation and autoimmune diseases, focal infection. Cardiopsychoneurosis.
2,4	Frequency universal multiple of (1.2 Hz) and enters the delta range (0.5-3 Hz) biocurrents brain. Frequency in the delta brain waves have a sedative effect and promote the normalization of physiological (delta) sleep with insomnia. Stimulation of hormonal function in women (hypermenorrhea, menorrhagia, uterine fibroids). Dyskinesia of biliary tract, kidney disease, fatigue (tiredness), sinusitis, and headache associated with it, bruises, injuries from bruises, infectious and toxic liver disease, rheumatic diseases.

9,40±0,5	Frequency of spectrum of the alpha rhythm (8-13 Hz) biocurrents brain, frequency of tremor of capillaries and frequencies that are multiples (0.1 Hz), alpha-rhythm of circulation. The resonant frequency of the release of ions. Increased efficiency due to the normalization neurodynamics brain. Other diseases and symptoms: headache of various origins, essential hypertension, accompanied by angina, respiratory disease (obstructive bronchitis), insufficient function of the endocrine glands (diabetes, impotence), adnexitis, prostatitis, cystitis, tonsillitis, peptic ulcer and 12 duodenal colon and other.
18,75	Diseases of the musculoskeletal system, phantom pain, burns, ophthalmic practice in patients with lesions of the cornea, acute respiratory infections.
37,5	Frequency of physical blocking of calcium channels (Ca <sup>2+</sup> ), and diseases associated with this process (instead of antihypertensive drugs, calcium channel blockers, to reduce the spastic muscle tone - post stroke patients, cerebral palsy, poorly healing fractures, etc.). Diseases of the neuromuscular system, dlyasnizheniya weight, in violation of thermoregulation, tonsillitis.
75	Universal frequency of analgesic, has antidepressant, reduces fear, strengthens kidney function. It stimulates the «color» vision, it is also recommended for diseases of the respiratory system, increases the content of leukocytes in the blood, stimulates lymphocirculation.
1-10	Scanning frequency (LF «swing») help the body recover from physical and mental overvoltage (asthenic gipofunktsionalnye and condition of the body), diseases of the cardiovascular system and parenchymal organs.
10-100	Scanning frequency (midrange «swing») has a sedative effect and normalizes hyperactivity conditions associated with neurotic disorders.

Studies have shown that each component of the functional system are unique to its own frequency range (biorhythm), which is associated with all spatial and temporal organization of the body. And this is true not only for the system, organ, cellular and intracellular structures, but also for the individual chemical components of cells, for example - lipids and nucleic acids. The resulting biorythmological activity has different levels between a strict mutually synchronized frequency phase and amplitude relationships.

Our bodies are equipped with most perfect synchronizers, where in addition to the nervous system and play a role other code-synchronizers. For example, ciliate-shoe,

with no nervous system, live, feeds, breeds, and all of these complicated processes are not chaotic.

Probably biorythmological (code-frequency) control is the most ancient (primary), which inherent in the simplest forms of biological objects, but have not lost their importance in the complex organisms in connection with the superstructure appeared - the humoral and neural regulation.

In the body, there are approximately 10<sup>15</sup> cells (a million billion) and each of them has a specific function, is clearly interact with each other. The ability to fully manage this armada can not afford even the nervous system, which is only about a few billion cells [109]\*. It is natural to assume that each of biorhythms, possessing a certain autonomy or self biorythmological activity in the general scheme is subject to the control signals from the some «tact of masters», that is, the clock rate.

System or organ rhythms cover organs, systems and organism as a whole, whereas the «molecular» (code-frequency) are present in the structure of the cell and the cell itself.

Humans and animals, is probably the union of the set of pacemaker cells, obeying a common pacemaker, and the latter is synchronized with the external periodic processes (A.E. Kushnir, 1999). For the de-synchronization of rhythms (of the disease) or their recovery is an important principle of biogenesis, which suggests the possibility of a quantized code transition of bio-system from one state to another, which is characterized by spasmodic or erratic.

According to this concept, any physiological variable, including heart rate should return after a disturbance to the value corresponding to the state of stable equilibrium, and the variations in heart rate - it's just temporary responses to environmental fluctuations (Le Chatelier-Braun principle). However, during the illness more difficult to maintain a constant heart rate and its amplitude variation increases.

It was found that the heart and other physiological systems, when the body is young and healthy, can act abruptly, showing elements of chaotic behavior, and more regular operation, which is described as continuous functions are associated with aging and disease, so irregular and chaotic behavior are very important characteristics of the health. Reduced variability and emergence reception frequency is often associated with many diseases.

Therefore, along with the widely known system of biological circadian clock, in response to a constant periodic change in living organisms chaotic dynamics

\* These billions of nerve cells vary in structure, although they are similar to each other. At the same time, our nervous system is capable of varying, highly diverse specific activities. What is the reason the specifics? It was found that the cause lies in the molecular organization of the surface of nerve cells in the presence of each type of neuronal cell specific set of very complex molecules. Finding ways to influence these molecules, and accordingly certain functions for which they are «responsible», need to be addressed in various ways, including the one for which the resonant frequencies.



are simulated. A similar pattern appears not only at the system level, but also as characteristic of the cell metabolism.

Thus, in the body of mammals, along with well-studied the nervous and endocrine systems, operates another information management system with a central pacemaker, which regulates the principle of the system frequency regulation. The main purpose of this system is to maintain activity and balancing of biorhythms of the hierarchically related functional systems (Fig. 10), which in turn are by synchronized exogenous environmental fluctuations (A.E.Kushnir, 1999).

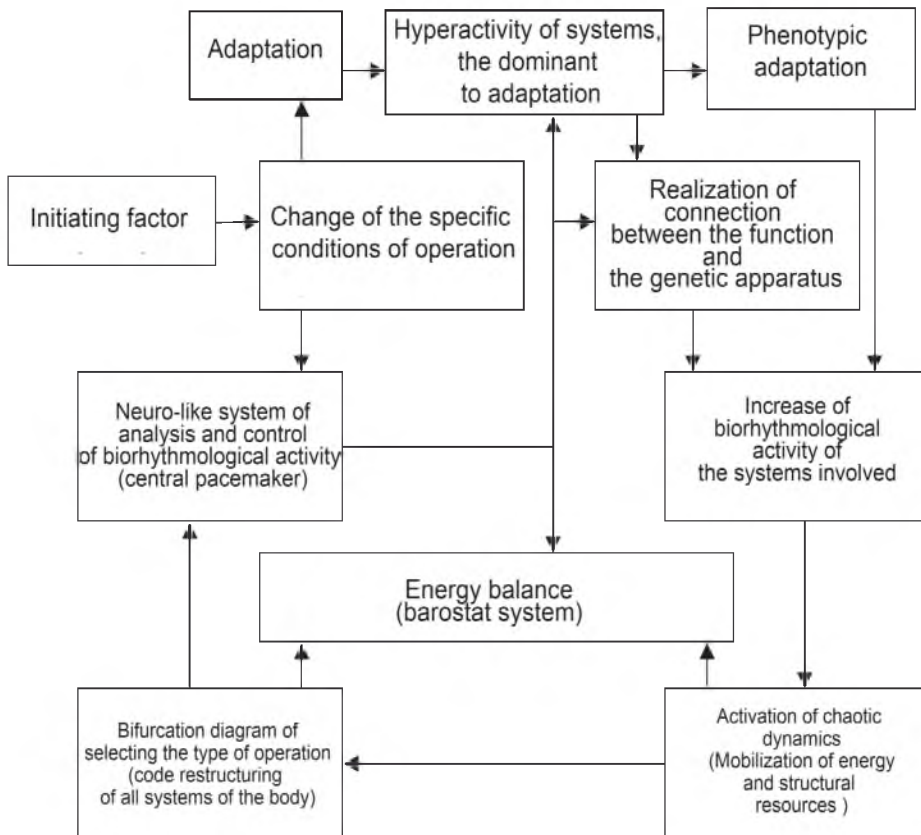


Fig. 10 Functional diagram of the frequency-code control (AE Kushnir, 1999)

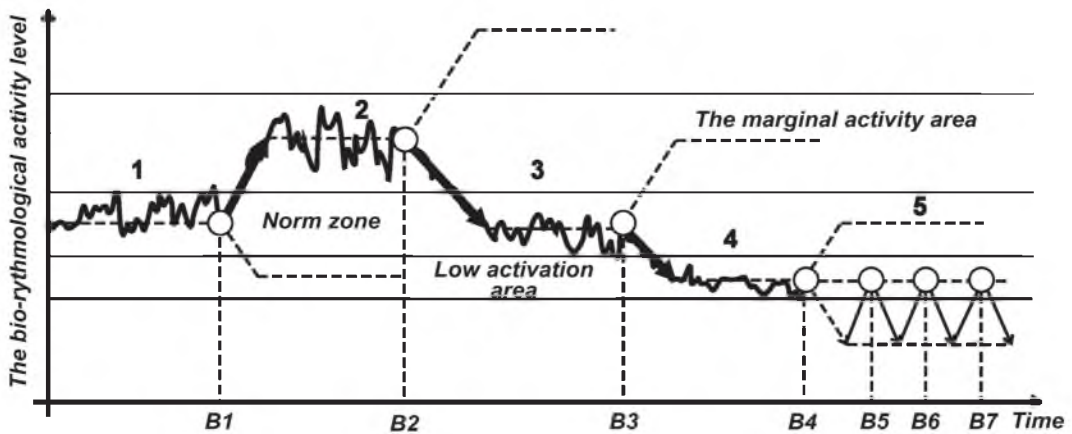
Any functional system, organ, and even cells have a certain autonomy, but functional and structural reorganization of any system of the body is consistent the change of biorhythmological activity of functionally related systems.

Possible fluctuations the activities of biorhythms of specific functional systems are in strict accordance with its function, structure and reserves free of ATP cellular energy and determine its physiological corridor and adaptive capabilities.

The exit from a pathological condition is carried out by successive saccadic bifurcation transitions from one biorhythmological state to another.

When we speak about the influence of physical factors, we need to know the essential parameters of the integrated spatial-temporal spectrum of it, which, in some cases, could serve as a pacemaker of the required rhythm ( the etalon-informative role of natural factors in its appropriate parameters).

Figure 11, by A.E. Kushnir (1999), shows the variability of the chaotic dynamics of the system around the stable area (1), characterized by a strange attractor, with an abrupt transition (bifurcation point B1) to a new state in the area of sustainable limit activity. In the future, the system successively passes through the unstable state of bifurcation (point B2-B3) to a state with reduced biological activity. As can be seen from the figure, the higher the level of biological activity, and then higher the level of variability chaotic dynamics of the system.



**B1-B7- the points of bifurcation (zone of instability)**

*Fig. 11 The dependence of variations of chaotic dynamics of the system from time to time*

With reduced variability level (point B4) appears the unstable zone (5), characterized by a pronounced periodicity and limit cycle in the phase plane. Further evolution of the system is associated with the mobilization of its energy and structural resources, with the obligatory selection of one of the possible stable states (or reduced activity zone or pathological zone).

Naturally, the process of exit of the biological system from the pathological condition requires ATP cellular energy reserve resources which in an integrated system of organism are regulated by the general homeostasis system. The most effective way of targeting the reallocation of existing resources of the reserve, in terms of their pathological deficit is the direct transformation the action of external energy.

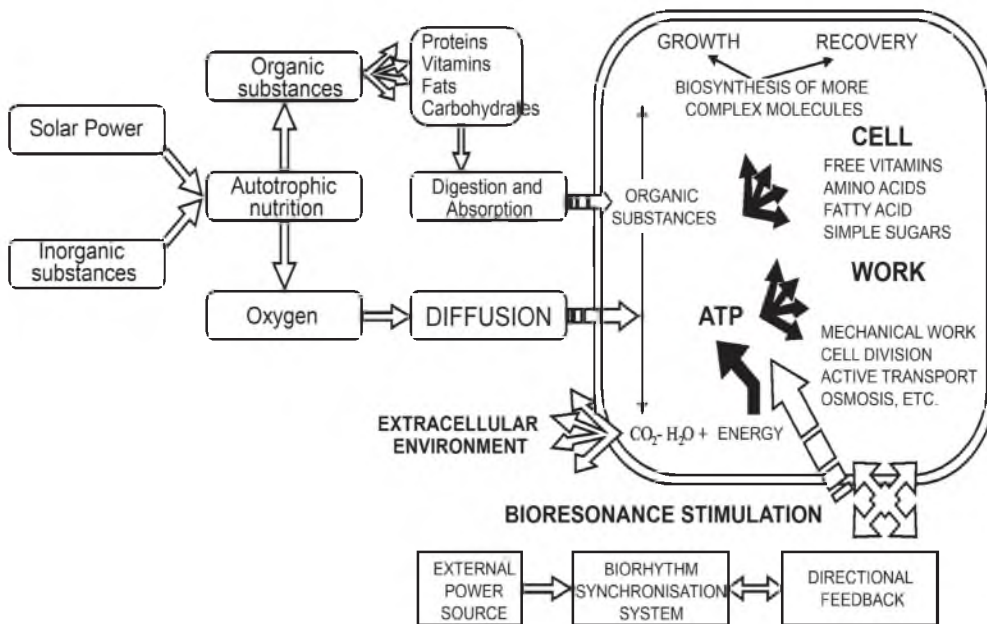


Fig. 12 Two ways of cells energy supply

Fig. 12 shows two ways of power maintenance of cells. First-serial conversion by photosynthetic organisms solar energy into chemical energy, followed by converting the energy and transportation materials in the cell structure in the form of ATP. And the second-straight external energy transformation in biological cells works by using bio-resonance stimulation (A.E. Kushnir, 1999).

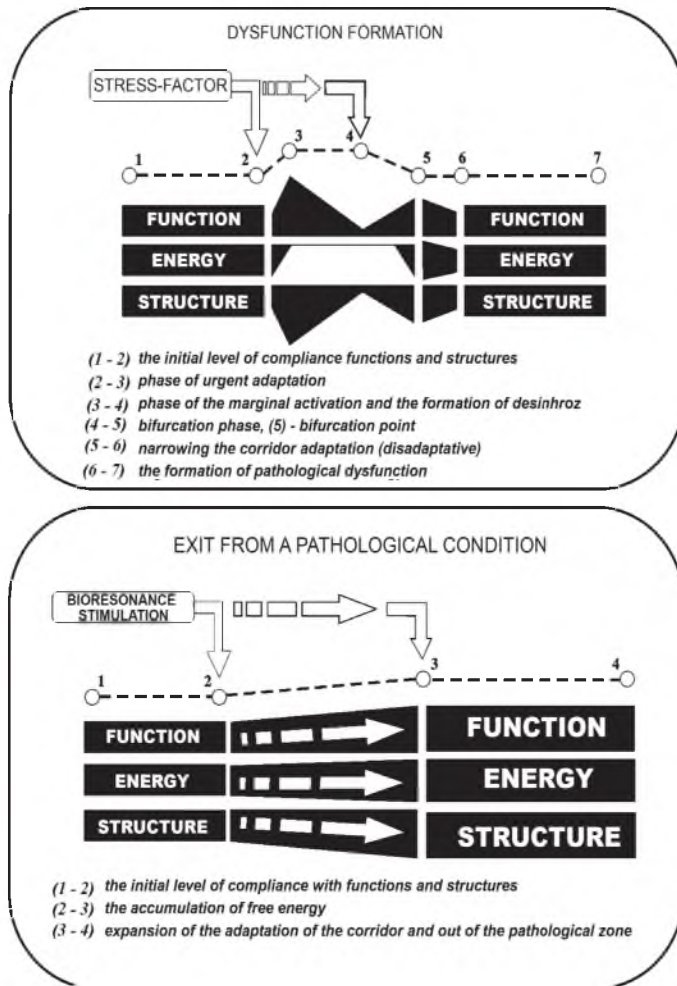
On the Fig. 13 is a diagram of the possible formation of pathological dysfunction due to exposure to stress factors and restore functions with adequate bio-resonance therapy (A.E. Kushnir, 1999).

Feed the free external energy, without compromising the overall orientation of the functional systems of the body, has a stimulating and normalizing effect on energy balance, blood circulation and lymph flow, metabolism, redox processes, membrane transfer, development of regulatory peptides, helps to normalize the tone of the autonomic nervous system, increase elasticity vessels and in general increases the adaptive ability of the organism.

As a general rule, the final result of the treatment is to restore the structural and energy ties and lost body functions.

An example of a «resonant interaction» of physical factors and some of the structures of the biological object is magnetic resonance imaging (MRI), one of the most informative diagnostic methods. The main contribution to the observed signal is a nuclear magnetic resonance (NMR) allows water protons - intra- and extracellular, low hydrogen-containing molecules, and molecules with high mobility, for example,

the lipids that make up the fat tissue. The very intensity of the NMR signal is provided by the spin relaxation time of water protons under the influence of the radio-frequency pulse voltage of more than 2 MP T. Relaxation characteristics mainly determined by the interaction between itself and spins, respectively, with the environment, and their mobility (frequency fields generated in their motion).



*Fig. 13 The process of forming dysfunction and restoration of normal functional state*

For NMR is important the essential matter content in biological tissues of the compounds which are having the so-called, paramagnetic properties. The latter refers to such substances, the total magnetization of which (the sum of the dipole moments) oriented towards the external a magnetic field (MF) and amplifies it (F. Bloch et al., 1946). A characteristic of the paramagnetic properties of substances is the presence in it of unpaired electrons and nucleons, respectively. The electrons in the same way

as the nucleons have spin angular momentum-own movement and its own magnetic moment. The magnetic moment of the electron is 800 times higher than the value of the proton and therefore has a significant effect on the magnetic properties of paramagnetic element (F. Bloch et al., 1946).

Elements having paramagnetic properties have unpaired electrons and are characterized by significant largest magnetic moment. This class includes metals such as  $Mn^{2+}$ ,  $Fe^{3+}$ ,  $Ni^{2+}$ ,  $Cr^{3+}$ ,  $Co^{3+}$ ,  $Cu^{2+}$ ,  $Ti^{3+}$ , in which the paramagnetic properties are most pronounced, as well as elements of the rare earth group as  $Gd^{3+}$ ,  $Eu^{2+}$ ,  $Du^{3+}$ . Some of the latter ( $Gd^{3+}$ ), are used as contrast agents in MR imaging. Since the paramagnetic substances have large dipole moment, they contribute to the transfer of energy from the excited nuclei in the atomic lattice, and at the same time increase the heterogeneity of the MF.

These data about NMR indicate a significant effect of the possibilities of physical factors act on the molecular-atomic levels of biological objects, causing them to predictable changes. These data are confirmed by the so-called ion-parametric MT (G.N. Ponomarenko et al., 1998; S.M. Zubkova et al., 1998; 2000)

Thus, until recently, the mechanisms of registered medical effects of magnetic therapy, most authors associate exclusively with the emerging vortex electric fields, leading to the formation of closed conduction currents (A.N. Kuznetsov, 1994). However, the level of energy of the magnetic interaction between the ions and biological molecules (10-19Dzh) on the 3 orders of magnitude lower than the energy of thermal motion of disordering (10-16Dzh) and clearly insufficient to change their orientation in space (A.R. Liboff, 1985). The linear model which exist now can not explain the paradox of «energy». In this regard, it is difficult to predict the specificity and importance of therapeutic effects of low-frequency magnetic therapy, as confirmed by clinical observations (A.M. Demetsky et al., 1991).

In the last decade are offering another, non-linear model of interaction of weak magnetic fields with biological systems, in which the direct target of selective action of weak magnetic fields are cations. Thus, the model of the «cyclotron resonance» implies that the motion of ions along a helical path at accelerating cyclotron frequencies are defined by mutual influence of the parallel component of the DC and AC magnetic fields, the latter provides a selective energy absorption and increases their speed of movement in the ion channels of biological membrane (V.V. Ledneo, 1991).

Subsequent analysis showed that an increase in the probability of displacement the cations through the biomembrane displacement can be achieved without external «pumping» energy into a-protein complex ion channel, and by periodically changing the kinetic energy of moving thereon cations.

This model of the «ion parametric resonance» (IPR) suggests that a primary link in the chain of cooperative reactions of the biological systems is  $Ca^{2+}$  ion, specifically associated with the  $Ca^{2+}$  -binding the centers of proteins and which is a messenger action of various stimuli on the metabolism of cells and other cations capable of

modulating the kinetics of cell metabolism of enzymatic reactions (V.V. Lednev et al., 1996).

The model is based on the impact of IPR parallel to the direction of the constant and variable Bdc Bdc vector components of the magnetic field B. IPR can be observed in the amplitude of the alternating magnetic field, comparable with the induction of a constant magnetic field of the Earth (40-70 mT). The frequency of the alternating magnetic field, causing the IRP, determined expression.

$$f_p = \frac{1}{n} \frac{Bdc}{2\pi} \frac{q}{m}$$

where  $f_p$ — resonance frequency of the variable component of the field (Hz),  $q$ — ion charge (C),  $m$  — ion mass (kg), Bdc—induction value of the constant field (mT),  $n$ —valence of the ion (an integer equal to 1, 2, 3 ...).

By now there is a sufficient number of experimental studies confirming the phenomenon of selective activation («oscillation buildup») of different cations at the frequencies corresponding to their IPR (the principal possibility of modulation cation mobility in biological membranes). At the same time, depending on the magnetic field parameters that meet the conditions of the IPR of various ions, it is possible to modulate the associated mobility (according to the electro-diffusion equation of Nernst-Planck) cation flux across the biological membrane and the likelihood of their distribution between lipid and aqueous phases, is calculated as Bourne.

The study, conducted by G.N. Ponomarenko et al., 1998, was made to evaluate the possibility of therapeutic use of the phenomenon of IPR and clinical testing based on it a fundamentally new method of magneto-ion-parametric magnetic therapy. His source was a machine «Effect» (production RNIITO name R.R. Vreden). It consists of two inductors and a control that contains a control voltage source DC and AC magnetic field and magnetometer with a remote transmitter (accuracy of 0.01 mT). An analysis of its clinical effects, the authors conducted in groups of patients with the disease, the pathogenesis of which play a leading role violations exchange of  $Ca^{2+}$ , - heart disease, vascular and musculoskeletal system.

These results are show positive results of the feasibility of introducing IPR-magnetic therapy and complex treatment of patients with diseases of the circulatory system and the musculoskeletal system. The mechanisms of action of MP, parametric resonance causes  $Ca^{2+}$  ions, is seen to bring the system ion channel - ion in an unstable state and the strengthening of small amplitude fluctuations of ions, which are inevitable in such an oscillating system, which is a living cell. In this system, there is always a corresponding external structure of MT and the oscillation frequency of the synchronous phase with it. The authors suggest that such structures may be the calcium cations, directly or indirectly involved in the implementation of reliably

reported therapeutic effects. In these circumstances, low-intensity MP enhances the amplitude of the oscillation and movement of such structures, which form the basis of cooperative generalized reactions that form the basis of «information» exposure.

Possibilities of active influence of certain parameters on the IP exchange of  $\text{Ca}^{2+}$  in the body is a very promising trend in modern medicine from the point of view of the uniqueness of the value of this element in the body.

Calcium - the basis of many metabolic and regulatory processes (just to name muscle contraction, blood sedimentation, hormonal regulation, vitamin metabolism and others.).

For example, the level of vascular tone depends on the concentration of intracellular free  $\text{Ca}^{2+}$ , which is reduced (as well as the tonus of skeletal muscle and cardiac muscle) while reducing  $10^{-7}$  mol below  $\text{Ca}^{2+}/\text{l}$ . Not coincidentally, calcium antagonists occupy a leading position (along with  $\beta$ -blockers, diuretics and peripheral vasodilators) in medical treatment of essential hypertension.

Of particular importance breach of  $\text{Ca}^{2+}$  exchange with hypervitaminosis D has in pathogenesis of atherosclerosis and calcification, and the presence of specific calcium-protein complexes\* can serve as molecular evidence of malignant neoplasms. This fact has been used successfully in Kiev for the past 5 years in the program «Onkotest».

B. Siesjo, F. Bengtsson (1989) formulated a unique theory overload calcium (calcium overload), according to which an excess of intracellular  $\text{Ca}^{2+}$  in neurons leads to dysfunction of cellular structures of the brain with the formation of ischemic lesions. Such a mechanism may be the cause of in hypoglycemia, depression and other neurological diseases.

Consequently, the search for the physical factors, that can actively influence the exchange of  $\text{Ca}^{2+}$  in the body, is an important branch of modern physiotherapy, the use of the MP, one of the most promising directions.

---

\* This calcium-protein complex in the brain is represented S100b- $\text{Ca}^{2+}$  - binding protein is synthesized by glia and has a predominantly glial localization (cytoplasm astrocyte), and is also found in synaptic structures and bodies of individual neurons. S100b is a trophic factor for serotonergic neurons. There are plenty of circumstantial evidence pointing to the fact that S100b functions relate to the regulation of the permeability of ion channels, as well as the integrative activity of the brain (the mechanism of learning, memory, emotional and motivational reactions). Change of content (an abnormal increase or decrease) of this protein in the brain tissue (for titer determination of serum antibodies thereto) characteristic for various pathologies of the nervous system (A.B. Poletaev 1995; G.V. Morozov et al., 2000) .

## Ultrasound therapy

Ultrasound treatment (UST), or treatment with ultrasonic waves (ultrasonotherapy), providing for the use of therapeutic or prophylactic energy inaudible to the human ear mechanical vibrations of an elastic medium with a frequency above 20 kHz, has found considerable application in medical practice. However, it should be emphasized that this is a unique physical effects can and should be more widely used in various fields of clinical medicine and, above all, in physical therapy offices, rehabilitation centers, sanatoria and health resorts and other organizations. Explanations and facts, that speak in favor of the use of ultrasound therapy, quite a lot. Consider the most important of them.

1) Ultrasound treatment (UST) is the unique physical factor that is capable make «massage» of not only micro tissue, but also of individual cells.

2) The ultrasound treatment has a universal therapeutic action, which consists of:

- Mechanical micro-massage cells and tissues;

- The energy impact of ultrasonic waves on the body to produce heat tissue and activation of physical and chemical action (changing the course of oxidation - reduction processes, accelerating the digestion of complex protein complexes, activation of enzymes).

That is, the ultrasound can be viewed as a kind of physical catalyst of biochemical, biophysical and physico-chemical reactions and processes in the body. Arising under the action of ultrasonic wave energy alternative micro-changes in cellular structures, such as lipoprotein membranes of lysosomes, leading to changes in the homeostasis of the intracellular environment and are stepping sanogenetic mechanisms inter cell regeneration, etc.

3) Ultrasound - is the ideal factor of physics for combined use with drug therapy, as he «loosens» histological barriers whereby circulating blood drug may penetrate the pathological lesion in larger quantities. These facts confirmed by modern clinical observations, such as the treatment of tuberculosis, when the combination of specific and low-frequency ultrasonic treatment on lung area leads to faster recovery time \* repeatedly.

4) Ultrasound can be combined with virtually all types of physical therapy: magnetic therapy, electrotherapy, massages, balneotherapy, laser, EHF-therapy and other therapy options electromagnetic waves, amplifying their effects.

5) Ultrasound easy to dose intensity, and modern equipment allows us to accurately determine the depth of its penetration, allowing purposefully affect the organs and tissues depending on the depth of their location, using a low-, medium- or high-frequency ultrasonic vibrations. New perspectives are opened by using focused ultrasound and modulated.

6) Increase the ability of permeation of drugs with phonophoresis, another feature of ultrasound, proving the feasibility of its application. In addition, the impact



of this factor changes (usually increases) pharmacological activity of most drugs, while it changes their pharmacokinetics and pharmacodynamics. Medicines given to the use of ultrasound, acquire a new dimension to action - information, which is close to the action of a well-chosen homeopathic remedies. Small doses of drugs that are administered and the particular method phonophoresis kinetics (within an hour after the treatment drug appears in the blood, through the watch is 12 and the maximum concentration is in the tissues within 2-3 days), it was confirmed the energy information and the mechanism of their actions. Consequently, phono-phoresis is not only the ultrasound treatment and medicine, but also a kind of variant of homeopathy (small doses of drugs administered by ultrasound, but a sharp increase in the energy of his action), who will undoubtedly find further development.

7) Ultrasonic puncture - a relatively new trend in ultrasound therapy. It provides exposure to ultrasonic waves focused on biologically active points (BAP).

The advantages of this are obvious effects:

- High effectiveness of the procedures;
- The possibility of precise dosage of energy and depth of action (this is achieved by selecting the vibration frequency of the ultrasonic waves, and more on their modulation of the resonant frequencies of organs, as well as the use of special focusing nozzles);
- The relative simplicity of the procedure;
- Compatibility with other options physio-puncture (magneto, laser, and other methods of EHF puncture therapy).

8) Ultrasound although preformed physical factors, but it is the natural and constantly part of the peoples environment, which we have not learned to use (or have lost the ability to!) knowingly use in their livelihoods, unlike many animals (dolphins, whales, sharks, bats, etc. ). Probably the person perceives the ultrasonic vibrations on a subconscious level, and thus they affect many systems of the body. «Naturalness» of this factor explains its main advantages:

- High efficiency and repeatability (repeatability) of the results;
- The absence of allergies or intolerances;
- The lack of habituation or any significant complications while respecting the elementary rules of dosage;
- Significant therapeutic effects corridor intensity: 0.05 to 1.0 W/cm (from 1 to 5 microns), which makes use of ultrasound therapy virtually secure.

I would also like to emphasize that the ultrasound, as well as some other physical factors, has the main advantage - makes the organism to fight the disease by launching and promoting mechanisms sanogenesis. The objective of any medical specialty, to pay attention to this aspect of the action of physical factors, and predict their use at home and, in general, in everyday life. It would not have been attractive pharmacotherapy (ease of use, the relative speed of action), its use should be limited to «for health reasons», since in most cases it is not indifferent to human (allergy,

addiction, side effects, or, often, small or short-term efficiency and etc.). Many of these unwanted (side) pharmacotherapy action can be avoided with a combination with physical therapy, ie physio pharmacotherapy. The advantages of such combinations are expressed in increasing the effectiveness of the treatment, reduction of allergic reactions, a significant decrease drug dosage and others.

## Basic terms and concepts

To date, are produced a large number of devices for ultrasonic therapy of various classes and systems designed to affect areas of the body, from the acupuncture points and ending reflexogenic zones for areas of significant areas. Due to the large different options exposure (generating mode, the power of ultrasonic vibrations, etc.), often with many doctors practicing ultrasound therapy, there are questions about the difference between one or another kind of ultrasound exposure. For a better understanding of the problem of ultrasound therapy in medicine need to have a clear idea about the advantages and disadvantages of various methods of influence, to determine with sufficient accuracy for each patient's specific type of ultrasound exposure. To this end, we offer the reader acquainted with the brief characteristics used in everyday therapeutic practice kinds of ultrasonic therapy, as well as the accepted terminology.

**Ultrasound** as oscillatory wave process, characterized by a wavelength ( $\lambda$ ), the period ( $T$ ), frequency ( $f$ ), vibration amplitude ( $A$ ) and propagation velocity ( $v$ ) in the medium. The main dosimetric parameters when performing ultrasound therapy are the power and intensity of the ultrasonic vibrations, mode and duration of exposure.

**The oscillation amplitude** ( $A$ ) is the maximal displacement of oscillating particles from the equilibrium position. Determined in micrometers (microns).

In accordance with the requirements of National Standard low frequency ultrasound is dosed in the amplitude of oscillation. However, most physicians are accustomed to the intensity values. Conventionally, it can be assumed that the  $1 \text{ W/cm}^2$  correspond to 5 microns in their therapeutic effect.

**Penetration depth** is the distance, the passage of which the intensity of ultrasonic vibrations decreases  $e^2$  (approximately 7.3) times. Determined in millimeters (mm). The depth of penetration of ultrasound in human biological tissues for different exposure is given in Table 5.

The depth of a therapeutically effective influence of ultrasonic vibrations is an average of 4-5 cm, 5-6 cm, the maximum depth for ultrasound with a frequency of 880 kHz and for 44 kHz, up to 10-12 cm. Ultrasound with high frequency and intensity of  $0.05\text{-}1.0 \text{ W/cm}^2$  is usually used for the treatment of pathological processes located in the soft tissues and organs at a depth of 3 cm. To increase the penetration depth of the ultrasound in the tissue of the patient, using vibrations of low frequency (LF) -22 and 44 kHz, maximum effect when using low-frequency ultrasound, we obtained in

the treatment of gynecologic, urologic and gastrointestinal diseases, in the treatment of diabetes, tuberculosis, and others.

For low-frequency ultrasound human body and its internal organs acoustically «semitransparent», this makes it possible to influence them through the skin on which they are projected. For these purposes the ultrasound oscillations with amplitude of 2, 3, 4, 5 (before heating). That is expedient to make sound with low-frequency ultrasound all tissue of human, including deeply located organs, including those containing a lot of air (e.g., lung) and bone and joints.

Ultrasound is absorbed by the tissues unevenly: poorly - in the subcutaneous adipose tissue, strongly - in the muscles, nerves, and especially in the bones, which is due to the properties of the tissues. The tissues which have reference function and tissues which experiencing mechanical stress have higher absorption than absorption in parenchymal tissue. The absorption coefficient for the ultrasonic bone 12-15 times higher compared to the muscle tissue. The depth of penetration of ultrasound in the bone is minimal and is about 0.3 cm.

The maximum ultrasonic energy is absorbed at the interfaces of different tissues: skin - subcutaneous fat, fascia - muscle, periosteum - the bone. When, pathological processes of absorption of ultrasound are changes. If the pathological process is accompanied by swelling of the tissue, the absorption coefficient decreases. Infiltration tissue by the cellular elements increases the absorption coefficient.

**The intensity** - amount of ultrasonic energy, passing through an area of  $1 \text{ cm}^2$ , for 1 second. It is expressed in watts per square centimeter ( $\text{W}/\text{cm}^2$ ). In modern physiotherapy ultrasound confirmed the division into small intensities ( $0.05\text{-}0.4 \text{ W}/\text{cm}^2\text{-}1\text{-}2 \text{ m}$ ), medium ( $0.4\text{-}0.8 \text{ W}/\text{cm}^2\text{-}3\text{-}4 \text{ microns}$ ) and larger ( $0, 8\text{-}1,0 \text{ W}/\text{cm}^2\text{-}4\text{-}5 \text{ microns}$ ).

**The power (P)** is the number of energy which emitted by across the surface of ultrasonic transducer. Are determining in Watts, (W).

Experimentally and clinically substantiated advantage of the use of low-intensity ultrasound is more appropriate for therapeutic and prophylactic effects.

Only when used ultrasound with low intensity (often  $\text{Vt}/\text{cm}^2 0.1\text{-}0.3$ ) with predominance modulated or pulse influences and short exposures (several minutes), it acts as the catalyst of the biochemical, enzymatic processes and trophic activation underlying sanogenesis. The most effective exposure of ultrasound, in a pulsed mode with an intensity, of  $0.1\text{-}0.3 \text{ W}/\text{cm}^2$ . In this case, we have the combined of low destructive reaction with high physical and chemical activity in the form of increased speed (fluctuations) molecules. Under the influence of low-intensity ultrasound is marked activation of microcirculation, increased membrane permeability and transcapillary exchange. With this in mind, the procedure is advisable to start with small doses (feeling weak heat on the skin in the affected area) and only after 3-4 treatments to move to medium intensity mode (the feeling of warmth on the skin in the affected area).

**Period (T)** - it is the time for which any point of the wave moves a distance equal to one wavelength. Are determined in seconds, (s).

The regime of generating ultrasonic waves - specifies the ratio of the emission time between the ultrasonic waves and pauses there between. The regime may be continuous (no pause between the pulses), which is modulated (additionally performs modulation ultrasonic vibrations at the resonant frequencies bodies) or pulse (oscillation in separate bursts). In case of using modulated or pulsed mode with the same vibration intensity for the same time the average energy radiated less than continuous exposure.

**The propagation velocity (v)** - the distance by which to move any point of the ultrasonic waves per unit of time. It depends on the properties of the medium, in particular the density, elasticity, compressibility coefficient, molecular structures, temperature and the like, that is, the acoustic impedance of the medium. Determined in meters per second, (m/s).

The propagation velocity of ultrasound in solids more than in liquids, and in a liquid more than in gaseous. In muscle tissue ultrasound propagation velocity (at a frequency of 880kHz) typically 1540m/s, that is, close to its propagation velocity in water. But in bone ultrasound propagates faster - about 3400m/s.

**The oscillation frequency (f = t/T)** - the number of complete oscillations of ultrasonic waves per unit of time. Determined in hertz (1 Hz-one oscillation per second) kilohertz (1kHz = 103 Hz) and megahertz (1 MHz = 106 Hz).

Between the wavelength ( $\lambda$ ), velocity (v) and the frequency (f) there is a dependence of ultrasonic vibrations, which is expressed by the formula:

Ultrasonic waves in a homogeneous medium are distributed almost straightforward, easy to focus, are reflected from the boundaries of separation media, they are characterized by the phenomenon of diffraction and interference of. Reflection, refraction, and absorption of ultrasonic waves mainly determined acoustic impedance of the medium, the oscillation frequency and the angle of incidence of ultrasonic waves. Due to the fact that the ultrasonic waves are absorbed rapidly by air environment and they are reflected from air space which is boundary with the biological tissues (99.7%), the effect of ultrasound on the human body is held through the contact space (degassed water, vaseline, lanolin, paraffin oil, glycerine, and etc.).

With increasing frequency ultrasonic vibrations increases their absorption medium and decreases the depth of penetration in the body tissue. Furthermore, the amount of ultrasonic energy absorbed depends on the type from the sonicated tissues: the bone most absorbs ultrasonic, then less - the nervous - and very little muscle - fat. Attenuation, ie total loss of acoustic energy in biological tissue, due to the combined effect of refraction, reflection, scattering and absorption of ultrasound.

## Features of action of ultrasonic waves on the body

After the penetrating into the body, the ultrasound has on it a complex biological and therapeutic effect. The mechanism of action of ultrasound on the body has: thermal (non-specific), the mechanical and physical-chemical (specific) factors.

The thermal factor is related to the processes of heat by absorption of ultrasound in biological tissues. The absorption depends on the type of sounded tissue, and the frequency of the ultrasonic vibrations. According to theoretical calculations, the ultrasound absorption coefficient for a single type of tissue is proportional to the square of the frequency. In practice, however, this dependence can vary from linear to quadratic, so low-frequency ultrasound penetration ability is much higher than with HF. The zone of high temperature formed unevenly in the body.

Most of them occur at the interface of the spaces, due to the difference in acoustic impedance and the formation of waves which are highly damped shear (transverse), as well as tissues, absorbs ultrasonic energy (nerve, bone), and in the areas which poorly supplied with blood, because for the latter removes heat, therefore, there may overheat. Because these tissue have no thermoreceptors virtually no possibility feel of local temperature rise. Pain receptors are stimulated, and the patient feels pain only when the local temperature exceeds 45° C. Most authors believe that the short-term rise in temperature to 45° C is not dangerous. To avoid overheating of tissues with ultrasound therapy should be preferred labile technique.

The consequence of the thermal effects of ultrasound can be considered as an increase in the flow rate of metabolic processes, the occurrence of temperature gradients, which improves blood - and lymphocirculation, improves tissue elasticity, etc.

Mechanical factor is due to the alternating acoustic pressure and manifests itself in a kind of «micro-massage» at the cellular and subcellular levels. Thus there is an increase in the permeability of cell membranes, thereby facilitating the process of transport of substances through the membrane and consequently increased the penetration of substances into the cell and the body as a whole. Equally important the effect, which make by ultrasound of depolymerization on hyaluronic acid. There activation electrokinetic (electrocapillary) phenomena observed in the micropores at the interface with different acoustic impedance, which plays an important role in phonophoresis. There are acoustic micro-showers in the protoplasm, movement of intracellular inclusions, change their spatial relative position that causes stimulation of the functions of the cellular elements and cells in general.

Physico-chemical action is due to the fact that the signs of variables elastic vibrations cause in the tissue mechanical resonance. As a result of this accelerated movement and oscillation of molecules, intermolecular bonds are weakened and, as a consequence, increasing their decay into ions, the formation of new electric field is disturbed isoelectric state; there are electronically excited states, and electrical

changes occurring in cells and tissues. There tribo-luminescence of water, serum and other fluids, the change of the structure of water and the state of hydration shells: are released biologically active substances, are formed the free radicals (HO, H, HO<sub>2</sub>, singlet oxygen) and a variety of products of biological solvent which are were made by sonolysis, are changed the processes of peroxidation lipid, are Intensified physico-chemical and biochemical processes in tissues. This is particularly reflected in the change of mitochondrial oxidative phosphorylation of the liver, the kidneys, the intensity of tissue respiration, glycolysis processes and the activity of the pentose phosphate pathway of carbohydrate metabolism, revitalizing the metabolism of proteins and nucleotides mitotichekoj enhancing cell activity.

The effect of all three factors (thermal, mechanical, physical and chemical) is closely related to each other and has on the body combined action. Under the influence of the ultrasound occur intracellular microflows by rotational movements of the cytoplasm, which contributes to stimulation of cell functions and elements in whole cells. Exposure to ultrasound energy on cellular structures, including liposome membrane lipoprotein, lead to changes in the medium and intracellular homeostatic mechanisms activate defense responses, the intracellular regeneration of other processes, which is important in the mechanism of action of ultrasound.

Thus, ultrasound may be considered, as a physical catalyst physicochemical and biophysical processes within the body.

### **The therapeutic effect of ultrasound waves\***

The therapeutic effect of ultrasound depends on the frequency of the ultrasonic vibrations, the intensity of the exposure time and the body's condition. With the optimal variants of ultrasound exposure alters membrane permeability, enhances the diffusion and osmosis processes, increases the activity of ions, hormones and other biologically active substances due to their transition to a free state, it activates the enzyme activity, increases metabolism. By the influence of the ultrasound, is

\* In a simplified version these factors (micro, fever and acceleration of physical and chemical processes) produce the following medical and physiological effects: improving local circulation, which leads to improved metabolism; the temperature rise lead to the expansion of blood vessels (more evident in the continuous ultrasound); the increase in capillary permeability results in rapid absorption of tissue fluid perspired; improving local circulation and a decrease in sympathetic activity leads to a marked muscular relaxation; decrease in local ischemic pain; conversion of the sol into gel takes place as a result of the conversion of fibrinogen to fibrin, and bruising and swelling to a gel. Ultrasound dissolves the gel and accelerate the reabsorption. Since the conversion of fibrinogen to fibrin is the main characteristic of the healing process (scar formation), we do not recommend the use of ultrasound in the acute post-traumatic period. As a result, the above effects improve the capacity for tissue regeneration.

improving the bioelectric activity of tissues, is increasing the phagocytic function of leukocytes, are activation mechanisms of nonspecific immunological reactivity of the organism, including by increasing the histamine binding protein of blood and the splitting it by histaminase.

Under the influence of ultrasonic vibrations improves local blood circulation, lymph flow, accelerates reparative processes in the nerves, bones, muscles, normalizes the activity of the cardiovascular system, respiratory function, increases the absorption of oxygen to tissues.

Micro massage with ultrasound has the anesthetic value, stimulates the activity of the nervous and endocrine systems, improves the functional state of connective tissue, and increases the protective reaction of the human body.

Ultrasound therapy has a significant anti-inflammatory, antispasmodic, resolving, trophic, analgesic, and hiposensibilic fibrinolytic effect, stimulates regeneration processes, promotes the resorption of adhesions and scarring. The latter is associated with the activation of intracellular processes of protein synthesis, and enzymatic reactions. It was found that the scar tissue which was formed under the influence of ultrasound - are firmer and more elastic.

Ultrasound affects the location of the newly forming collagen and contributes to the recovery process, and at the same time it increases the strength of scar tissue. However, the effect by the ultrasound on bone inflammation, in proliferative stage leads make it more slow the differentiation of osteoblastic and enhancing cartilage growth.

The action by ultrasound on the connective tissue, are make the rejuvenation by manifested its cellular composition and fibrous structures. In mast cells is marked transient infiltration of histamine with quick activation of diamine, binding and neutralization excessive amounts of histamine by the blood proteins (gistaminopektichesky effect), free heparin (mast cells) and the normalization of the blood coagulation system. Revealed at ultrasound show the increase the body's resistance to histamine shock, anaphylactic and allergic reactions, activating effect on phagocytosis.

In an experimental model of the disease, the action by ultrasound in low intensities inhibits the development of degenerative process after injury of joint , stimulate the consolidation of the bone after a fracture and bone-plastic operations, promotes the resorption of the inflammatory infiltrate in the damaged disc with osteochondrosis, improves recovery of the fibrous ring of the structure and the nucleus pulposus to the accumulation in the last glycogen and acid mucopolysaccharides.

When exposed to ultrasound to the skin is enhanced physiological and reparative regeneration in the skin, increasing its permeability varies redox potential and active reaction (pH), activates skin excretory function (increasing the number of functioning the sebaceous and sweat glands), and increases the excretion of lipids chlorides, increased antibacterial properties, the barrier function of the skin, the normalization

of its reactivity. Segmental effects of ultrasound changes the resistance of the skin constant electric current (impedance), which is an objective criterion neuroreflex action of ultrasound on the organism. The sensitivity of the skin of various areas of the body to the ultrasound is different. Thus, is the more sensitive skin - skin of the face, and then - the abdomen, much less sensitive skin of the limbs.

The ultrasonic waves enhance physiological lability of the nerve centers and peripheral neuromuscular structures, helps to eliminate parabolic foci, increasing the adaptive-trophic function of the body. According to some researchers, despite the impact of the local ultrasound, in the formation of the body's reactions take part and the higher autonomic centers, hypothalamo-pituitary region, reticular formation and limbic system.

Small doses of ultrasound have a stimulating effect on the brain glia and alter energy metabolism in neurons. The reaction of the spinal cord neurons to ultrasound by electron microscopy has a phase character, the primary irritation to the restoration of the broken structures. It is known as the influence of ultrasound on the function of motor axons, increase conduction velocity along the peripheral nerves upon exposure to low intensity and pulse mode.

Ultrasound therapy activates and normalizes the function of the pituitary-adrenal axis, the sympathetic-adrenal system, thyroid and sex glands, normalizes exchange of catecholamines. Moreover, under the influence of ultrasound activated not only trans-pituitary, but para-pituitary pathway of neuroendocrine regulation.

Ultrasound has a vasodilatory effect, and normalizes vascular tone, improves the local blood circulation, microcirculation, increasing the circulation of blood and lymph flow, revealing the reserve capillaries, reducing their spasms and venous stasis. Ultrasound exposure increases the activity of mast cells, increased tolerance of plasma to heparin, and normalizes blood, increases tolerance of plasma to heparin, and normalizes blood, had made free heparin, affects plasma cells of lymphoid tissue. Ultraphono-therapy slows blood clotting, mainly due to inhibition of the activity of the coagulation system has made deviations coagulation after a course of ultrasonic irradiation to normal (A.G. Mrochek et al., 1995).

Ultrasound therapy stimulates transcapillary metabolism in tissues, neovascularization, increases protein synthesis (V.S.Kotlyarov, 1991). As shown by experimental studies (T.A. Bozhko, 1993), the effect of small doses of ultrasound on the thyroid gland helps correct stress disorders myocardial contractile function. According to the authors, this is due to the inherent ultrasound increase the permeability of cell membranes and passing histological-hematic barriers that contribute to a better capture of iodine by the thyroid gland and by thyroid hormone synthesis increase its functional activity. A sufficient level of thyroid hormone is necessary for normal functioning of the myocardium.

Ultrasound therapy contributes to the normalization of respiratory function, increases the absorption of oxygen to tissues; increasing the enzymatic activity of



lysosomal enzymes alveolocytes leads to the purification of the inflammatory focus from the cellular debris, from the clots of fibrin degradation products; stimulates the regeneration of alveolar tissue, removes spasm of the bronchi and pulmonary vessels. Ultrasound improves motorics, evacuation, absorptive functions of the stomach and intestines, relieves intestinal cramps, biliary tract, increases diuresis.

Ultrasound has a pronounced anti-inflammatory, analgesic, antispasmodic, fibrolytic, resolving, trophic, antipruritic, and anti-allergic effect. Under his influence increasing, the content of endogenous serotonin, which, apparently, has a protective effect in inflammatory, allergic and radioactive tissue lesions. However, the study on the influence of ultrasound on the inflammatory edema in the experiment showed that the ultrasound make no action when acute inflammatory edema, exudation, has expressed, does not decrease the inflammatory response of the cells (D.H. Goddard et al., 1983).

Under the influence of the ultrasound improves the bioelectric activity of tissues, increases the phagocytic function of leukocytes, activation mechanisms of nonspecific immunological reactivity by increasing the histamine binding protein of blood and splitting his histaminase. When articulating human blood leukocytes revealed the positive effect of ultrasound of low intensity on T-lymphocytes; changes in the B-lymphocytes is not detected. Ultrasound has a bactericidal action primarily by damaging the cell walls of microorganisms. The sensitivity of different bacteria kinds are different; most sensitive staphylococcus, viruses die under the influence of ultrasound.

Thus, the principle of the biological effect of ultrasound on the body is to increase the activity and adaptive defense mechanisms. The therapeutic effect of this influence is expressed in anti-inflammatory, analgesic, antispasmodic, absorbable and desensitizing influence.

Ultrasonics enhances in the tissue penetration through the skin and mucous membranes of liquid drugs and ointments (phonophoresis). This is especially true for low-frequency ultrasound, because its amplitude of oscillation of about two orders of magnitude higher than that of high-frequency ultrasound. In some cases, an ultrasound may be more effective form of thermotherapy than microwave radiation, paraffin baths or infrared radiation.

Ultrasonic vibrations are brought into contact through the scoring zone of space (typically petroleum jelly, apricot, lavender and others oil or drugs in the form of impregnated tampon).

All of the above allows the use of ultrasound therapy in a number of diseases.

## The methods and techniques of treatment with ultrasonic waves

The term «ultrasound treatment» (UST) involves the use of ultrasonic waves to act on the human body for therapeutic or prophylactic purposes. Experience in the use of ultrasound therapy suggests the following options and its principles of application. Ultrasonic wave is most often done directly on the area of pathological changes. For example, the sound- influence on the psoriatic plaques, keloid scars or contact, on one or more affected joints with arthritis. Likewise, ultrasound can affect the internal organs, placing the emitter region of the liver, lung, stomach, spleen, etc. This principle is widely used in UST; it is easily carried out and fairly effective. At the same time, as a rule, do not need long-term training for the use of this option UST.

However, this principle of ultrasound therapy can not always be used. For example, how to influence the pathological focus in hypertension, neurosis and others.

In such cases, preference is given to ultrasonic therapy with the impact on reflex zones or acupuncture points (AT), that is, the sonopuncture, ultra-phono-puncture (UPP).

It should be noted that the most effective in the combination of two ultrasound therapy principles mentioned above,

ie the impact on the pathological focus area should unite with UPP to the distal point. Thus, the professionals involved in the practical application of UST, have a choice of four basic methodological approaches:

- A direct impact on the pathological center;
- The impact on reflex (segmental) zone;
- Impact on the acupuncture points in accordance with the basic principles and laws instead of the traditional acupuncture needle that is holding ultrafonopunktury;
- Effects on the pathological focus, combined with the impact on reflex (segmental) zones or acupuncture points.

Naturally, in each case, the doctor chooses the most appropriate methodological approach. However, if the impact on the pathological center at UST requires more purely technical training, then during the UPP necessary basic knowledge of acupuncture, the rules to select the appropriate points, features a combination thereof in each case. The use of PFO allows accurately dosing intensity of the impact on the acupuncture points, which are not easy to achieve the classical method chen-chiu therapy.

Currently methodically identified, three main options for ultrasonic treatment: ultrasound therapy (including underwater), phonophoresis and ultrasound puncture.

For this embodiment, impact optimally apply impact mode with a change of the modulation frequency (1-10 or 10-100).

## **Ultrasound therapy (UST)**

Apply two main methods of ultrasound exposure: fixed and labile. When we use a fixed technique emitter mounted fixed for the duration of the procedure. With labile method the of 1-2 cm s, making a stroking motion - at first - line, and then circular motion. When this technique is sometimes useful slightly delayed (up to 30-45) in the most pronounced painful areas. In this case, the fixed-frequency modulation mode is better. In all cases, the contact of the vibrator (oscillator) with the skin should be maximized (at a right angle, perpendicular to the skin) in order to eliminate the air gap between the emitter and the skin. For this exposure area is exposed, thick hair coat is removed and the skin is rubbed copious, amounts of contact substances (mineral oil or glycerin). Then the skin tightly applied emitter. Especially the close contact, necessary to achieve near the bones, joints and rough surfaces of the body.

When ultrasonic treatment modality is through the rubber bag (glove), with water on parts of the body complex configurations (the joints of the foot or hand). One takes the form of the surface area of impact, and the other is in contact with the transmitter. When underwater irradiation (irregularities, acute inflammation or ulcers when touching the vibrator to undesirable lesions) emitter is held at a distance of 1-2 cm from the area of impact.

As already stressed, the ultrasound treatment is carried out by acting on the lesion, reflex zones or acupuncture points in a single procedure. Announces, a certain size to 250 cm<sup>2</sup> area, of the body. If necessary, act on its larger surface is divided into several areas. On the first day we make sound of the field 1-2 and then 3-4-fields. Sounding is carried out in pulsed mode at fixed frequencies using frequency scanning. The latter option is gentler, it is usually used in more severe stages of the disease, when expressed neuro-vegetative manifestations of the disease, when exposed on a reflex-segmental zone, for children, etc.

Switching of the fixed mode is advised in more severe inflammatory activity, moderately severe diseases of the cardiovascular system, sensitization and, where necessary to limit the thermal effect. The ultimate value of a therapeutic dose of ultrasound is the appearance of heat. The feeling a strong burning sensation or pain, even when we work by the fixed method, should not be!

Currently, with the purpose of treatment is prescribed small and medium-intensity ultrasound, rare - large. The maximum duration of sound, 15 min. Sounding is carried out every day or every other day, a course of treatment-6-14 procedures. Repeated treatment may be administered in two or more months.

## **Ultraphonophoresis (UPPh)**

The drug phonophoresis and phonophoresis (the name of the outdated, not exact, because there are sound and ultrasound) - combination of physio pharmacological

treatment, in which the effects on the body we do by ultrasound and administered with the help of medicinal substances (V.V. Orzheshkovsky, V.V. Orzheshkovsky, 1998).

In medical practice, this method takes a significant place. It provides for the simultaneous combined effect of ultrasonic vibrations and of drugs on the body. To this end, an ultrasound is performed through contact of the medium in which the drugs are administered. The drug should retain its structure and biological activity, and its action is to be unidirectionally with ultrasound, ensuring their synergy effect on the organism. According to most researchers, UPPh through ducts of the sweat and sebaceous glands. A certain role in the penetration of drugs in UPPh play ion channels of the cell membrane and intercellular gap as one of the most important properties of ultrasound is its depolymerization and «loosening» effect.

In the dosage treatment modalities performed according to the energy flux density (intensity). Its threshold at various techniques should not exceed  $1 \text{ W/cm}^2$  (5 microns). It should be remembered that the lower limit of the thermal action of ultrasound is  $0.8 \text{ W/cm}^2$  (4 m) for pulse ultrasound fluctuations.

The duration of exposure to one field is usually 2-5 minutes, and on the area of a large joint-sometimes up to 6-10 minutes. Depending on the number of fields of duration of the procedure can be up to 10-15 minutes, in a stable manner, to 3 minutes per zone, with labile-5-10 min. Treatments usually carried out every other day or every day. The average treatment course consists of 7-14 procedures. Because of the long and severe after-effect of treatment is recommended to repeat it no earlier than 3-5 months. The X-rays therapy and radium therapy should be avoided for 3-4 months prior to treatment with ultrasound and 3-4 months after treatment.

Babies' ultrasound can be administered in the preschool years. For persons under 20 years of age and older than 60 years, and the intensity of the procedure is reduced by 30%.

A prerequisite for the development UFPH method was a significant increase in skin permeability and vascular cell membranes, increasing the number of functioning sweat and sebaceous glands, acceleration and transport of substances improving the functional activity of tissue under the influence of ultrasound.

Calling by ultrasound the increase permeability of skin and histological-hematic barriers creates favorable conditions for the penetration the molecules of drugs through them. With this method, to a therapeutic effect of the ultrasonic waves are added to the therapeutic effects of a particular drug. Thanks to alternating pressure of ultrasonic waves the molecule of drug gains greater agility and reactivity. This significantly increases the amount of drug entering the body and the efficiency of its therapeutic action. UPPh The effectiveness also depends on the area of his holding.

The depth of penetration of drugs at UPPh does not exceed the thickness of the epidermis of the skin. Proof of this is the fact that when UPPh radioactive isotopes in the subcutaneous tissue are determined only after 1-2 hours after the procedure.

Number of substances entering the body varies from 1 to 5% of the dose taken for the procedure. This mucosal introduced more substance than through the skin. For substances poorly soluble in water and also to enhance the absorption of drugs through the epidermal barrier, is used as the solvent of DMSO-dimethyl sulfoxide (25% solution). Be aware that the phoretic capacity of ultrasound (amount injected them into the body medicine) depends on the frequency (frequency at 22 kHz greater than 2640 kHz) ultrasonic intensity (increasing to 0.8 W/cm<sup>2</sup> (4 microns) increases, and then decreases), the mode (continuous mode is increased by 20% the amount of drug penetrating through the cell membrane, as compared with exposure to the pulsed mode (U. Smolenski et al, 1988)). Also has the meaning the technique of the procedure (in labile procedure are injected drug more), solution concentration (5-10% of optimal solutions), duration of the procedure and site of administration (mucosal drug enters greater than through the skin). Accordingly, when introduced into the body phonophoresis from 1 to 5% of the procedures used for the drug, but its therapeutic efficacy is much higher than other options of administration.

UPPh drugs have potentiated the effect of ultrasonic therapy and specific effect of the drug substance which is administered.

Ultrasonic vibrations significantly affect the pharmacokinetics and pharmacodynamics of «sounding» drugs. As a result of the combined action there are a lot of potentiated therapeutic effects: of vasodilator, anti-inflammatory and absorbable substances, antibiotics, immunosuppressants and anticoagulants and weaken their side effects. However, the ultrasonic vibrations can several inactivate certain drugs (atropine, barbiturates, vitamins, codeine, caffeine, morphine, procaine, platifillina tartrate, polymyxin B sulfate, pyrazolone derivatives, quinine, ephedrine, etc.). Ultrasound waves do not substantially accelerate the diffusion of ascorbic acid and thiamine.

For phonophoresis are recommended such formulations: hydrocortisone (suspension hydrocortisone 5 g is mixed with lanolin and vaseline, each 25 g), Analgin (50% dipyrone solution of 5 ml in a mixture with vaseline and lanolin, 25 g), Trilon B (Trilon B 5 g., petrolatum and lanolin, 25 g), antibiotics (ampicillin emulsion, monomycin, tetracycline) lidasa (64 units was dissolved in 0.8 ml distilled water and add 0.8 ml of vaseline oil), aloe (aloe extract liquid 1: 3 applied to the skin coat layer and vaseline oils), aminophylline (1.5 g aminophylline mixture, 20 g of distilled water, 15 g of petrolatum, lanolin, 15 g), prednisolone (0.5% ointment) Baralginum (2-2.5 ml baralgina ampoule solution is rubbed into the skin and covered with glycerol), benzocaine (5-10% anestezinovaya ointment), gangleron (a mixture of 0.25% gangleron solution with Vaseline and lanolin).

Penetrating into the human body, these drugs simultaneously with the biological effects of ultrasound increases the activity and adaptive defense mechanisms. The therapeutic effect of this influence is expressed in anti-inflammatory, analgesic, antispasmodic, absorbable, desensitizing influence.

Procedures are carried out in two ways: contact and distant (underwater). In the first case, the target area is applied medicinal substance in the form of solutions, suspensions, ointments, and then fixedly mounted radiator (stable technique) or move it without departing from the skin surface (labile technique). When using the drug solutions and pipetted their rubbed into the skin. Next, cover the place with vaseline oil and produce effects of ultrasound. The effectiveness of this method UPPh increases after preliminary mechanical or chemical treatment of the skin surface in the area of exposure: dehydration of a mixture of ether and alcohol, heating or hot water, or diadynamic electricity treatment (DDT). In the second case UPPh conducted in the bath with the drug solution in degassed water at a temperature of 35-36° C. Emitter move small circular motions at a distance of 1-2 cm from the skin surface. Such a method should preferably be used to influence the heterogeneous broad surface. In ophthalmology and dentistry various funnels and nozzles are used instead of baths.

*ATTENTION! When using liquid drugs, ultrasonic waves are supplied to the audio zone through the cotton-gauze thickness of 2-3 mm.*

N.A. Gavrikovym et al. (1975) proposed phonophoresis combined drugs with the provisional name «Kortan 1» (a mixture of 1% hydrocortisone solution and 10% dipyrone), «Biokortan» (a mixture of 0.5% hydrocortisone solution, 10% dipyrone and bio-stimulants such as drugs-gumizol, FIBS, pelloid of distillate), «Biofon» (preparations containing biostimulants «Biofon A» -aloe «Biofon G» -gumizol «Biofon P» -pelloid of distillate «Biofon F» -FIBS); «Singing» (10 g dipyrone, dissolved in 40 ml of mud filtrate and mixed with a solution of 40 g anhydrous lanolin and vaseline 10 g).

Phonophoresis with drugs UPPh is combined with electrophoresis (ultra-phono-electro-phoresis), diadynamic therapy (ultra-phono diadinamo-phoresis) Amplipuls therapy (ultra-phono Amplipuls-phoresis), magnetic (magneto-ultra-phono-phoresis) vacuum treatment (vacuum ultra-phono-phoresis); conducted on acupuncture points in the form of micro-ultra-phono-phoresis.

## **Sonopuncture (SP)**

Impact on biologically active point and the A-SHI (pain points) by means of ultrasonic vibrations has been called the ultrasound puncture. The basis of this method is based on the same principles as in the general ultrasound therapy, the only difference is that the implementation of the therapeutic effect is not carried out due to local effects, but due to the effect of acupuncture-point acupuncture channel (meridian) organ. In this regard, expanding range of indications for ultrasonic therapy, because in cases where the local ultrasound therapy is contraindicated, it becomes possible to conduct at remote locations from the lesion. In this case, the body is not exposed to intense ultrasound, and therapeutic effect is achieved by biologically active points

(BAP). Note that the indications and contraindications for ultrasound puncture almost the same as for physiopuncture.

When used in the practice SP doctor should have a clear idea what are the ultrasound parameters he will use for the treatment of certain diseases.

Optimal for a specialist doctor using in their practices for SP sedation have low-frequency ultrasound (44 kHz). Preference should be given to low-frequency ultrasound when exposed to the signal, and, especially, on sympathetic points.

Here are energetic parameters of ultrasonic influence on biologically active points:

- A slight degree of stimulation (arousal, toning) ultrasonic treatment corresponds to the intensity of 2-3 microns, with a duration of exposure of 5-20 with one point, the modulation frequency of 1-10 Hz;

- Moderate stimulation (harmonization) corresponds to the intensity of the ultrasound 3-4 microns, with exposure to 20-30 at one point, the modulation frequency 18 and 37 Hz;

- High degree of stimulation (brake, sedation method) are respectively 4-5 and 30-60 microns with a single point, the modulation frequency of 75 Hz.

Of particular note is that the doctor guided by the patient's feelings must remember - the power of ultrasound stimulation with BAT should not exceed  $1 \text{ W/cm}^2$ ). The total time for the ultrasound puncture is in the redistribution of 3-25 minutes. Procedures are conducted daily or every other day, for a course of treatment is usually carried out 7-14 sessions. After the procedure is necessary to rest for 30 minutes.

When selecting areas for SP should be favored classical approaches, which are detailed in many studies (D.M. Tabeeva, 1980; G. Luvsan, 1989; I.Z. Samosyuk, VP. Lysenyuk, 1994). It should be noted that when doctor does ultrasound punctures he must clearly understand the functional significance of impacts, to be able to determine their location and use rules for choosing BAP and compatibility.

As with any medical process, an important task is the correct diagnosis of the disease, as well as the development of treatment strategies based on comorbidities. All this requires a doctor's thorough and comprehensive examination of the patient, establish the clinical diagnosis and acupuncture. The establishment of the last substantial assistance to the doctor can provide methods of electro-diagnostics Nakatani or Voll. Sited exposure or a combination thereof is a matter of creativity.

In recent years, the majority of doctors - specialists in acupuncture is used in formulating points of both traditional and modern principles. Of the modern principles of the most popular and effective - segmental, in which affect metameres having a common segmental innervation to the affected organ.

This principles responsible and use of signal points and sympathetic points, the action which allows purposefully to provide a therapeutic effect on specific organs.

Among other ways to select AT widely used effect on pain points (A-SI), or a combination of local and remote AT pain on the meridian, which belong to these pain points. Treatment of pain syndromes can be carried out also by stimulating and

analgesic of signal points, as well as start and end points of the meridian. It is necessary to observe the following rules. In acute pain syndrome, first act on distant point from the hearth or on the opposite side of the point, then the treatment include local point. In chronic pain syndrome or a long-term course of the disease treatment should begin with action (2-3 sessions) on the so-called AT restorative action: P7 Les -Tsyue; GI4 Hae-Gu; GI11 Qu-Chi; E36 Tsu-San-Li; RP6 San- Yin- Jiao; R6 Chao-Hai; MS6 Nei-Guan; TR5 Wai-Guan; VG4 Min-men; VG14 Da-Chzhuy and auricular points AR55, AR82, AR22 and other \*, which can contribute to energy restoration and recovery of the patient.

In the following it is possible to make further work on the symptomatic points AT.

With long-term course of the disease, along with the stimulation of tonic AT, action is necessary to use the special power of the «sea», «pools» or «chakras» of energy.

For example, in diseases of the central nervous system \* (the effects of encephalitis, cerebral palsy, and others.) recommended exposure to the AT «medullary sea» -VG16, VG20, in the asthenic conditions or diseases smoldering preference «sea power» -E9, the V10. The points «sea food» - E30, E36 recommended used in cases of chronic diseases of the gastrointestinal tract, the points named «sea of blood» - V17, E31, E39, with anemia. The treatment of diseases, which takes place on the background of reducing immune reactivity of the organism, should begin with the impact on the «ocean of energy» -VC17. Immunomodulatory effect is inherent in some of the other points, the influence on which has a beneficial therapeutic effect. Impact on AT restorative action and energy «pools» in chronic diseases the first 2-3 sessions is the most essential because it provides the necessary «energy pattern» for further treatment.

The points of restorative action (Fig. 14), immunomodulatory (Fig. 15) and power pools constitute a basic recipe and (2-3), it is desirable to include in each session SPDs.

The ultrasound therapy is successfully used different points AT: corporal (meridian points) out-meridian point and the point of the ear.

Taking into account the experience gained by the use of acupuncture treatment for chronic diseases, it is desirable to start with the use of distal points (restorative, immunomodulatory, energy seas, analgesic) and then reaching some improvement, it is necessary to switch to the impact on local points - the signaling points, sympathetic points and auricular points.

The number of treatment sessions in the course of ultrasound therapy, are determined mainly by the clinical effect is, but remains important not to overdose therapeutic dose as possible exacerbation of the process. In chronic diseases usually prescribe repeated courses of treatment.

\* When exposed to auricular points is used only high-frequency ultrasound.



The doctor who uses ultrasound therapy, is obliged to pay attention to the following points:

1) During the treatment session the patient is, if possible, should lie, which reduces the probability of occurrence of adverse reactions..

2) At the first session, the doctor is obliged to establish the patient's individual sensitivity to the therapeutic effects of the ultrasound, that is, to establish the required dosage to evaluate the effect on the patient's state of health, blood pressure changes, heart rate and other objective indicators. Throughout the course of treatment carried out monitoring of the patient, and in the event of adverse reactions in the treatment, it is necessary to make adjustments, until the abolition of ultrasound therapy.

3) In the selection of the dosage should take into account the impact of the degree of weakening of the body, the type of nervous system of the patient, the degree of asthenia. For example, in the treatment of children, the elderly, debilitated patients, reduce the radiation dose by 30-50% from common for middle-aged persons. With the same purpose cutting session duration, or use much smaller device modes. Otherwise, the treatment may be accompanied by undesirable effects: vertigo, nausea, changes in heart rate, a fall or rise in blood pressure, etc. In any case, for the more successful adaptation of the patient to the ultrasound therapy sessions , it is desirable to reduce by 20-30 % of total exposure time during the first exposure.

4) the points throughout the course of treatment necessary to alternate for the best effects, as permanent effect on the same point reduces the therapeutic effect in connection with the adaptation to the impact on the point. It is necessary to take into account the state of the meridians from the perspective of «redundancy - insufficiency» (a history of clinical manifestations or controlled trials by technic of acupuncture diagnosis).

5) When preparing the recipe of points it is necessary to consider the presence of concomitant diseases. For patients with labile mentality, prone to alarming suspiciousness in the formulation is necessary to include the point with calming actions (E36 Tsu-San-Li, MS6 Nei-Guan, C7 Shen-Men, etc.).

6) It is necessary to carefully define the localization of the points, because points with different assignments can be placed close to one another.

7) In order to achieve maximum clinical effect of the treatment session, it is desirable to establish, taking into account the daily activity of the affected meridians.

8) Do not act by the ultrasound on spots, nevi, angiomas due to its exposure to biostimulation.

Furthermore, during the work the doctor has to act, based on recommendations for the use of different modes of operation the apparatus, to changes parameters according to the power frequency ultrasound, the frequency, type of modulation , etc.

For the introduction of drugs into the BAP (micro ultra-phono-phoresis) on the working surface of the radiator applied the drug ointment base, and then make contact to the projection of point on the skin . Duration of exposure to each point is

not more than 1-2 minutes. In general, the recommendations for micro-ultra-phonophoresis look the same as recommendations for sonopuncture.

### **A combination of other health factors with sonopuncture**

As mentioned above, the ultrasonic puncture successfully combined with the simultaneous action of a magnetic field and, if necessary, followed by EHF puncture at the same point.

For example, lsciatca. In this disease the most painful points are: VB30, V36, V58. These points can be influenced by ultrasound and immediately, without a break to spend on them EHF-puncture. The number of combinations of ultrasonic puncture with a variety of medical factors virtually unlimited. However, to obtain maximum efficiency it is necessary to adhere to the general principle of physiotherapy reflexology, using several methods of influence, try to «separate them on different levels.» For example, if the treatment of peptic ulcer disease 12 duodenal ulcer selected ultrasonic puncture + magnet with exposure to point back (V21, V20), then at the same session can be influenced by the infrared laser on the abdominal organs (the projection bulbs 12 duodenal ulcer, gallbladder, epigastrium).

### **The combination of the action of ultrasonic waves with other physical factors**

Treatment with ultrasonic waves are combined with virtually all types of electrotherapy, vacuum massage, balneotherapy. Effective combination: ultrasound therapy with laser therapy, magnetotherapy and EHF. Ultrasound in these cases it is advisable to apply first. It should be remembered that in the physiotherapy conditionally distinguish between two methods of influence, combined and united. Combined physical therapy is considered to be consistent (at different times) the use of physical methods of treatment. Thus combinable physical methods can be applied in a single day, on different days (interlace method) in the course of treatment or when some other alternate methods. The combined effect is a combination of two or more medical procedures either simultaneously or sequentially (one after another) on the same region. Increasing the use of two or more treatment methods may result from the effect of addition of acting in the same direction (on the same physiological system) methods or potentiating the action of another method.

The effect of combined and physiotherapy based on the strengthening of the local reaction on the principle of contrast therapy and mechanism of sensitization. Properly selected physiotherapy complex greatly increases the effectiveness of treatment has an impact on basic and associated diseases, various physiological systems of the body and the disease process, summarizes the positive effects of physical factors acting

synergistically or weakens their adverse effects, as well as lengthen the period of aftereffect physiotherapy course.

In a day, are compatible such procedures:

- General and local action on the underlying disease (e.g., ultrasound, and then shared bath or a common electrophoresis);
- Common action on the underlying disease and local action, for the treatment of concomitant diseases (e.g., ultrasound in the region of the tonsils and gas bath);
- Two procedures of local action on the one disease (e.g., ultrasound and EHF-therapy);
- Two topical treatments, from which subsequent increases the effects of another (e.g., phonophoresis and amplipulse);
- Permissible use in one day of three local procedures that do not cause a large load and fatigue of the patient (e.g., microwave therapy, ultrasound and then electrophoresis);
- In the same session is acceptable combination of three factors, for example the magnet inductors on the medulla zone and the corresponding segment of the spine, and the ultrasonic transducer on the projection of organ being in a pathological state).

## **Indications and contraindications to the use of ultrasound therapy**

### ***The main indications for ultrasound therapy***

1. Diseases of the peripheral nervous system (radiculitis, neuritis, neuralgia, myalgia, peripheral nerve injury);
2. Diseases of the musculoskeletal system (degenerative-dystrophic and inflammatory diseases of joints and-deforming spine osteoarthritis, low back pain, spondylosis, ankylosing spondylitis, rheumatoid arthritis, bursitis, psoriatic polyarthritits, periarthrosis, epicondylitis, heel spurs, the effects of trauma and joint contractures, post-fracture bones, chronic tendovaginitah, Dupuytren's contracture and Liderhoza, meniscal lesion, sprains);
3. Internal diseases (chronic bronchitis, bronchial asthma, chronic pneumonia, initial forms of pneumoconiosis, peptic ulcer and 12 duodenal ulcer, chronic colitis, chronic cholecystitis without the presence of stones, biliary dyskinesia, chronic pyelonephritis, chronic pancreatitis);
4. Gynecological diseases (subacute and chronic inflammatory diseases of the uterus, secondary infertility, mastitis, etc.);
5. Urological diseases (prostatitis, epididymitis, orchitis, and others.);
6. Surgical disease (sluggish granulating wounds, scars, adhesions, hydro-adenitis, burns, chronic osteomyelitis, limb obliterating vascular disease);
7. Otolaryngological diseases (chronic tonsillitis, hypertrophic pharyngitis,

subacute and chronic sinusitis, in the absence of pus in the sinuses, allergic rhinosinusopathy with moderate allergization, vasomotor rhinitis);

8. Dental disease (periodontal disease, glossalgia, scar adhesions cervical-facial region, arthritis and arthrosis of the temporo-mandibular joints, masticatory muscles contracture);

9. Eye disease (age scars, opacification of the vitreous, the prevention of corneal transplant clouding, residual manifestations of hemorrhage in vitreous, retinitis pigmentosa, diabetic eye disease, and others.);

10. Skin diseases (atopic dermatitis, chronic recurrent urticaria, limited scleroderma, arthropathic form of psoriasis, pruritus);

11. Diabetes and its complications, some embodiments, a pulmonary tuberculosis\* when staunchly non-healing cavities.

### ***Main contraindications***

- acute infectious diseases;
- fevers of unspecified nature;
- expressed neurotic or personality disorders;
- circulatory (atherosclerotic and etc.) III-IV encephalopathy;
- coronary heart disease with angina II-III FC or arrhythmia;
- aneurysm of the heart; hypertension stage III,
- circulatory failure of III degree;
- thrombophlebitis (the affected area);
- blood disease;
- bleeding tendency;
- pregnancy;
- pronounced depletion;
- systemic blood diseases.

The relative contraindications include: neoplasms (tumors) and mental diseases in the acute stage, syringomyelia.

### ***Prohibited areas for ultrasonic therapy***

#### ***The Epiphysis of growing bones (Approximately 17 years)***

The use of ultrasound may be accompanied by the risk of damage to the bone growth zone. Since ultrasonic instruments of older types operate at low intensity (on display data does not match the actual number of attached energy), their use in most cases not result in damage to the growth zone. For this reason, many doctors do not agree with these contraindications. Modern devices are much more strong and effective,

\* Currently are conducted researches on the use of low-frequency ultrasound therapy in the combined treatment (with antibiotic therapy) newly diagnosed pulmonary tuberculosis.

can, in contrast to older devices, cause damage to the bone growth area, especially if insufficiently radiating head moves. Preventing this contraindication is the responsibility of the physician. It is easily overcome by applying appropriate intensity ultrasound (0.4 W/cm<sup>2</sup> or 3 micrometers) and applying the labile (but not stable!) technique.

### ***The sex gland in men (testicles) and female (ovaries)***

Small doses lead to temporary but large doses - in permanent or spermatozoal ovogenoy failure.

### ***Eyes***

The use of ophthalmic ultrasound devices is allowed only in specialized centers.

### ***Consequences of laminectomy***

As a result of the operation the spinal cord is not completely covered by bone bed after laminectomy, intense effect of ultrasound on the spinal cord can lead to transient or persistent paraparesis. Prevention: the impact on the post-operative area should only be conducted labile technique and low-intensity ultrasound.

It is not recommended to work with ultrasound directly on the heart, brain, bone prominent on the surface (the patella, the spinous processes of the vertebrae, etc.).

## ***Features of ultrasound therapy***

Many authors believe that ultrasound therapy is good treatment for epicondyle disease. This can be taken if the ultrasound is performed only for the relevant muscles. Direct exposure to ultrasound on painful space of bone can lead to increased pain and possibly a transition in the chronic phase of disease (the same effect as that in many cases, the massive use of corticosteroids). Similarly, the direction of the ultrasound directly «on the spine» often gives rise to pain in the periosteum around the protrusions of spine.

In the acute phase of post-traumatic condition (up to 24-36 hours) the application of ultrasound to the area of torn traumatized tissue is contraindicated (could intensify edema and 'slow' bleeding). The same applies to the classical inflammation (swelling, erythema, local temperature rise).

If the intensity of the ultrasound is too high, can occur the deceleration in the corresponding nerve conduction, and then followed it by (reversibly) the blocking of the flow pulses. However, it can follow irreversible disintegration of axons (myelin sheath is retained).

Prevention: Use labile techniques and low-intensity ultrasound on nerve projection.

The ridges of bone just beneath the skin (ankle epicondyles, spinous processes, etc.) Are also sensitive to ultrasound. In such cases, preference should be given to the method of underwater ultrasound therapy.

There are other negative effects, mainly caused by an overdose: hypoglycemia, fatigue, anxiety, change in appetite, and others.

The resumption of bleeding. For example, in the treatment of the knee joint by sonication, may occur resuming epistaxis.

Prevention: the use of low-intensity ultrasound in a patient with «usual» bleeding. Do not attempt to sonication during menstruation.

### ***Nota bene for doctor and patient***

Do not allow the patient to conduct ultrasound therapy by himself !

Ultrasound therapy is often asymptomatic, but in the area to be treated, may feel a mild fever or heat.

If the skin feels the intense heat, it indicates insufficient contact substances. Pain during the treatment session, or may indicate to overdose or lack of movement of the radiating head. Discontinue the procedure in case of overdose.

Therapy can be resumed at a lower intensity, usually after a one-day break.

After the first procedure may be a temporary worsening of the disease.

Noticeable subjective or objective improvement occurs no later than after the third treatment session.

If improvement does not come (in the acute or under acute conditions) after five sessions, ultrasound therapy should not be continued.

If ultrasound is used to treat chronic processes or changes in the mechanical properties of tissue (such as Dupuytren's contracture or plantar aponeurosis associated with osteophytes calcaneus), the impressive results can occur only after a full (14-15 sessions) treatment or even several courses of ultrasound therapy.

## **Magnetic-laser therapy**

Concomitant use of complex physical factors become one of the important directions in modern physical therapy. MP combination with a low-energy laser radiation (LeLR) is widely currently used.

The LeLR impact on certain areas or human tissue, located in the permanent or pulsed magnetic field (MF) has been called magnetic-laser therapy (MLT). Such a treatment option, as follows from the name itself, provides for simultaneous action on a specific area of two physical factors: LeLR and MF, for which the laser effect is enhanced in the magnetic field of therapeutic intensities (20-40 mT) by increasing the absorption of infrared (IR) radiation in the collinear arrangement of the molecular dipoles arising in MF. It seems appropriate to stop at the physical characteristics of these factors. For laser characterized by the following physical properties: monochromaticity, coherence, direction and polarization.

Monochromaticity radiation of electromagnetic waves (EMR) a specific frequency or a specific wavelength. For example, for a helium-neon laser (HNR) characteristic radiation of wavelength 632 nm, for Halieu arsenide laser-890 nm, etc.

Coherence-order phase - distribution of the laser radiation in both time and space.

The concept of orientation characterizes the small divergence LeLR, the concept of polarization-ordering and orientation of the vectors of the electric and magnetic fields of the light waves in a plane perpendicular to the light beam. These physical properties LeLR determine features of its biological action, and the intensity of the latter also depends on the wavelength: the longer the wavelength, the smaller the energy of the photon.

The incident on the surface of the biological tissue laser light is divided into three parts: reflection, absorption and diffuse.

The coefficients of reflection, absorption and scattering primarily depend on the laser wavelength. Thus, the penetration depth of ultraviolet LeLR ( $\lambda = 337$  nm) is a fraction of a millimeter of the skin. The penetration depth of LeL infrared ( $\lambda = 890$  nm), without MF, is 40 mm, and with the impact on the tissue by irradiated with MF, the penetration depth growth up to 45 mm, .

Biological factors affecting the change, the above coefficients are: skin pigmentation, nature of tissue damage, the degree of its blood supply, etc. Thus it is known that the reflection coefficient of the laser radiation of human skin varies from 20 to 43%, the absorption coefficient of 57 to 80. %. A liver, kidney, heart, spleen, large intestine has the high absorption coefficient (75 to 90%).

The degree of absorption of laser radiation defines the effect of laser treatment and the duration of the of the subsequent processes of pathology. It manifests in the fundamental law of photobiology, the essence of which is to ensure that the biological effect can only cause a light wavelength that is absorbed by the molecules or components of the cell membrane. In the near-infrared (IR) region of the absorption of light quanta, probably due to overtones of oscillations of valence bonds of hydrogen atoms to carbon atoms of nitrogen and oxygen, and the increase in vibrational energy of the biomolecules. This may explain the uniformity of the electromagnetic radiation in a wide wavelength range. Infrared light is preferentially absorbed in the body of water molecules, oxygen, and some enzymes.

The main physical processes occurring in the skin, mucosa and other tissues in the absorption of light energy to reduce the appearance of internal photoelectric effect and electrolytic dissociation of molecules and different systems of the body.

When an internal photoelectric effect under the influence of laser radiation electron is first associated with the atom absorbs a photon energy, breaks the connection with the nucleus of an atom and becomes free. Therefore, by irradiating laser light to the tissue it increases the concentration of free electrons and the conductivity increases.

At the surface more photons absorbed by the tissue and produce more free electrons than the depth in the tissue, and this leads to the occurrence of a potential difference between them, which in turn leads to a photoelectromotive force (PEMF) and the appearance of photons. Moreover, the larger power of the radiation, the more pronounced the effect. Increasing the concentration of free charge carriers-electrons

indirectly changes the dielectric constant (photodielectric effect), the magnetic susceptibility of tissue, etc.

Another result of the impact of a weakening LeLR ionic bonds and ion-dipole interactions in molecules and tissues due to the absorbed energy. Thus there a free ions and electrolytic dissociation is occurs. It is also known that the laser radiation in the wavelength range 0,85-1,3 microns absorbed primarily oxygen, water, biological structures (primarily cell membranes) in resonance mechanism. This endogenous oxygen is virtually the only molecular target for MLT. This leads to the formation of the two forms of high-energy singlet oxygen, the energy of which is realized in the form of non-selective photodynamic effect without photosensitizers. With regard to the problems of laser generation of singlet oxygen will result primarily to effects on cellular membranes, alteration of the antigenic properties of organs and tissues, as well as the peroxidation of cyclic compounds (purine and pyrimidine bases, cholesterol, steroids and hormones, bile pigments, porphyrins and others.) and aliphatic compounds (unsaturated fatty acids, phospholipids, sphingomyelin, cerebroside).

Consequently, the severity of the impact LeLR (gain or attenuation of the normalization of lipid peroxidation) depends on the concentration of singlet oxygen, that is, the dose of laser irradiation (V.A.Buylin et al., 1990)\*.

When combined (simultaneously) the impact LeLR and MF, in addition to a simple summation of the energies there, and other physical phenomena. The first is the effect Kikoin-Noskov: irradiation of tissue in the MF leads to the anomalous Zeeman effect and electron paramagnetic resonance, that is observed selective absorption of EMR irradiated substance associated with its transitions between Zeeman atomic electron energy levels. The frequency of the absorbed radiation (the resonance frequency) depends on the strength of a magnetic field.

The laser pulse energy are utilizing, after it was accumulation in the «dark stage» during the pulsed bio-stimulation (ie, in the intervals between laser pulses) only in high-speed and spectrally selective excitation transfer acts, cascades of biochemical reactions of the catalytic type, labile electronic states of the molecules in the cells of tissues and physiological substrates in the patient. Laser pulses can periodically renew, start (trigger principle) and «feed» the energy of such reactions in the case of local energy imbalance in certain diseases.

Thus, knowing the frequency of the laser light (the reciprocal of emission wavelength) and changing the force MF is possible to achieve equality of the resonant frequencies of electron paramagnetic resonance and laser radiation that leads to a sharp increase in the degree of absorption of the tissue which being irradiated, and consequently, an increase in photocurrent and effectiveness of the procedure.

\* Buylin V.A., Polonsky A.K., Antonov G.A. et al. The use of magnet-infrared laser therapy device with a built-in photorecorder (MILTA-F) in medical practice. - M., 1998.- 102 p.



The increase leads to a photocurrent due to the Hall effect, an additional potential difference between the irradiated layers located at different depths of tissue, which in turn leads to an increase in photo-electromotive force, to several tens of volts (Kikoin-Noskov's effect). It is also shown that actively affects MLT membrane processes in cells and tissues in a state of ions.

It is known that under the influence LeL tissues with free ions ( $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Ca}^{2+}$ , etc.), Which increase metabolic processes through activation of membrane processes. For example, an ionic bond energy NaCl is 97 kcal/mol, but the dissociation in liquid media, these cellular structures are weakened connection and does not exceed 10 kcal/mol, which is a fraction of electron volts. laser photon energy in the red and near-infrared spectral ranges about 1.9 eV, and that is enough to disrupt a fairly weak electrolytic ties. However, parallel to the process of recombination of ions, which slows down during metabolic reactions. Simultaneous exposure to biological tissues and MF LeR inhibits ion recombination process. It is this combined effect promotes the separation of free charged particles by induced EMF proportional to the magnitude of the magnetic field (the Hall effect). It should also be noted that the photon energy of the laser light in the focus of the the effect of magneto-laser able to break the energy ties between the water molecules and charged particles. Jonah tissue when irradiated LeLR MF and ordered, the dipoles are aligned along the lines of power MF.

If power lines are directed deeper into the irradiated tissue, and the bulk of the ions and polarized molecules, too, is built deep into the tissue, which increases the penetration depth of the radiation. Irradiation of LeLR I in MF each unit volume of the tissue to digest more energy.

Naturally, the mechanism of biological action of laser radiation, especially in combination with a magnetic field may not be limited to any one elementary event it is determined not only by a set of separate structures bioenergetic cell or tissue, but also reactions of the organism as a whole.

### ***Therapeutic effects of magnetic laser therapy (MLT)***

LeLR has make in the body complex and varied effects and leads to a significant number of effects, the main manifestation of which is anti-inflammatory, analgesic effect and stimulation reparative processes pathophysiological sequence which may be the following:

#### ***Anti-inflammatory action:***

#### ***Activation of superoxide dismutase and catalase:***

- Activation of microcirculation;
- Change the level of prostaglandins;
- Immuno-modulating action.

#### ***Reduction of lipid peroxidation when properly selected dose LeLR:***

- Alignment of the osmotic pressure;
- Reducing the swelling of tissues.

***Analgesic effect:***

- Activation of neurons metabolism;
- Increase the level of endorphins;
- Increase your sensitivity to pain.

***Stimulation of reparative processes:***

- The accumulation of ATP;
- Stimulation of cell metabolism;
- Increased fibroblast proliferation;
- Protein synthesis and collagen.

It is assumed that the specificity LeLR action depends on the radiation spectrum as specific wavelength absorbed by specific biological substrate (cells, molecules, and others.). For example, LeLR in the ultraviolet range is absorbed mainly protein substrate (amino acids), and a specific acceptor emission (helium-neon laser) is the enzyme catalase, having a maximum absorption in the red region of the spectrum (628 nm), which practically coincides with the wavelength HNL radiation.

Increasing catalase activity within certain limits positively affect the antioxidant system. Under the influence LeLR in the red range, also in the tissues is activated enzyme superoxide dismutase, which, like catalase enzyme has a maximum absorption in the red region of the spectrum. All this leads to the normalization of lipid peroxidation (LPO), however, provided adequate doses selected EMR.

At high power loads and insufficient supply of the body with natural antioxidants, may increase lipid peroxidation processes that appear possible exacerbations of the disease to 7-9 sessions of laser therapy. It is assumed that the strengthening of the oxidation processes in tissues associated with the formation of active (singlet) oxygen species, as the latter has an absorption band near 640 nm (HNL  $\lambda = 632$  nm), and thus activated, that is, it is formed from a singlet.

Under the influence of Red-radiation (R) are improved microcirculation, activation of collagen fibrillogenesis and with rapid epithelialization of the wound defect. Mitotic activation processes can be increased due to the energy metabolism in the cells of the wound edge epithelium and under the influence of radiation HNR.

In the near-infrared photon energy LeLR ranges that allow you to initiate the oscillatory processes in the molecules of the substance and activate electronic excitation of atoms.

Therefore, the mechanism of action of biological activity of IR-radiation is associated with photochemical transformations and a significant increase in the thermal vibrations of molecules of substances.

As a result of IR-radiation in MF tissue come in a more excited state in which metabolic processes are amplified. This contributes to the appearance of free forms substances, biologically active products of photolysis, pH-change medium. Ranges energy activity of cell membranes, conformational changes occur in the liquid-crystal structures, primarily intracellular water. Strengthening of turbulent processes in the

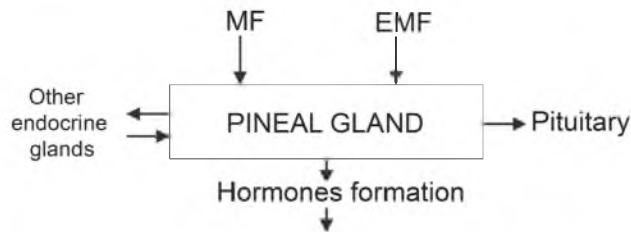
flowing blood and lymph provides a more complete response to the plastic and energy components at the points of contact with the capillaries. These effects occur in the zones of irradiation launcher play a role for the development of zones generalized reactions at the tissue level, organ systems and whole organism.

There comes the activation of the system DNA-RNA-protein biosynthetic and redox processes in the main enzymatic systems. The Magnetic-laser treatment causes an increase in education macroergs (ATP), the mitotic activity of the cells, oxygen absorption tissues, lowers the threshold of sensitivity of the receptor, reduces the duration of inflammation, interstitial edema and tissue tension, improves blood flow, increases the amount of collateral, has immunomodulatory effects\*, activates transport of substances through the vascular wall. Thus, clinical observations and experimental studies show that the therapeutic effect of LeL and the MP is more pronounced than in the separate or sequential use thereof. At the same time it was possible to reduce the impact of exposure on the pathological center, compared to the duration of exposure when using only one factor and treat more deep-seated lesions.

Furthermore, now it is shown that the earth and the natural MF EMR actively affect many life processes, including endocrine glands, including - on the pineal gland.

***The magnetic field of Earth and the natural electromagnetic fields affect:***

- on the small groups of magnetite crystals which are inclusions in many cells of living organisms;
- on acupuncture points system, chakras and meridians;
- on the paramagnetic properties of water;
- On the endocrine glands and, especially, to the pineal gland.



1) control, and biological rhythms, primarily «day and night mode», and hence of sleep and wakefulness, sleep or normal insomnia;

2) control of human immune status and, consequently, disease resistance and possibly to cancer (these data are now intensively studied by scientists in many research centers);

\*In 1980, the discovery of the team of scientists (B.B. Pershin, S.N. Kuzmin, V.A. Levando, R.S. Suzdalsky) have been registered, have proven that at the maximum physical and psycho-emotional stress from serum and human biological secrets disappear completely separate classes of immunoglobulins, protein molecules are responsible for the immunological reactivity of the organism. The normal concentration of immunoglobulins are recovered only after 2-4 weeks after cessation of stress factors. It is quite natural that people in times of stress significantly weakens the immune system. As a consequence, the risk of various diseases increases.

3) control of human mood, that is, from the base function of the pineal gland, in particular on the level of its hormones depends largely state of «depression», «euphoria» or balance. Interestingly, all the drugs-antidepressants act directly «through the pineal gland,» or indirectly affecting its function;

4) control of the sexual activity and functional status of the prostate. For example, it turned out that southerners who moved to the place of residence in the Nordic countries, very often suffered from prostatitis and from treatment of it in an infinite variety of specialists. The reason - lack of solar isolation and, of course, from hypo functional condition of thyroid.

5) control of pain, that is, the dependence of human behavior from the pain, it has It depends on to the function of the pineal gland and its hormones level.

Important experimental studies on the effect of the combined action of infrared radiation, the DC and AC magnetic fields in experimental atherosclerosis held S.M.Zubkova et al. (1998 \*, 2000 \*\*).

The experimental model of hyperlipidemia was created in rats by transferring them to diet without vitamin but rich in cholesterol (LDL) and Mercazolilum. The object of the study were inbred male rats weighing 250-300 g were divided into the following series.

Control animals series are was transferred, in the time of the experiment (24-28 days), on the diet without vitamin, but without the cholesterol and merkazolila. Was isolated a series of rats with hyperlipidaemia who did not receive any influence of physical factors; II class of rats with hyperlipidaemia, to whom in the cervical-thoracic spine (paravertebrally on CIV-ThV level) was carried out for 10 days for 3 minutes. daily exposure to IR radiation ( $\lambda = 0,87 \text{ m}$ , 5 mW) in combination with CMF (constans magnetic field) ( $30 \pm 10 \text{ mT}$ ); III of rats with hyperlipidaemia, to whom in the same zone was exposed by the infrared radiation in combination with a full-wave and alternating magnetic field (AMF) (50 Hz,  $30 \pm 10 \text{ mT}$ ) for 3 min. daily for 10 days; IV of rats with hyperlipidaemia, which at the same zone was exposed to 3 minutes a day for 10 days by the IR radiation in conjunction with CMF and AMF half-wave pulsed (50 Hz,  $15 \pm 10 \text{ mT}$ ).

In all animals, the authors studied the adaptive changes in target organs of this pathology (the myocardium, liver, cerebral cortex) in terms of protein and nucleic acid metabolism, the level of lipid peroxidation and antioxidant activity (AOA), indicators

\* Zubkova S.M., Varakina N.I., Mikhailik L.V., Bobkov A.S., Maksimov E.B. The combined effect of infrared radiation, the DC and AC magnetic fields in experimental atherosclerosis // Questions resort., Physiother. and Kin. Therapy-1998.-№ 4.- pp 31-36.

\*\* Zubkova S.M., Varakina N.I., Mikhailik L.V. et al. Restorative processes in the cerebral cortex, myocardium and thymus of rats with experimental atherosclerosis effects at exposure of low-frequency electromagnetic fields on the head // Questions resort., Physiother. and Kin. Therapy-2000.-№ 4.- S.3-7.

of activity of the kallikrein-kinin system (KKS) and protease inhibitors, the content of insulin and thyroid hormones in serum.

As a result, comparisons of all indicators investigated in experimental animals the authors concluded that the complex of physical factors (IR+CMF+ half-wave pulsating AMF) turned out to be the best (of all three modes are used) to restore vasomotor metabolic and immune disorders arising in the development of atherosclerosis, as well as for proper authorization inflammatory reactions intravascular level.

When was localization of effects on the cervical-thoracic (CIV-ThV) there was a decrease of the sympathetic nervous system tone in sympathetic ganglia and strengthen parasympathetic influences providing vasodilating action and change systemic and regional hemodynamics, with the active participation of kinin system.

In initiation of mutations, the authors point out, an important role has as IR absorbers, CMF and alternating magnetic field, play water molecules - on an, one of the most widespread compounds of body. For example, in the IR spectrum of water characterized region 0.7-0.9 microns maximum absorption band corresponds used IR-0.87 microns. It is the absorption of infrared radiation in the water molecule creates the conditions for the interaction of radiation with biological membranes at the level of the near-membrane layer - glycocalyx, which are an integral component of the water molecule. Hydrated ions and cytoplasmic structures polyelectrolyte comprising water into their system, are also sensitive to IR-radiation systems.

In the CMF occur the orientation effects of the same water molecules hydrating the membrane, or ions. The biological tissue is usually regarded as an optically turbid diameter or paramagnetic environment in which under the influence of CMF comes a certain ordering of the structure is due to these orientation effects. And when such a more ordered structure becomes effective infrared radiation, the scattering of light (Tyndall effect) is reduced and the resulting biological effects are mostly related to the direct absorption of electromagnetic energy of infrared radiation.

If these two factors (IR and CMF) added the third - AMF, the important role is played by the frequency characteristics of this field. In essence, it is the frequency provides information towards the interaction electro-magnetic fields with biological systems, as it can help to inform the biosystem adequate for her rhythm and synchronize its rhythmic characteristics. One such type of frequency characteristics are the cyclotron frequency (vts), which ions are determined by dividing the product of the ionic charge (q) the value of CMF magnetic induction ( $B_0$ ), divided by the ion mass (m) (M.Y. Azbel, 1966)\*:

$$\nu_{\text{ts}} = \frac{1}{2} \pi \cdot q \cdot B_0 / m$$

When a match of the cyclotron frequency and multiplicity of the frequency of the external alternating magnetic field having the resonance effects of these ions and

\* The cyclotron frequency // Azbel M.Y. Physical encyclopedia. M., 1966.-T.5.-P. 397.

provides greater efficiency of its biological action (A.R. Liboff, 1985<sup>1</sup>; A.R. Liboff et al, 1987<sup>2</sup>). It was found that this combination CMF and AMF can change the intra- and extracellular calcium concentration and the conditioned reflex activity of mammalian (C.F. Blackman et al, 1985<sup>3</sup>; J.R. Thomas et al, 1986<sup>4</sup>).

Revealed by S.M. Zubkova et al. (1998), as well as in other studies (V.V. Novikov, M.N. Zhadin, 1994<sup>5</sup>; G.N. Ponomarenko et al, 1998<sup>6</sup>), increasing the biological activity of the combined effect of CMF and the AMF with a decrease in the alternating magnetic field induction is evidence of the critical importance of information exchange with the AMF biosystems.

Thus, by proper selection of the complex physical factors can provide a more meaningful impact on the regulatory system of the body, reaching optimal adaptation reactions.

The results of experimental studies of S.M. Zubkova and co-workers (1998, 2000) were performed using the «MUM-50», which provides for the possibility of simultaneous action of three factors mentioned above (laser light infrared, CMF and alternating magnetic field frequency of 50 Hz). The resulting the high biological effect in the IV group by experiment a combination of these factors no doubt. However, there are clinical studies (G.N. Ponomarenko et al., 1998; A.M. Gofeld et al., 1999)\* when with much smaller parameters of magnetic induction ( $\approx 70$  mT, which is comparable to Earth's magnetism) it received high therapeutic effect. Thus the basic parameters in choosing the impact are not their capacity, and the selection of the resonance frequency.

To this end, by the scientific and methodological center «Medinteh» was made a special unit for magnetic resonance therapy («MIT-MR»), it passed the technical and clinical trials with high therapeutic effect of many diseases (hypertension I-II, Angina, neuroses and etc.).

Technically, the device is make as a special mattress with built-in it 8 inductors and the control unit. Tensions of MF on the surface of the inductor-less than 2 mT, and in the zone of impact 50-200 mT. The device makes it possible to influence the following frequency variants: 1.2; 2.4; 3.3; 10.4; 12.5; 37.5; 50; 60; 75; 145; 700; 1500 Hz, which actually covers all the most commonly used frequency (heart rate, an alpha rhythm, the frequency of physical blocking of ion channels, frequency and analgesic al.).

1 Liboff A.R. // Interaction Between Electromagnetic Fields and Cells.- New York, 1985.- P. 281.

2 Liboff A.R., Smith S.D., McLeod B.R. // Mechanistic Approaches to Interaction of Electric and Electromagnetic Fields with Living Systems.- New York, 1987.- P. 109.

3 Blackman C.F., Benane S.G., Hause D.E. // Bioelectromagnetics Society. Annual Meeting, 7-th: Abstracts.- San Fransisco, 1985.- P.9.

4 Thomas J.R., Schrot J., Liboff A.R. // Bioelectromagnetics.- 1986.- Vol. 7.- P. 215.

5 Novikov V.V., M.N. Zhadin // Biofizika.-, 39, 1994.-, number 1.- pp. 45-49.

6 Ponomarenko G.N., Sokolov G.V. Shusov S.B. et al. Analysis of the clinical effects of ion-parametric magnetic therapy // Problems. Resort., physiother. and Kinesistherapy.- 1998.- № 1.- pp. 6-9.

In addition to the machine are done one remote inductor imparted with the same parameters as the MF in the above, and outrigger emitter inductor for MLT and pulsed MP and IR-laser or a pulsed laser and MF in the red range.

The procedure is as follows. The patient is placed after the required examination «on the mattress,» that is, the inductors in special packaging (mattress) and then set the required parameters and enable the timer button is pressed the «start» and thus released the procedure, the duration of which is 10 to 30 minutes.

If necessary, when there is a specific disease (liver, stomach, and other fractures.), An external inductor or inductor emitter which is connected to the control unit is applied to the desired organ.

Therefore, in medical practice today magnetic laser therapy has a place, and its application in the foreseeable future is even more promising. Of the manufactured equipment the most famous models are the devices MIT series («MIT-1 MLT», «MIT-11», «MIT-1 Series 2», «MIT-1 IR» and others.).

## General principles of magneto-laser therapy

Magneto-laser therapy is currently used in two basic versions - zonal impact and transcutaneous laser irradiation of blood.

At the zonal exposure zone selection is made according to the principles set out in the relevant section of our book, and the time and other parameters are determined in the first place, the laser energy ( $J/cm^2$ ) and the tension MT (mT).

It is known that the laser energy dose, the following effects (V.E.Illarionov, 1994; I.Z. Samosyuk et al., 1997):

- Preventive-0.01-0.3  $J/cm^2$ ;
- Biostimulating-0.2-0.9  $J/cm^2$ ;
- Therapeutic, 0.8-10  $J/cm^2$ ;
- Inhibitory-10-25-30  $J/cm^2$ ;
- More than 30-40  $J/cm^2$  damaging.

Based on the objectives of the treatment, the necessary dose is selected, and is calculated by the known formula:

$$t = E \cdot S / P \cdot K ,$$

Where t-time exposure, s; E - required dosage of exposure energy,  $J/cm^2$ ; S-exposure area,  $cm^2$ ; P-power laser radiation, W; K-factor of the use of radiation.

When carrying out zonal MLT frequently used contacts, contact-compression or labile (scanning) methods and rare - remotely methods .

On the pathological focus, after, where appropriate, the measures of asepsis and antisepsis was done (wound, trophic ulcer, an area of bone fracture, inflammatory infiltrate, etc.) act with the help of special devices such as MIT, which combined the

magnetic field and laser radiation emitters or impose or impose a ring ferrite magnets (magnetic field strength of the order of 30-45 mT, but not more than 100 mT), and simultaneously irradiating by LeL which has performed at a power flux density of 4.5 to 20-30 mW/cm<sup>2</sup>, depending on the severity and nature of the flow of pathological process. Exposure exposure of said physical factors on the one area, 3 -10 min., in one session are 20 minutes. The treatment typically consists of 3-10 treatments less frequently duration -15 or 20 - min. With the lack of clinical efficacy of the first course of therapy through a magnetic-10-15-20 days should undertake a second course of treatment.

### ***Here are some options for MLT and features of their use***

L.N. Budkar et al. (1996)\* studied the effect of MLT in 112 patients with dysfunction of the pacemaker and conduction system of the heart (sinus node weakness syndrome or autonomic syndrome (parasympathetic) depressed sinus node and conduction system of the heart), which manifests itself in different variants arrhythmias (ventricular or supraventricular arrhythmia).

MLT course consisted of 15 daily treatments, which were carried out by the following procedure.

Exposure was carried out in the precordial area infrared laser ( $\lambda = 0,8-0,88$  microns), the power density of 4 mW/cm<sup>2</sup> and constant MF 10-40 mT with a total exposure of 12 minutes.

As a result, MLT marked a pronounced therapeutic effect in patients with sick sinus syndrome and less significant in patients with imbalance at VNS. However, the authors note that a number of patients with arrhythmias experienced antiarrhythmic full effect, while others was get much facilitated in it.

Kochetkov AV et al. (2000)\*\* studied the effectiveness of various methods of magnetic and laser therapy in early rehabilitation of patients with cerebral stroke (CS in 75 patients (ischemic CS was 57 people, hemorrhagic CS - at 18).

Treatment was started at 4-5 weeks after the acute cerebrovascular accident (ACVA). In one group of patients (61 pers.) has been used the method of combined of MLT (SMLT) treatment procedure was as follows.

In the projection area of the lesion was performed trans-cerebral impact by low-frequency alternating magnetic field (LFAMF) in a continuous mode, a contact, a

\* Budkar L.N., Antyufev V.F., Oransky I.E., Bekhter T.V. Influence of the magnet-laser impact on clinical status and cardiac electrophysiological parameters in patients with cardiac arrhythmias // Problems. Resort., physiother. and Kinesistherapy- 1996.- № 2.- P. 5-8.

\*\* Kochetkov A.V., Gorbunov E.F., Minenkov A.A. and other. Optimization of the early rehabilitation program of patients with cerebral stroke: the use of magnetic and laser techniques // Problems. Resort., physiother. and Kinesistherapy- 2000.- № 3.- pp 17-21.



cylindrical inductor (inductance 27-35 mT) exposure of 10-15 min; a course of 15 treatments.

After 15-20 min. after applying LFAMF exposed to low-intensity infrared laser radiation (IRLILR) ( $\lambda=0,89$  nm) above the vessels. Parameters of IRLILR for one field: pulse mode (80-150 Hz), the power of 2-4 watts/pulse at the contact stable method, exposure of 4-8 min. in the carotid sinus area and 4-10 minutes on a projection of the vertebral artery in the suboccipital region; the total exposure when using single-channel devices, up to 20 minutes (4 fields); two-channel - 10 min.; a course of 12 treatments.

In patients with hemispheric lesions used to combine, combined version of MLT (CMLT). The essence of the method is as follows.

In one procedure, consistently, without interval worked LFAMF the brain (1st field, see above.) And in the projection area of cervical enlargement of the spinal cord (2nd field): a rectangular inductor, contact, intermittent (2-premise 2 with a break), the inductance of 18-25 mT, exposure of 10-12 min.; the total exposure to the two fields - 25 min.; on course 10-12 procedures. At the same time nadarterialnoy laser therapy on the projection area of both common carotid artery (CCA) was also carried out impact on your joints (no more than 2 joints).

Parameters influence on field 1: pulse mode (80 Hz and 1.5 kHz for 2-4 minutes each), power up to 5 W/pulse, the exposure of 4-8 min.; methods of contact, labile; total exposure to 4-field up to 20 min.; in the course of 10-12 procedures.

Patients in both groups received standard medical therapy.

As a result, the authors of the study noted: clinical and neurological efficiency of complex rehabilitation, including methodology SMLT, was 72% (in terms of «significant improvement» and «improvement») and CMLT («improvement») - 85%, which is significantly higher than the control groups ( $P < 0.05$ ).

### ***Percutaneous magnetic laser irradiation of blood***

Until recently, the most common and good studied was the effect on the blood predominantly by red laser as intravenous, percutaneous or irradiation of fluids and blood transfusion. These treatments are very popular among physicians and patients due to their relatively high efficiency. However, the practical application of magnetic laser therapy allowed to use it in order to blood exposure. Thus from the very beginning it was a variant of percutaneous exposure in mind the possibility of deeper penetration in the sharing of these factors.

The advantage of magnetic laser hemotherapy before the laser is as follows.

1) When hemo-laser-therapy for stable controlled positive exposure required 1/3 the volume of circulating blood, and for enough effect of hemo-magnetic-laser-therapy - 1/4.

This is due to more intense influence of magnetic-laser-therapy exposure to blood.

Red blood cells are known to contain iron which is paramagnetic and thus able to «magnetized» and gain «new biological properties». The same applies to the enzyme «catalase» in the active center which also includes the iron atoms.

2) For the laser irradiation third of blood volume, in the patient with a weight of 70 kg, for example via the cubital vein, it takes about 30 minutes. and in order to avoid a possible relapse during course of treatment optimal power of LR at the end of the optical fiber should be 1-2 mW.

The hemo-MLT procedure with equal effectiveness lasts 20-23 minutes with power of LR up to 20 mW and magnetic induction of 30 mT. At MLT procedures the phenomenon of the secondary aggravation of pathology usually is not observed. The latter, according to modern views, is associated with changes in the intensity of lipid peroxidation. In exchange application, such as laser therapy, especially considerable intensity (50 mW), and the long duration of the procedure (30 min.) After 6-7 treatments may experience an exacerbation of the disease. In physiotherapy and resort these facts are well known and described in the form of so-called «balneo-reaction». The possibility of exacerbation\* in most PT options related to the following factors:

- Depletion of natural antioxidants in the body in course of treatment;
- Increased metabolism and lipid peroxidation in response to «stress» (powerful PT);

- Changes in hormonal status (activation of the prostaglandin system in its thromboxane link, dopaminergic department and others).

In order to avoid exacerbation of the phenomenon it is recommended:

- Intake of antioxidants for the period PT (Vitamin E, A, C, Aevitum and others.);
- The short courses of treatment (up to 5 sessions) followed by a break for 3-4 days;
- Selection of adequate capacity (dose) of physical factors and the factors themselves.

It turned out that MT is a kind of natural antioxidant, which is due to increased absorption of vitamins of this group from the intestine under the influence of MFs

\* In very rare cases may develop vegetative-vascular reactions of two types: 1) a rise in blood pressure, headache, aching joints; 2) some fall in blood pressure, paleness of the skin, as an extreme option, «cold» and sweat chilling feeling, pretty significant weakness. Often it turns out that such reactions occur in these patients and with other procedures (e.g., when taking blood from a finger). The first variant is more common in 1-2 hours after the treatment and can last from several minutes up to 5-8 hours. In such cases, either rest or the corresponding application of antihypertensives, analgesics, tranquilizers are recommended. There is no danger of such states and it is not required to terminate the MLT. In the second variant mentioned manifestations occur in the first 3-5 minutes after the start of laser exposure. Therapeutic measures are the same as in other similar cases, i.e. ammonia, cardiac or vascular agents, a horizontal posture with raised extremities etc. In this case, a correction of doses is required and the MLT mode (reducing session time, output power, mode of action, the combination of operating factors) (V. Buylin et al., 1998).

and their activation in the blood, regulation of lipid peroxidation (known MF parasympathocotony stimulation phenomenon), there may be other mechanisms.

Anyway MLT, unlike purely laser therapy, in most cases, does not cause secondary exacerbations which is extremely important in the treatment of many disorders (e.g., angina, post-infarction patients, hypertension etc.).

3) Percutaneous hemo-magnetic-laser-therapy allows to influence, due to significant penetration ability, not only on the blood venous system, but also on arterial and on the filled with blood ventricles and atria of the heart.

These advantages of percutaneous hemo-MLT gradually replacing laser techniques for blood exposure.

### ***The zone for exposure to magnetic percutaneous laser irradiation of the blood***

Selected for this purpose are usually vascular bundles in areas where they are positioned most surfactants: elbow and popliteal fossa, femoral and subclavian arteries, if necessary, the carotid arteries and the heart area. Less effect on smaller arteries or veins: radial, ulnar and others.

Before the procedure, if the effect on the artery defined by its pulsation and then magnetic-emitter mounted on the artery without much pressure (the blood must pass through the artery). Using a special attachment (cuffs) transmitter is attached for the desired time. Next, turn on the device with the specified (required) parameters of magneto-laser impact.

### ***Parameters of the procedure of hemo-magnetic-laser-therapy***

For hemo-magnet laser therapy (hemo-MLT) may be used as the red laser light ( $\lambda = 0,63$  micron), and infrared ranges ( $\lambda = 0,85-1$  micron). Preference is given to the latter. Red laser power range optimally should be 10.5 mW and an infrared-10-20 mW. The magnetic-induction from 5 to 50 mT. With these parameters, the duration of exposure in a single session, 20-23 minutes. If other parameters require appropriate recalculation towards increase or decrease the duration of the procedure, as well as at higher (70 kg) or less (70 kg) patient weight. However, the duration of hemo-MLT for adults should generally not be less than 15 min., and for children of 10 min. (The need for a specific irradiation volume of blood). It should also be remembered that in the same session is preferred to operate at 4 to 5 min on the area. For one zone (the bundle of vascular) - 20 min. In our work we prefer also a frequency modulation of these factors, determining in each patient of his basic rate by the number of heartbeats. For example, the number of heartbeats per minute, is 75 beats, then  $75: 60 = 1,25$  Hz. This is the base rate for a particular patient and the frequency of the modulation or a multiple of it is set on the apparatus.

Number of hemo-MLT defined procedures individually and can range from 3 to

10-15 per course of treatment. If necessary hemo-MLT alternates or combined with other physiotherapy (ultrasonic, electro-therapy, etc.) and to the zonal exposure MLT.

B.S. Briskin et al. (1996) biophysical and biological effects of magneto-laser radiation formulated as follows.

I. At the atomic and molecular level:

- The absorption of light by tissue photo-acceptor.
- Electrolytic dissociation of ions (the gap of weak links).
- The formation of electron excitation.
- The migration of electronic excitation energy.
- Primary photosynthetic effect.
- The emergence of primary photoproducts.

II. At the cellular level:

- Changing the energetic activity of cell membranes.
- Activation of the nuclear unit cells system DNA-RNA-protein.
- Activation of redox, biosynthetic processes and key enzyme systems.
- The increase in the mitotic activity of the cells, activation of the processes of reproduction.

- Stimulation of ATP and the nucleic acid synthesis.
- Reduced intensity of free-radical processes.
- Immunostimulatory effects.

III. On the organ level:

- Reduction of the sensitivity of the receptor.
- Reduction of the duration of the phases of inflammation.
- Reduction of interstitial edema.
- Increased oxygen absorption fabrics.
- Increased blood flow velocity.
- Increasing the number of new vascular collaterals.
- Activating the transport of substances through the vascular wall.
- Improve the microcirculation.
- Activation of metabolic processes.

IV. At the level of the whole organism:

- Anti-inflammatory.
- Analgesic.
- The regenerative, immunocorrective.
- Decongestants, desensitizing.
- Improvement of the regional circulation.
- Bactericidal and bacteriostatic effects.

## The combined and united use of physical factors

In the previous section we formed the basic principles of the exposure zone selection with multi-level rationale, systematic approach, as the most promising and giving the most significant therapeutic effect. In domestic PT to this date is justified and has been successfully applied an integrated approach to the appointment of therapeutic physical factors (TPF), providing combined or united their application. In our opinion, multilevel, system selection principle zones combined with complex application of TPF complement each other and extend the capabilities of physiotherapy and physio-puncture treatment. In this regard, let us stop more detailed on these issues.

The combined use of TPF involves the simultaneous exposure to several factors in the same area carried out taking into account the laws of their mutual influence, which contributes to potentiation of the therapeutic effect. Clinical practice proved high efficiency and cost-effectiveness of simultaneous use of DC or pulse currents and mud applications (electro-mud), a high-frequency magnetic field and the drug electro-phoresis (inductive-thermo-electro-phoresis), vacuum-electro-phoresis and vacuum-magnetic therapy, electro-ultra-phono-phoresis and magnetic-phono-phoresis, magneto-laser-phoresis and ultra-magnetic-laser-phoresis and others.

Such variants of «phoresis» facilitate the administration of more drug increased pharmacological activity and extend its action in comparison with the individual application electro-phoresis or ultra-phonophoresis.

The combined use of TPF requires consistent (at different times) the use of TPF. In this case two or more impact factors can be carried out on one or different in one zone, and on different days or courses of the use of one method can be replaced by other procedures use rate.

In recent years, serial production of devices that allow simultaneous use of a magnetic field and laser radiation (magnetic-), ultrasound and laser radiation (laser-ultrasound therapy) - apparatus «MIT-11», as well as options for magneto-hydro-laser and magneto hydro-laser and vacuum therapy, hydro-bath, magnetic and others.

There is no doubt that further technical improvement of equipment will help to create new combinations of TPF.

The basic principles are the principles of a comprehensive physiotherapy synergy and potentiation implemented the inclusion of a set of physical factors of unidirectional action. For example, magnetic-, magneto-hydrodynamic laser-vacuum massage, laser, ultra-sound therapy and others.

The synergism principle is widely used in the combination methods, for example, when the preliminary application of ultrasound, magnetic fields or magnetic-laser facilitates the introduction of a large number of drugs by electrophoresis and lengthening their period of validity. To enhance the analgesic effect of ultrasound therapy combined with diadinamo- amplipuls therapy or therapy, electro-phoresis of

local anesthetic agents, while increasing anti-inflammatory and allergen ultrasound effect is achieved through an integrated application of high-frequency electromagnetic fields, UHF, EHF, and UFO, low-frequency magnetic therapy or magnetic laser therapy.

Much less frequently used the principle of antagonism in the complex physical therapy, which can reduce the unwanted or excessive effect of the actions of one of the factors. In particular, the use of infrared rays (infrared hydro shower) to the area exposed to ultraviolet radiation causes of erythema attenuation. A similar procedure has already found application in a number of resorts in the Crimea.

The use of the electric UHF field or infrared laser radiation in combination with mud applications greatly reduces the acute reaction to the mud.

The principle of sensitization is sufficiently widely used in combining of TPF, based on the fact that the effect of one factor causes the body or some of its system in the state, more sensitive to the effects of another. Thus, prior to use techniques that cause active hyperemia (ULTRAFON therapy, heat treatments, massages) enhances the action of UV rays and more fully to carry out electrical stimulation as a result of reducing the electrical resistance.

An important integrated in physiotherapy is the principle of the local gain (focal) reaction, which is implemented by a combination of methods advantageously influence general and local (local procedure usually precedes the total).

The cumulative to this date data make it possible to formulate the basic rules of the integrated use of therapeutic physical factors as follows (L.Y. Vasilyeva-Linetskaya, 1999):

1. In physiotherapy there are no absolutely incompatible procedures. Inappropriate use of individual actions on the exact same area on the same day does not exclude the possibility of their use in different areas or on different days.

2. The effectiveness of the therapeutic complex is not enhanced by the inclusion of a large number of procedures, and depends on the doctor's ability to use multi-faceted properties of physiotherapy techniques for deliberate action on the pathological mechanisms and sanogenesis of disease, as well as the main clinical manifestations and comorbidities.

3. The most effective in most cases, is the inclusion complex in procedures general and local effect thus reasonable to administer local effect immediately prior to the common amplification reaction or 2-3 hours after the procedure, Considering the generalized reactions and requiring a period of rest and recovery.

4. On the same day it is advisable to appoint a single procedure the overall impact, and only patients with high adaptive properties of the cardiovascular system, are in remission, it is permissible to use two procedures generalized influence provided enough (4-6 hours) period between them and maintaining the optimal number of procedures for the course.

5. Should act on a local area with one or two therapeutic factors, taking into account

the possibility of their interaction and the optimal combination. In the presence of concomitant diseases the number of local effects may be increased to 3-4 carried on different zones, while it is advisable to use the methods which have different physical characteristics and nature, but do not have an antagonistic action with respect to each other.

6. Among the optimal combinations used for one zone and one day, the therapeutic effectiveness for which, has been proven, are a combination of IP and the laser electric field UHF, and FAL, electro-phoresis of drug and ultrasound, high frequency electromagnetic fields, UHF, EHF and iontophoresis. Equally feasible is the combination inductothermy, UHF-therapy or micro-wave therapy with constant or variable pulse currents, and ultrasound. The effectiveness of the drug electro-phoresis increases significantly during the preceding exposure to infrared or visible rays or low-frequency magnetic field. Carrying out of electrical neuromuscular system more effectively after thermal procedures, or, conversely, after cold exposures (when the hyperemia).

7. Of considerable importance is the sequence of actions and the interval between them. Thus, the use ultrasound after iontophoretic administration of drugs are promotes more amounts of drugs in the tissue, an opposite order of procedures indicated deeper penetration of drugs. Optimal for iontophoretic after exposure to microwaves is no more than an hour interval between treatments, ultrasound should be used after exposure DMV immediately for 10-15 minutes, but just before the magnetic-session.

8. The traditional rule is not appropriate combinations in a day of physical factors that are similar in nature. However, in recent years, thanks to the wide dissemination of short-pulse electroanalgesia apparatus for the relief of acute pain is widely used application on the same day or sinusoidal modulated diadynamic currents and short-pulse currents that combine to affect one area 4-6 times a day. And one, twice DDT exposure is carried out, or CMT, and all subsequent by short-pulse currents. In order to provide the analgesic effect of the application it is also acceptable in one day on one area of pulsed alternating sinusoidal current with frequency of 110 kHz (D'Arsonval current) and sinusoidal modulated currents.

9. In most cases impractical to effect one day per two factors reflexogenic zone except for using a combination of physical therapy techniques or special tasks.

10. As a rule, are not held on the same day multifaceted action procedure, in particular, heat and cold, due to possibility of surge of adaptive systems of the body and the development of an exacerbation of the pathological process. This combination of procedures is justified only in certain cases, to provide coaching or quenching influence (contrast baths and showers) or to attenuate excessive reaction to a previous procedure.

11. On the day of difficult and tiring diagnostic studies it is advisable not to prescribe physical therapy, especially the overall impact.

To these must be added the following recommendations.

1. Combined or the combined use of TPF must take into account the multi-level, systemic principle in the choice of treatment zones. For example, in the treatment of optic nerve subatrophy proved optimal:

- a) the magnet-laser effects on occipital lobe of the brain;
- b) magnet-laser effects on the eyes;
- c) the magnet-laser effects on cervical region;
- g) low-frequency ultrasonic treatment on the liver area.

Thus preferably is simultaneous influence by these factors on listed above zones. Carrying out such procedures is possible with the use of the machine «MIT-11».

2. To deliberate use of multilevel TPF must be a precise definition of the status of functional systems of the body using acupuncture clinic data and diagnostic methods (methods of Nakatani, Akabane, Voll et al.). In these cases, it is preferably to influence on the systems that are in state of hyperfunctional by electromagnetic radiation of mm- range, and on systems that are in hypofunction - by laser radiation or ultrasonic waves.

3. With different combinations of TPF or their consistent application it is preferable to start with more powerful energetically influence, finishing with less powerful. For example, start with the impact of sonication, then - the laser and at the end of the procedure - EHF. This principle allows you to keep one side of the actions of any physical factor - information. In the reverse of the procedure (from weak to strong) information of the poor «erases» the information of stronger.

Fig. 14 are schematic options for an integrated multi-level, systemic use of therapeutic physical factors.

Thus, the combined application of TPF, taking into account the multi-level system of the principle of selection of zones is not an identity of their cumulative effect, and represents a new quantitative and qualitative effects, which can not only strengthen or weaken the effect of a single factor, but also give it new features.

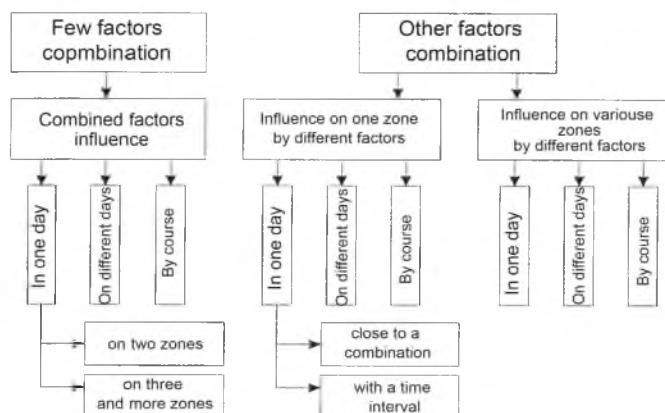


Fig. 14 Variants of complex multi-level system of application of therapeutic physical factors



## REFERENCES

1. Alexandrova V.A., Lebedev V.P., Rychkov S.V. Stimulation endorphinergic brain structures - the new drug-free method of treatment // Journal of neuropathy and psychiatrist. -1996. -№2. -pp. 101-104. (in Russian)
2. Amunts V.V. Structural organization of sensory projections to the reticular formation of the brain stem // Journal neuropathy and psychiatrist. -1999. -№9. -pp. 37-41. (in Russian)
3. Asratyan E.A. Influence of extirpation of the superior cervical sympathetic ganglia for food conditioned reflexes // Arch. biol. Nauk [Architecture of biological Sciences]. -1930. -T.30, Issue 2. -p.243. (in Russian)
4. Babov K.D., Voloshin A.B., Gorban E.M et al. Current issues of sanatorium rehabilitation of patients with cardiovascular disease in the elderly // Med. reabylt., kurort., fzyoter. [Med rehabilitation, resort, physiotherapy ]-1996. -№2. -pp.3-6. (in Ukrainian)
5. Baron M.A., Mayorova M.A. Functional stereo morphology of meninges. Atlas. -M.: Medicine, 1982. -350 p. (in Russian)
6. Bobchinskaya I.N. The combined effects of EMF ultrasonic frequency transcerebral and UHF on the area of the adrenal glands in the complex treatment of microbial eczema // Med. reabilit., kurort., fizioter. [Med.rehabilitation, resort and physiotherapy] -1998. -№2 (14). -pp.43-45. (in Russian)
7. Bogdanov N.N., Ezhov V.V. Discussion on the principles of physiotherapy // Med. reabilit., Resort., fizioter. -1997. -№2. -p.58-62.
8. Bogolyubov V.M., Zubkov S.M. Radzievskii S.A., Mikhailik L.V. et al. Experimental study of physical and chemical action of currents at transcerebral application // Voprosi kurort, fizioterapii i LFK [Problems of resort, physiotherapy and kinesitherapy]. -1994. -Issue.4. -pp.3-6. (in Russian)
9. Bulygin I.A., Ginsburg S.E., Leonovich A.L., Starostesha L.I. Status of blood supply and tone of cerebral vessels in the cervical sympathetic-ganglionitis // Journal of neuropathy and a psychiatrist. -1984. -№7. -pp.1045-1050. (in Russian)
10. Chychkan D.N. Ulashchik V.S., Tikhonov A.V., Pletnev S.V. Features of action of low frequency magnetic fields of different parameters in experimental enodotoxemia // Voprosi kurort, fizioterapii i LFK [Problems of resort, physiotherapy and kinesitherapy]. -1999. -№5. -pp. 26-29. (in Russian)
11. Darenskiy I.D., Melnikov A.V. Effect of Electrical tranquillisation on certain hormonal parameters in patients with alcoholism // Journal of neuropathy and psychiatry. -1996. -№1. -pp. 67-69. (in Russian)
12. Ged G. Violations of skin sensitivity for diseases of internal organs. -Berlin. -1898.
13. Gorbunov F.E., Smith E.M., Isaev S.V., Bugaev S.A. Influence of combined transcerebral magnetic and electro-therapy on the brain and central hemodynamics in patients with cerebral stroke in the early period of rehabilitation // Voprosi kurort,

fizioterapii i LFK [Problems of resort, physiotherapy and kinesitherapy]. -1996. - Issue.3. -pp.21-24. (in Russian)

14. Hudyma A.A., Andreychin M.A., Gnatyuk M.S, Hmil S.V. Comparative effect of the magnetic-laser irradiation of the liver and the blood on the selection and composition of bile in the experiment // Voprosi kurort, fizioterapii i LFK [Problems of resort, physiotherapy and kinesitherapy]. -1998. -№6. - pp.26-29. (in Russian)

15. Illarionov V.E. Conceptual bases of physiotherapy in rehabilitation: A New Paradigm of physiotherapy - M.: Vseros. Tsenter meditsinu katasrtov "Zaschita" [All-Russian Center for Disaster Medicine «Protection», 1998. - 93 p. (in Russian)

16. Kaladze N.N., Rusyaev V.F., Gorlov A.A. et al. Human erythrocyte membrane rigidity modification by insufficient extract of Saki sulphide mud in combination with irradiation with red light and ultraviolet // Vestnik fizioter. i kurort. [Herald of physiotherapy and the resort]. -1999. -№1. -pp.33-34. (in Russian)

17. Karlov V.A., Selitsky G.V. Sorokin N.D. The impact of magnetic field on the bioelectric activity of the brain of healthy people and patients with epilepsy // Journal of neuropathy and a psychiatrist. -1996. -№2. -pp.54-58. (in Russian)

18. Karmazina I.V. Immunomodulatory effects of various factors in the effect on spleen // Vestnik fizioter. i kurort. [Herald of physiotherapy and the resort]. -1999. -№2. -pp.28-31.

19. Kharchenko E.P., Jatsuk S.L., Makarenko G.A. Transkraniovertebral micro-electrostimulation in the treatment of cerebral palsy // Journal of neuropathy and psychiatrist. -1999. -№8. - pp. 21-23. (in Russian)

20. Komarova L.A., Kiryanov V.V., Zaboltnyh V.A. Transcranial electrotherapy for rehabilitation of patients with osteochondrosis // Voprosi kurort, fizioterapii i LFK [Problems of resort, physiotherapy and kinesitherapy]. -1998. -№5. - pp.27-29. (in Russian)

21. Kryzhanovsky G.N., Magaeva S.V. The pathology of the nervous regulation in the genesis of immune disorders in diseases of the central nervous system // Journal of neuropathy and psychiatrist. -1998. -№5. -pp.60-64. (in Russian)

22. Kyrchinskiy A.R. Reflex physiotherapy. -K.: Gos. med. izd USSR. [National medical edition of Ukrainian SSR. -1959. P-270. (in Russian)

23. Lapinsky M.N. On the mechanical baths in neurological practice. Gushingbath // Practicheskiy vrach [Practitioner], 1914. -№37-38. -pp.39-40. (in Russian)

24. Lapshin V.P., Golovkin O.L. Gray E.V. et al. Intracranial electrical stimulation when the partial failure of human circulatory // Voprosi kurort, fizioterapii i LFK [Problems of resort, physiotherapy and kinesitherapy]. -1997. -№2. - pp.15-16. (in Russian)

25. Malashkhiya Y.A., Nadarsishvili Z.G., Malashkhiya N.Y., Malashkhiya V.Y. The brain as the organ of immunity // Journal of neuropathy and psychiatrist. -1999. -№9. - pp.62-65. (in Russian)

26. Mikhno L.E., Babov K.D., Fissenko L.I. Transcranial electroanalgesia in patients

with acute and pre-acute myocardial infarction // Medical rehabilitation, balneology, physiotherapy. -1998. -№1 (13). -pp. 8-10. (in Russian)

27. Podbereznyj A.I. The effect of unilateral extirpation of the cervical sympathetic ganglion, and electrical stimulation of the posterior hypothalamus in the conditioned reflex activity of dogs // Physiological magazine. -1982. -T.28. -№2. -pp.150-155.

28. Ponomarenko G.N., Enin L.D. Somemethodological approachestophysiotherapy of pain // Voprosi kurort, fizioterapii i LFK [Problems of resort, physiotherapy and kinesitherapy]. -1998. -№5. -pp.20-23.

29. Ponomarenko G.N. Physical methods of treatment: Spravocghnik [A Handbook]. SPb., 1999. -252 p.

30. Ponomarenko G.N. Physical methods of treatment: Spravocghnik [A Handbook]. SPb., 1999. -252 p.

31. Samosyuk I.Z., Miasnikov V.G. Klimenko I.V. The use of low-frequency ultrasound in the treatment of patients with pulmonary tuberculosis // Voprosi kurort, fizioterapii i LFK [Problems of resort, physiotherapy and kinesitherapy]. -1999. -№2. -pp. 9-11. (in Russian)

32. Selitsky G.V. Karlov V.A., Sorokin N.D. Indirectly, the effect of short-term variable magnetic field on the brain at an epilepsy // Journal of neuropathy and psychiatrist. -1998. -№12. - pp. 40-43.

33. Serebrina L.A., Belichenko T.O., Dragomiretskaya N.V. and others. Immunocorrective recovery therapy in the treatment of patients who have had the virus hepatitis / Guidelines. -Odesa. -1994. -27 p. (in Ukrainian)

34. Shcherbak A.E. Major works on physiotherapy 1936.

35. Shmakov I.P., Gazhy I.N., Dukova O.R., Pavlova E.S. New aspects of the use of low-frequency pulsed electromagnetic field in the rehabilitation of patients with cerebrocardiac syndromes // Vestnik fizioter i kurort. [Herald of physiotherapy and the resort]. -1998. -№1. - pp. 32-34. (in Russian)

36. Slavin M.B. Methods of system analysis in medical research. -M.: Medicine, 1989. -304p.

37. Sokolov G.A., Troshin V.D., N.I. Kiseleva, Muraviev N.V. About the impact of chronic diseases of the upper cervical sympathetic ganglia of the brain cortex (experimental research) // Journal of neuropathy and psychiatrist. -1992. -№4. -pp.78-81.

38. Sollertinskaya T.N. Influence of extirpation of the superior cervical sympathetic ganglia on the reflex activity of the cerebral cortex of rabbits: Abstract of Ph.D. -A.: IEM AMS of the USSR, 1958, 19 p. (in Russian)\

39. Stikhina N.Y., Lyskov E.B., M.P. Lomarev et al. Transcranial magnetic stimulation in neurotic depression // Journal of neuropathy and psychiatrist. -1999. -№10. -pp. 26-29

40. Tondiy L.D. Vasilyeva-Linetskaya L.Y. A new approach to the classification of therapeutic physical factors // Medical rehabilitation, balneology, physiotherapy. -1997. -№1. - pp. 59-62.

41. Tyshkevich T.G., Nikitina V.V. Multi-tier stimulation in the treatment of patients with paralysis and paresis // *Voprosi kurort, fizioterapii i LFK* [Problems of resort, physiotherapy and kinesitherapy]. -1996. -Issue. 1. -pp. 16-18.
42. Tyshkevich T.G., Bersnev V.P., Stepanova T.S. The use of millimeter-wave in neurosurgery under the electrophysiological control // *Voprosi kurort, fizioterapii i LFK* [Problems of resort, physiotherapy and kinesitherapy]. -1998. -№1. -pp. 30-33.
43. Ulashchik V.S. Hemophysical therapy: rationale and prospects of research // *Voprosi kurort, fizioterapii i LFK* [Problems of resort, physiotherapy and kinesitherapy]. -1999. -No. 3. -pp. 3-9.
44. Vaysfel'd D.N. Kondratova L.S. Using rheoencephalography to optimize the choice of reflex zones and selectively differential impact of physiotherapeutic factors on vascular brain pools *Med. reabilit., kurort., fizioter.* [Med. rehabilitation, resort and physiotherapy]. -1997. -№2 (10). - pp.12-14. (in Russian)
45. Yevtushenko S.K. Melatonin and its role in the experimental and clinical neuroimmunology // *Journal of neuropathy and psychiatry.* -1994. -No. 3. -pp.93-99.
46. Zakhar'in G.A. Clinical lectures. -M.: Ed. IV, issue 2. -1894. (in Russian)
47. Zolotarev T.A. Grishanova A.Y., Gulyaev L.F. et al. Effect of low-intensity medical factors on hepatic microsomal oxidative system in experiment // *Voprosi kurort, fizioterapii i LFK* [Problems of resort, physiotherapy and kinesitherapy]. -1998. -No. 3. -pp.34-37.
- 47a. Zubkov S.T., V.A. Oleinik, Buldyhina U.V., Skrynychuk N.A. Laser treatment of hypertrophic form of autoimmune thyroiditis / *Guidelines.* -Kiev, 1996. -15 p. (in Ukrainian).
48. Axelrod J., Quay W., Warker P. // *Nature.* -1965. -V.208, №5008. -p.368-390.
49. Barber B.J., Martin J.S., Rapela C.F. Analysis of the Effect of bilateral sympathetic stimulation on cerebral and cephalic blood flow in the dog // *Stroke.* -1978. -Vol.9. -№1. -p.29-33.
50. Itakura T., Yamamoto K., Tahyama., Shimizu N. Central dual innervation of arterioles and capillaries in the brain // *Stroke.* -1977. -Vol.8. -p.360-365.
51. Kurchin A., Adar R., Zweig A., Mozes M. Gustatory Phenomena After upper Dorsal Sympathectomy. // *Arch. Neurol (Chic),* 1977,34, 10, 619-623.
52. Lindvall M., Edvinsson L., Owman C. Sympathetic ne inhibition of CSF formation from the choroid plexus // *Newrosurgery.* -1979. -V.4. -№5. -P.481-489.
53. Morgan W.W., Hansen J.T. Time Course of the Disappearance of Pineal Noradrenaline Following Superior Cervical Ganglionectomy // *Exp. Brain. Res.,* 1978, 32, 3, 429-434.
54. Wang H., Li K., Wu G., Cao X. C-fos expression in spinal cord and brainstem following noxious stimulation and electroacupuncture plus noxious stimulation // *Acupuncture and electrotherapeutics research.,* -1995. -Vol.20. -№3/4. -P.163-172.
55. Waniewski R.A., Suria A. // *Life Sci.* -1997. -V.21. -P.1129-1141.

# **PRACTICAL RECOMMENDATIONS FOR USE OF MAGNET-LASER-ULTRASOUND THERAPY IN CLINICAL PRACTICE AND THE SPA**

## **(ON THE BASIS OF COMBINED APPARATUS FOR PHYSIOTHERAPY MIT-11)**

### **CONTRAINDICATIONS:**

- Malignancy (malignancy);
- Thrombophlebitis;
- Ulcer bleeding (especially recurrent) in history;
- Hypertension stage II-III;
- Coronary heart disease with angina and arrhythmia;
- Individual sensitivity to the factor;
- Acute ischemic stroke;
- Pronounced hypotension;
- The presence of cardiac pacemakers.

Magnetic-laser-ultrasound therapy (MLUST) is effective in various diseases as well as the impacts on common diverse nature of disease pathogenetic links. These common pathogenetic link refers to intracellular hypoxia, leading to a decrease in the body's energy potential (2 molecules of ATP are produced instead of 36-38, activated lipid peroxidation, impaired cellular metabolism, reduced functioning of the mitochondria, the membrane-damaged cell structure, adaptive reactions turn into pathological) (V. Buylin et al., 1998).

Designed MLUST techniques allow to influence basic pathogenetic links of the disease and, just as importantly, the processes of sanogenesis.

1. The method allows to act simultaneously on the three areas, the choice of which is carried out according to known principles of physical therapy, taking into account the recommendations outlined and experience of each individual physician.

However, the most important in the selection of areas for MLUST is a multi-level system-principle that allows to «unite» disparate pathological process system.

2. It is necessary to take into account the physical characteristics of each factor, their overall impact on the body and a specific organ or area, the depth of penetration into the underlying tissues and other. Thus, the inductor-emitter inducing MP and optical flow in the infrared range, it should work on a more deep-seated organs including ischemic foci in the brain and other. Inductor-emitter with the MP and optical stream in a red range - at a superficial formations or tissues, including the neurovascular bundle and some reflex zones.

The impact of low-frequency ultrasound on a particular area or a projection of the internal organ is the most powerful of the applied, but it should take into account possible contraindications.

3. In each case, for each patient, in addition to the stimulation of the zones, select the necessary exposure parameters: frequency modulation factors, their power, the duration of the procedure.

4. In order to achieve a stable therapeutic effect is carried out course treatment, which comprises from 3-5 to 20-21 procedures.

In cases of alleged long-term treatment (10 treatments and more - chronic or recurrent disease) the energy capacity of factors used should be increased gradually.

5. Methods of MLUST should take into account the whole complex of medical actions in each case. Hence strictly necessary daily inspection of patients for timely registration of positive (or negative) changes in the condition of the patient, in consultation with experts. In acute diseases, treatment is carried out every day (sometimes 2 times a day) or every other day, in chronic - a day or 2-3 sessions per week.

6. In some cases (for angina pectoris, postinfarction states, hypertension, stroke) when there is a threat of disease exacerbations (for 5-7-th session), the patient should be appointed antioxidants along with MLUST (Aevitum 600 mg/day or a multivitamin including vitamins C, E, A).

The procedures performed in a patient lying down or reclining. The doctor determines the areas of the patient's body to be exposed to ultrasound and MLT. With significant amounts of the affected area it is divided into zones and irradiated in turn, bearing in mind that the total time of one procedure should not exceed 30 minutes for MLT and 15 minutes for UST.

Zones of influence, pulse repetition frequency and capacity define individually for each patient according to the disease and treatment method. After the procedure, the patient should rest for 30-35 minutes.

Magnetic-laser-ultrasound therapy is not performed in the first 3 days of menstruation. For women it is advisable to start treatment after 5-7 days after menstruation.

## K00-K93 DISEASES OF THE DIGESTIVE SYSTEM

### K50-K52 NONINFECTIOUS ENTEROCOLITIS AND COLITIS

**Enterocolitis** - inflammatory-dystrophic diseases of small and large intestine, leading to mucosal atrophy and intestinal problems.

#### **Etiopathogenesis**

The main etiological factors: infection, toxic effects, the abuse of certain drugs, radiation exposure, mechanical stress, genetic factors, etc. Leading pathogenetic mechanisms - intestinal dysbiosis, allergies (microbial, food, fabric), congenital and acquired enzymopathy.

To treat the infectious enterocolitis is possible to use magnetic-laser therapy only in combination with antibiotic therapy.

#### **TREATMENT SCHEME:**

Exposure is carried out before a meal or 2 hours after a meal (alcohol and smoking are contraindicated, requires an appropriate diet).

5 minutes before the start of the procedure to drink 300 ml of liquid (phyto-solutions, mineral water, etc.).

On the forward panel of the device we expose the parameters:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-3	75-99	9,5 - gastric ulcer 8.6 - ulcer of 12- duodenal	US - 10 in total MLT -5-7 in the zone, 25 in total

#### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position of transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 12-15.

Retreatment: if necessary, after 30 days.

Possible combination with other treatments:

- Diet therapy;
- Drug therapy;
- Herbal medicine;
- Psychological correction.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

Day 1:

US - SP area (the projection of the stomach).

MLT R - Zone 8 (paravertebral, projection C8-D2 vertebral segments).

MLT IR - Zone 26 (paravertebral, D 10-12 segmental innervation area of the pancreas)

- Zone 26a (D 5-8 segmental innervation of the stomach area).

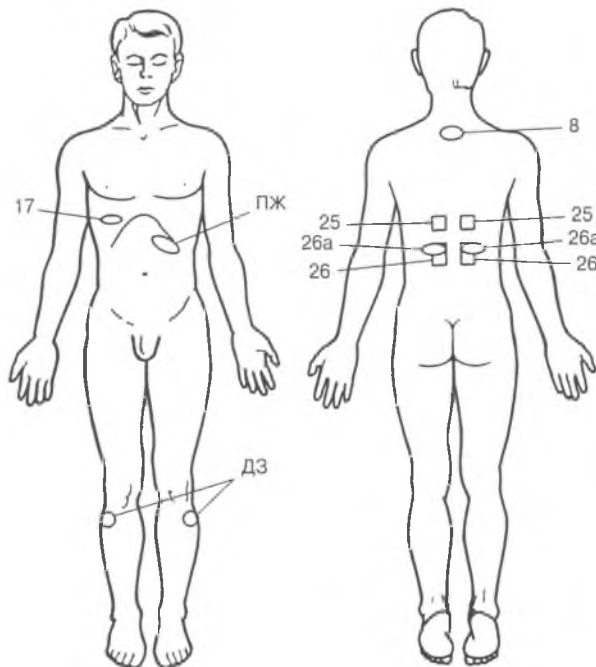
Day 2:

US – PL - Zone 17 (the projection of the liver).

MLT R - Zone 25 (the projection area D7-12 segmental innervation of the liver), D3 zone (additional area) AT 36.

MLT IR - Zone 17 (the projection of the liver), after the UST.

Influence zones		
US	MLT IR	MLT Rd
PS; 17	26,26a; 17	8; 25; D3





## K29 GASTRITIS, DUODENITIS

**Gastritis** - an inflammatory disease of the mucous membrane of the stomach.

Duodenitis - an inflammatory disease of the mucous membrane of 12 duodenal ulcer.

### **Etiopathogenesis**

Gastroduodenit is polyetiological disease.

Exogenous causes: H. pylori - a major factor; chemical (pesticide exposure); physical (receiving acute, cold or hot food); giardiasis.

Endogenous causes: increased acid production; reduce the formation of mucus; violation of the hormonal regulation of secretion; liver disease and biliary tract.

Pathogenesis of acute gastritis is possible to reduce damage to dystrophic necrotic surface layer glandular epithelium and gastric mucosa apparatus and development in these inflammatory processes. Depending on the etiology inflammatory process may be limited to the surface epithelium of the mucous membrane, or spread to the entire thickness of the glandular system, interstitial tissue and even muscle layer.

### **TREATMENT SCHEME:**

Exposure is carried out before a meal or 2 hours after a meal (alcohol and smoking are contraindicated, requires an appropriate diet).

5 minutes before the start of the procedure to drink 300 ml of liquid (phyto solutions, mineral water, etc.).

On the forward panel of the device we expose the parameters:

AMPLITUDE US, µm	MLT POWER rel., %	MODULATION, Hz	TIME, min
4-5	50-75	9,4	Total: US before 7 MLT – Not more 25.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 12-15.

Retreatment: if necessary, after 30 days.

Possible combination with other treatments:

- Diet therapy;
- Drug therapy;
- Herbal medicine;
- Psychological correction.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

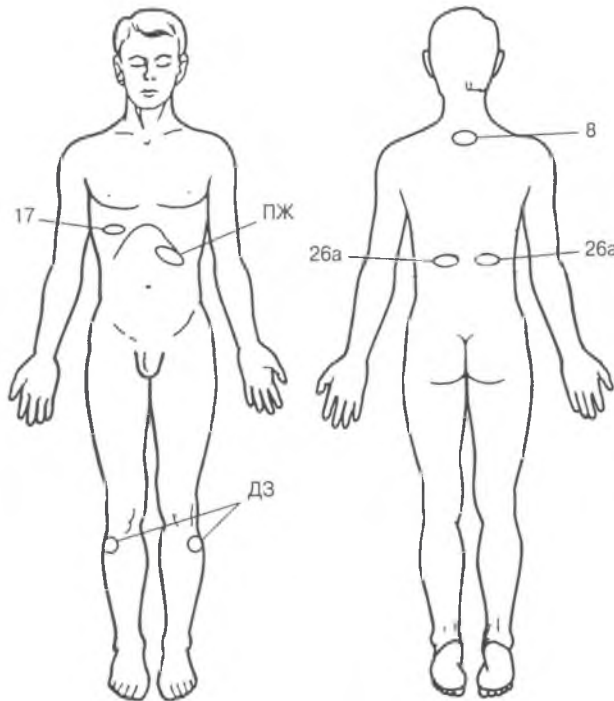
US - PS area (the projection of the stomach).

MLT R - Zone 8 (C8-D2 projection of the vertebral segments)

- D3 zone (the additional area, the epicenter of the AT 36).

MLT IR - 26a Zone (paravertebral, D 5-8 segmental innervation of the stomach area).

Influence zones		
US	MLT IR	MLT Rd
SP;	26a; 17	8; ДЗ



## K25 GASTRIC ULCER K26 DUODENAL ULCER

Peptic ulcer and 12 duodenal ulcer - chronic, prone to progression of disease characterized by the occurrence of ulcer in the gastric mucosa, and (or) 12 duodenal ulcer.

### **Etiopathogenesis**

The etiological structure of peptic ulcer:

- 1) hereditary constitutional factor;
- 2) exogenous factors (neuro-emotional stress, a violation of the regime of the day and meals);
- 3) endogenous factors (nerve reflex action on the stomach and duodenum from the other affected organs, as well as cardiovascular, urinary and endocrine systems.

Emerging with pathological vissero-visceral reflexes violate the regulation of gastroduodenal cause discoordination secretory and motor functions of the stomach and duodenum.

It is possible that a certain role in the pathogenesis of peptic ulcer disease and plays a violation of blood circulation, as well as autoimmune reaction caused by infection H. Pylori.

### **TREATMENT SCHEME:**

Exposure is carried out before a meal or 2 hours after a meal (alcohol and smoking are contraindicated, requires an appropriate diet).

5 minutes before the start of the procedure to drink 300 ml of liquid (phyto solutions, mineral water, etc.).

On the front panel of the machine exhibited procedure parameters:

AMPLITUDE US, $\mu$ m	MLT POWER rel., %	MODULATION, Hz	TIME, min
4-5	50-75	9,4	Total: US before 7 MLT – Not more 25.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Frequency of treatments: daily or every other day.

The number of procedures in the course of treatment up to 15.

Retreatment: if necessary, after 30 days.

Possible combination with other treatments:

- Diet therapy in conjunction with psychophysiological correction;
- Drug therapy;
- Phytotherapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Performing MLT Wires contact simultaneously with the UST. Inductors mounted on the projection of the pathological focus, paravertebrally in the zone of innervation of organs, on the area of the reflex zones or zone of the medulla oblongata.

Day 1:

US - PS area (the projection of the stomach).

MLT R - Zone 8 (paravertebral projection C8-D3).

MLT IR-26 zone (paravertebral, D10-D12 - segmental innervation area of the pancreas), 26a Zone (D5-D8 segmental innervation of the stomach area).

Day 2:

US - Zone 17 (the projection of the liver).

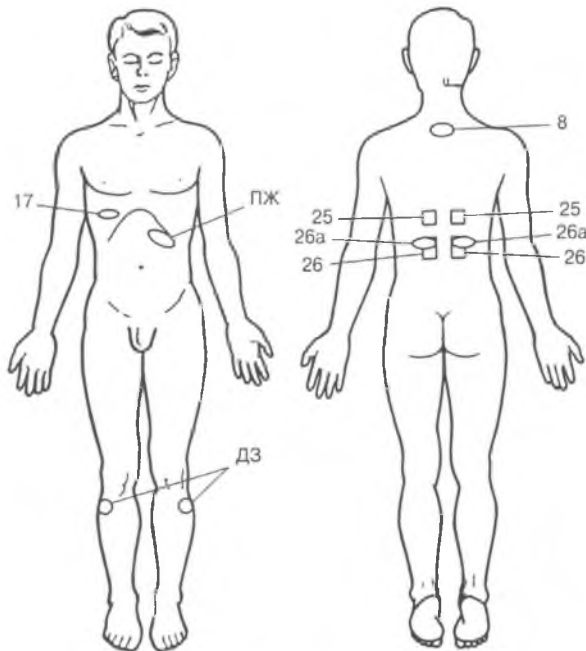
MLT R-25 zone (projection D7-D12 zone segmental innervation of the liver)

D-3 zone (additional zone, the epicenter of the AT 36).

MLT IR - Zone 17 (the projection of the liver), after the UST.

MLT Blue - Zone 17 (the projection of the liver), after the UST.

Influence zones		
US	MLT IR	MLT Rd
SP; 17	26; 26a; 17	8; 25; Д3



## K71 LIVER TOXICITY

**Nonspecific reactive hepatitis** - a disease caused by exogenous acute poisoning acute or chronic liver disease.

### **Etiopathogenesis**

Toxic liver damage is caused by various pathological processes (inflammation, necrosis, degeneration, abnormal regeneration of the liver) due to exposure to toxic substances, as well as in excess of the dose exposure to a substance.

The main groups of toxic agents: hepatotropic poisons, plant poisons, phenols, alcohols, etc., salts of heavy metals, poisons of biological origin (toxins), industrial and household chemicals...

Treatment is complex: MLT on fone active detoxification (plasmaphoresis, dialysis, biological) and conventional therapy. Indications for the MLT are hyperbilirubinemia in excess of 80 mmol / L and increase the level of enzymes ACT and ALT serum blood more than 5 times. At lower rates below 80% of prothrombin and fibrinogen - below 1.8 g / l Execution MLT impractical.

### **TREATMENT SCHEME:**

The front panel of the device exhibiting the following procedure parameters:

AMPLITUSE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
0	50-75	altern 37; 50 ate each day other	6 on one zone

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Methods of exposure: a stable, recommended zone.

This MLT R slow circular movements promoted by zones corresponding to the left and right lobes of the liver. MLT IR - placed under the patient paravertebrally motionless (right and left for 3 minutes).

MLT R - Zone 17 (the projection of the liver).

MLT IR - Zone 25 (paravertebral, D7-L2 segmental innervation zone of the liver).

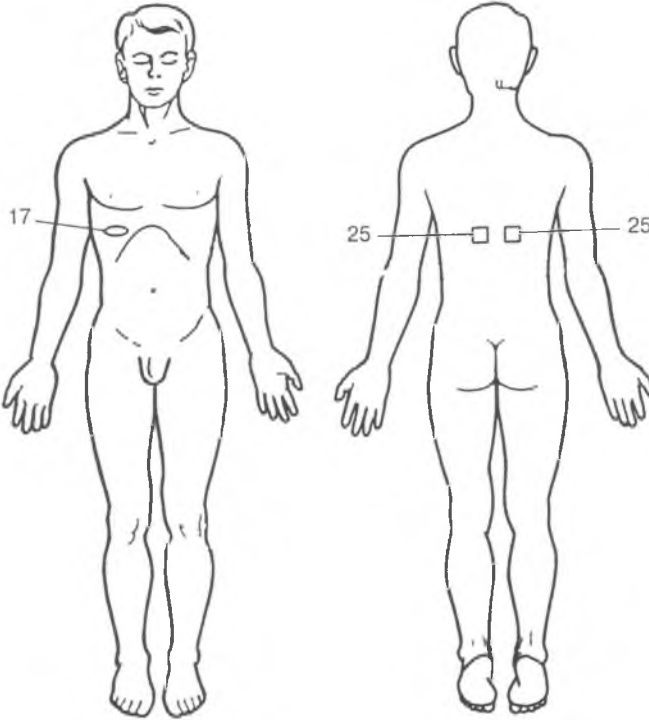
Frequency of treatments: daily.

Number of treatments: 6-12.

Possible combination with other treatments:

- Diet therapy;
- Drug therapy;
- Phytotherapy.

Influence zones		
US	MLT IR	MLT Rd
-	25	17



## K70 K70 CHRONIC HEPATITIS

**Chronic hepatitis** - a disease of inflammatory and degenerative nature of the liver.

### **Etiopathogenesis**

Established etiologic relationship of chronic viral hepatitis with acute viral hepatitis B, C, D, F and G. The development of chronic viral hepatitis is facilitated by such adverse factors as late hospitalization of patients with acute hepatitis, wrong treatment, premature statement, burdened premorbid background, and presence of concomitant chronic diseases, use of alcohol, drugs, and superinfection by other hepatotropic viruses, such as delta virus infection with HBV.

The leading mechanism of liver injury in chronic viral hepatitis is the interaction between virus-containing immune cells with hepatocytes. Patients with chronic hepatitis noted the inadequacy of the immune response, resulting in antigen recognition process on the surface of hepatocytes and their elimination is disturbed and sometimes becomes impossible.

Treatment is complex: MLT on background active of detoxification (plasmapheresis, dialysis, biological) and conventional therapy.

### **TREATMENT SCHEME:**

The front panel of the device exhibiting the following procedure parameters:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
0	50-75	37- 50 (1-3 sessions) 77 (4-10 sessions)	10 (3 on the zone)

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Frequency of treatments: daily.

Number of treatments: from 10-12.

Repeated course of treatment: 2-3 weeks.

Possible combination with other treatments:

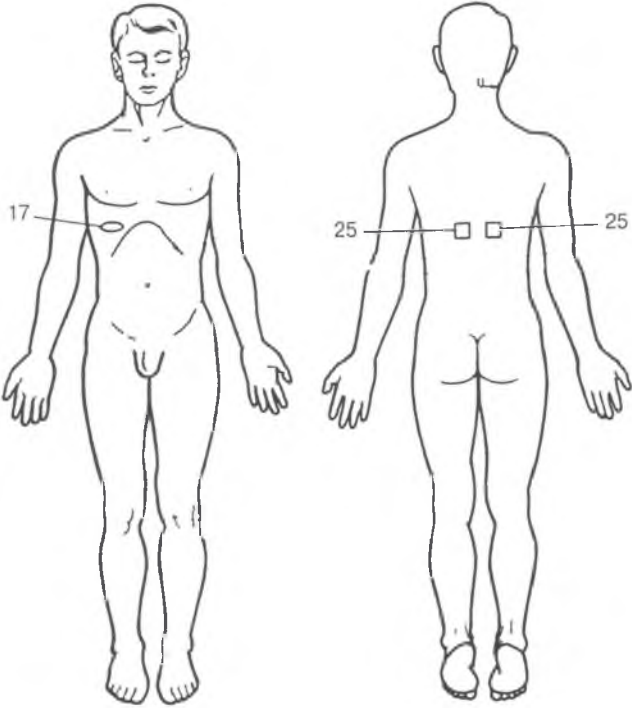
- Diet therapy;
- Drug therapy;
- Herbal medicine;
- Laser reflexology.

Methods of exposure: stable at the recommended zone.

MLT IR slow circular movements move by zones corresponding to the left and right lobes of the liver. MLT Cr - placed under the patient paravertebrally motionless (right and left for 3 minutes).

MLT Rd - Zone 25 (paravertebral, D7-L2 segmental innervation zone of the liver).  
MLT IR - Zone 17 (the projection of the liver).

Influence zones		
US	MLT IR	MLT Rd
-	17	25





## K82.8 DYSKINESIA OF CYSTIC DUCT OR GALLBLADDER

**Biliary dyskinesia** - biliary excretion system disorders characterized by a change in the tone of the gallbladder, bile ducts and sphincters, manifest violation of the outflow of bile into the duodenum, accompanied by the appearance of pain in the right upper quadrant.

### **Etiopathogenesis**

The leading role in the development of dysfunctional disorders belongs to psycho-emotional overload, stressful situations. Secondary dysfunctional disorders more likely to occur when hormonal disorders: may be due to a decrease in muscle mass and a decrease in sensitivity syndrome, premenstrual tension, pregnancy, systemic diseases, hepatitis and cirrhosis of the liver, diabetes, inflammation, calculi in the gall bladder, etc. The decrease of the contractile function of the gallbladder. receptor apparatus to neurohumoral stimulation.

### **TREATMENT SCHEME:**

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors set (stable) on a projection of pathological hearth, or in para vertebral reflex zones and the zone of the medulla oblongata.

The front panel of the device exhibiting the following procedure parameters:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
0	50-75	37- 50 (1-3 sessions) 77 (4-10 sessions)	10 (3 on one zone)

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: from 10-12.

Repeated treatment: if necessary, in a month.

Possible combination with other treatments:

- Diet therapy;
- Drug therapy;
- Herbal medicine;
- Ultrasound puncture.

Methods of exposure: a stable or labile recommended zone.

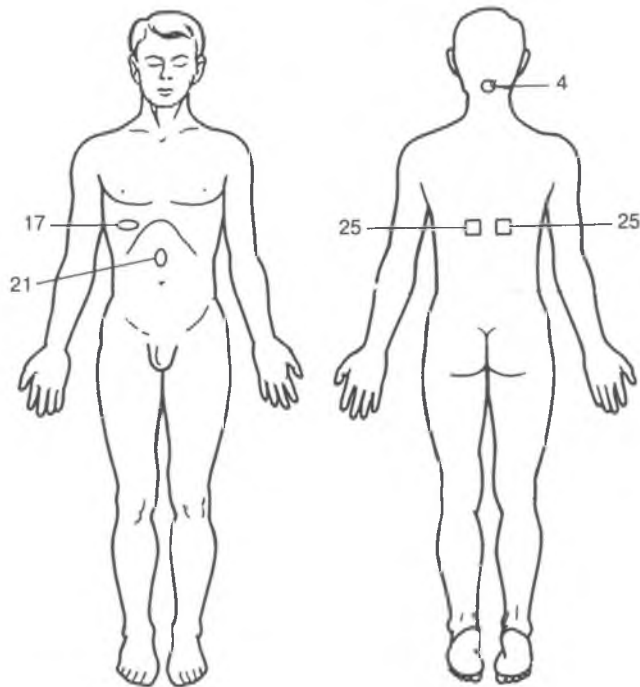
US - Zone 17 (right upper quadrant)

- Area 21 (epigastrium - epigastric pain point).

MLT R - Zone 4 (zone of the medulla oblongata).

MLT IR - Zone 25 (paravertebrally, D7-L2 segmental innervation zone of the liver).

Influence zones		
US	MLT IR	MLT Rd
17, 21	25	4



## K 86.0 CHRONIC PANCREATITIS

**Chronic pancreatitis** - a progressive inflammatory disease of the pancreas accompanied by severe violation of its functions.

### **Etiopathogenesis**

The most common causes of chronic pancreatitis are diseases of the stomach, duodenum, liver, gallbladder and biliary tract (hepatitis, cirrhosis, cholecystitis, cholangitis, duodenitis, peptic ulcer disease, particularly ulcer penetrating the pancreas). Chronic pancreatitis occurs in almost 30% of patients undergoing cholecystectomy. Among the reasons for it should be noted nutritional disorders and changes in fat metabolism (errors in diet, alcohol); intoxication, poisoning; changes in the ductal system of the pancreas (primary tumor, stricture, metaplasia of the epithelium of the excretory ducts); contusions pancreas; acute and chronic infections.

An important role in the pathogenesis of chronic pancreatitis plays intraorganic activation of enzymes (protease and lipase) damaging the prostate tissue. Contributing moments for the development of chronic pancreatitis is stagnant secretions caused by a mechanical obstacle in its excretory ducts.

Pathogenesis. Chronic pancreatitis causes severe disorders of parietal digestion and absorption, disruption of metabolism of proteins, fats and carbohydrates.

### **TREATMENT SCHEME:**

At all stages of the disease may conduct MLT, except when needed emergency surgery, including the gallbladder.

*ATTENTION!*

*The impact of ultrasound on the projection area of the pancreas is not recommended for pancreatitis!*

The front panel of the device exhibiting the following procedure parameters:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
0	50-70	37- 50 77 (on pain zones)	MLT – 15

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Frequency of treatments: daily.

Number of treatments: from 10-12.

Repeated treatment: if necessary after 2 weeks.

Possible combination with other treatments:

- Diet therapy;
- Drug therapy;

- Phytotherapy.

Methods of exposure: stable at the recommended zone.

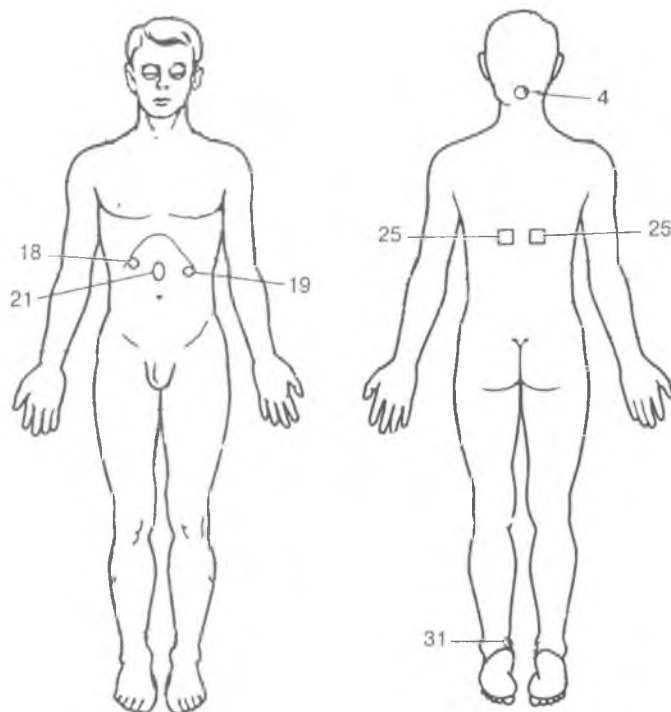
Impact MLT inductors set (stable) on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

MLT R - Zone 4 (zone of the medulla oblongata)

- Area 37 (between the inner ankle and Achilles tendon attachment place the left foot).

MLT IR - Zone 25 (paravertebrally, D10- D12 segmental innervation area of the pancreas).

Influence zones		
US	MLT IR	MLT Rd
-	18, 19, 21, 25	4, 31



## K81 CHOLECYSTITIS (non-calculous)

**Chronic cholecystitis** - chronic inflammation of the gallbladder, which occurs when the penetration of various mikobov of 12 tiperstnoj, as well as blood and lymphatic vessels from different foci of infection in the body.

### Etiopathogenesis

Chronic nekalkulězny (without stones) cholecystitis - is a chronic inflammation of the gallbladder, usually combined with motor-tonic disorders biliary system, but is not accompanied by the formation of gallstones.

Causes of chronic cholecystitis nekalkulěznogo may be conditionally pathogenic microbial flora (Escherichia, streptococci, staphylococci, rarely Proteus, Pseudomonas aeruginosa, enterococci).

Predisposing conditions is the stagnation of bile in the bile ducts and gall stones, worms. Symptoms typical of cholecystitis: paroxysmal pain in the right upper quadrant extending to the right shoulder and the shoulder; yellowness; severity of epigastric bloating, nausea, belching.

### TREATMENT SCHEME:

The front panel of the device exhibiting the following procedure parameters:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-4	50-70	2,6	Y3 – 7; MLT – 10

### METHOD OF TREATMENT

Position of the patient - lying on your back / sitting.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 8-12.

Repeated treatment: if necessary after 2 weeks.

Possible combination with other treatments:

- Diet therapy;
- Drug therapy;
- Herbal medicine;
- Ultrasound puncture.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors set (stable) on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

US - Zone 17 (the projection of the liver, right upper quadrant)

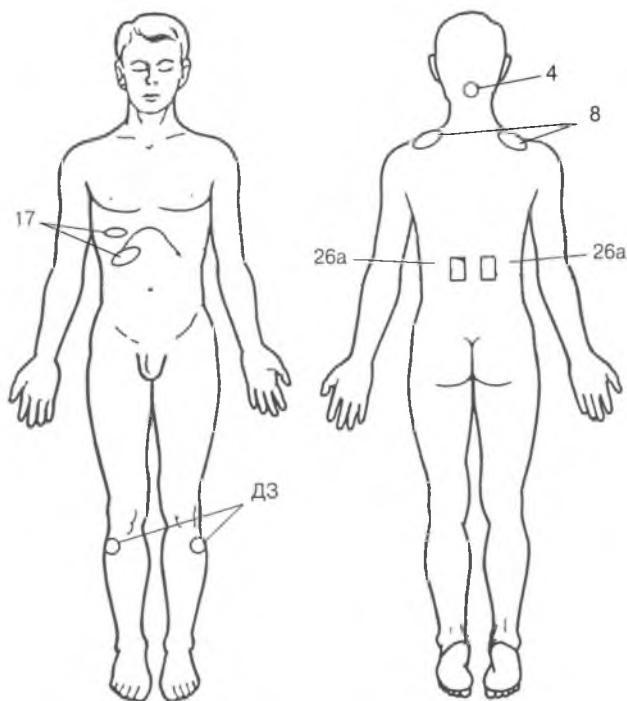
- Zone 8 (shoulder girdle).

MLT R - Zone 4 (zone of the medulla oblongata)

- DMZ zone (the additional area, the epicenter of an acupuncture point E36).

MLT IR - 26a Zone (paravertebrally, D7- L2 segmental innervation area of the gall bladder).

Influence zones		
US	MLT IR	MLT Rd
17, 8	26a	4, Д3



## K 59.0 CONSTIPATION (OTHER FUNCTIONAL INTESTINAL DISORDERS)

**Constipation** is a violation of bowel function, resulting in an increase intervals between acts of defecation in comparison with the individual norm or systematically inadequate bowel movement.

### Etiopathogenesis

Constipation is caused by violation of the processes of formation and promotion of stool through the intestines. The main causes are intestinal motility disorders, weakening of the urge to defecate, changes in anorectal and pelvic floor. It must also be considered as etiopathogenic factors anamnestic moments: in childhood - lack of training health defecation, resulting in growing fear of defecation; into adulthood - an increased level of anxiety, the presence of stress factors.

### TREATMENT SCHEME:

The front panel of the device exhibiting the following procedure parameters:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-4	75-99	3,8; 7,8; 65	Y3 -5-7 MLT - 10

### METHOD OF TREATMENT

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: every other day.

Number of treatments: 10.

Repeated treatment: if necessary, in a month.

Possible combination with other treatments:

Maximum efficiency is achieved by pre and post acupuncture balneotherapy as well.

- Diet therapy;
- Drug therapy;
- Herbal medicine;
- Ultrasound puncture.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors set (stable) on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

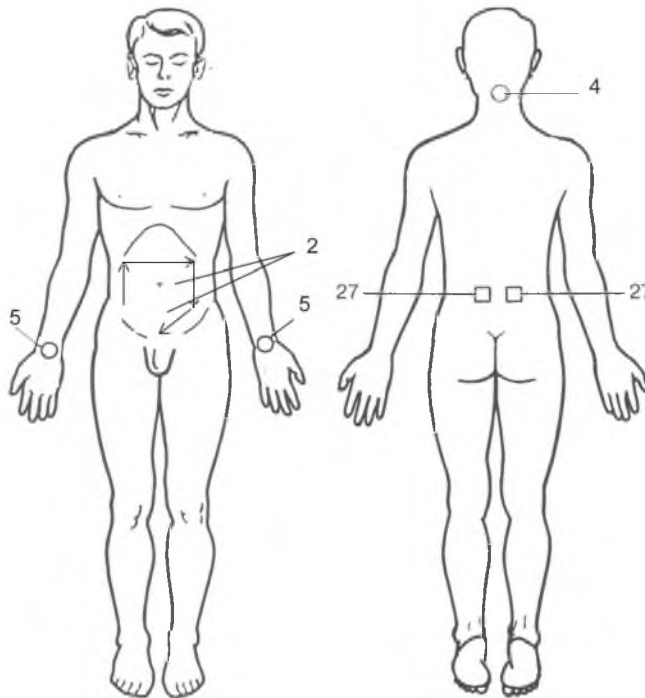
US - Zone 2 (in the direction of the colon).

MLT R - Zone 4 (zone of the medulla oblongata)

- Zone 5 (wrist crease on the right / left).

MLT IR - Zone 27 (paravertebrally, D8- L1 band segmental innervation of the colon).

Influence zones		
US	MLT IR	MLT Rd
2	27	4, 5





## J00-J99 RESPIRATORY DISEASES

### A15-A19 PULMONARY TUBERCULOSIS

**TB** - an infectious disease characterized by the formation in the affected tissue specific inflammation foci and expressed the general reaction of the organism. Pathogen - mycobacterium tuberculosis. The main source of infection - the sick people.

#### **Etiopathogenesis**

The causative agent of tuberculosis is the tubercle bacillus or Mycobacterium tuberculosis. It retains its activity for a long time on the objects (clothing, utensils, etc.), Resistant to acids and many disinfectants. The main source of infection is a sick person or a sick animal. The main route of infection - airborne.

#### **TREATMENT SCHEME:**

The front panel of the device exhibiting the following procedure parameters:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	75-99	9,4	Y3 -12; MLT - до15

#### **METHOD OF TREATMENT**

Position of the patient - lying on his stomach with UST paravertebral zones; lying on his back at UST field caverns.

Position transmitter: contact.

Frequency of treatments: 1-2 days.

Number of treatments: 15.

Repeated treatment: spend 1-3 rate intermittently 1.5-2 months.

Possible combination with other treatments:

- Specific anti-TB therapy;
- Drug therapy;
- Phytotherapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors set (stable) on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

US - Zone 23 (paravertebrally, D2 - D5 segmental innervation of the lung area)

- Area 16 (the projection of possible tuberculosis foci).

MLT R - Zone 15 (the projection of the thymus gland)

- Area 12 (subclavian fossa)

- Area 11 (ulnar fovea)

- Area 20 (the projection of the spleen)

- Area 10 (palmar surface of hands).

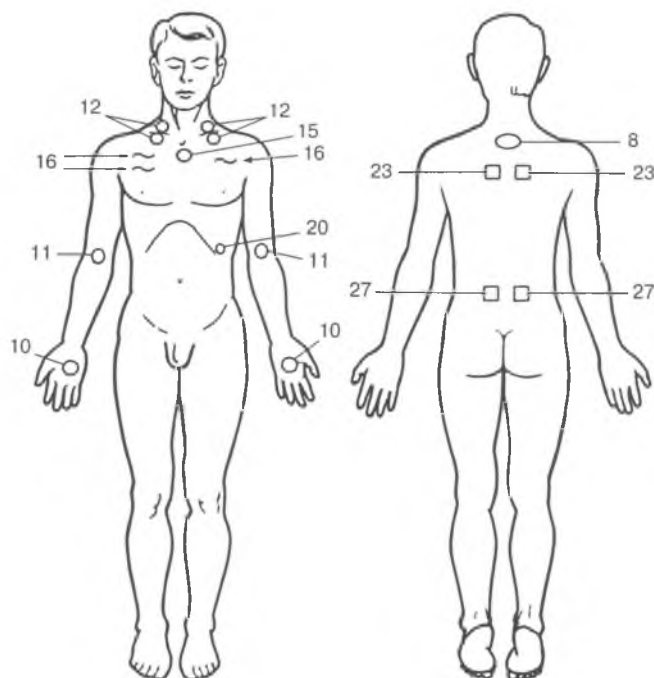
MLT IR - Zone 8 (projection C7 vertebrae segments - D2),

- Area 27 (paravertebrally, D11 - L1 segmental innervation zone of the kidney and adrenal gland).

*ATTENTION!*

*Usually a single session using 3-4 zones 1-2 zones for the impact of US and 1-2 zones for the impact of MLT.*

Influence zones		
US	MLT IR	MLT Rd
16, 23	27; 8	15; 12; 20; 11; 10.



## J42 CHRONIC BRONCHITIS UNSPECIFIED

**Chronic bronchitis, (CB)** - a long, usually progressive, inflammation of the bronchial tree, manifested by cough, sputum, shortness of breath.

### **Etiopathogenesis**

The etiology of chronic bronchitis is focus on the long-term effect by infectious agents (viruses influenza, adenovirus, Mycoplasma, Pneumococcus, polyutantov (volatiles) - tobacco smoke, exhaust and of not indifferent dust, which provide mechanical and chemical effects on the bronchi and bronchial mucosa. In the pathogenesis of CB matter are secretory disorders of protective function of bronchi, and mucociliary clearance (bronchi purification) arising under the influence of polyutantov.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	75-99	9.4 obstructive bronchitis 8.0 bronchitis wheeze	US -12; MLT - до15

### **METHOD OF TREATMENT**

Position of the patient - lying.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 10-12.

Repeated treatment: spend 1-3 exchange rate intermittently 1.5-2 months.

Possible combination with other treatments:

- Drug therapy;
- EHF-puncture; electrophoresis of 0.1% solution izotsima bilaterally.
- Phytotherapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors set (stable) on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

### **ATTENTION!**

*Thorax divided into six fields: the right and left front, right and left rear side and 2.*

*Usually 2 field is used for one session for the impact of UST (excluding the region of the sternum and the heart) and 2 zones for the impact of MLT.*

1 Day

UST - Zone 1 (the right and left field in front of the chest).

MLT R - Zone 4 (zone of the medulla oblongata).

MLT IR - Zone 23 (paravertebrally, D3 - D6 area segmental innervation of the bronchi).

2nd day

UST - Zone 2 (the right and left field back of the chest).

MLT Red - Zone 15 (the projection of the thymus gland).

IRL - Zone 4 (zone of the medulla oblongata).

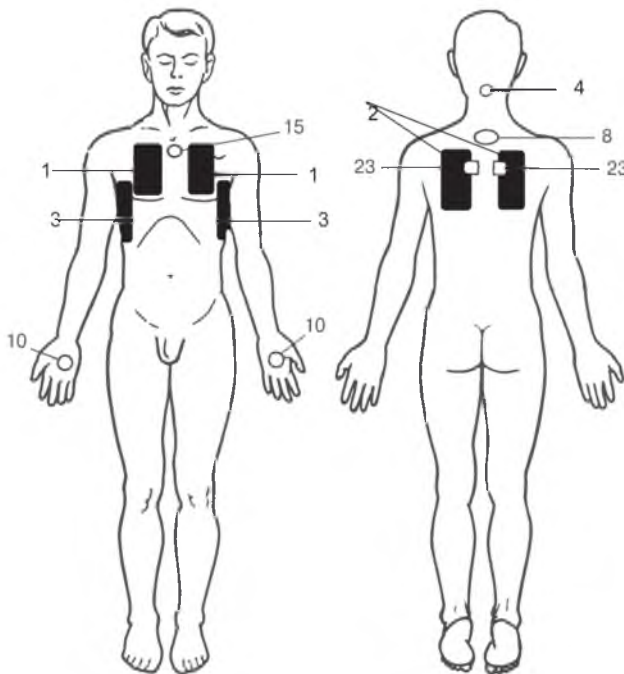
3rd day

UST - Zone 3 (the right and left field side of the chest).

MLT Red - Zone 10 (palmar surface of the hand).

MLT IR - Zone 8 (C8 projection D2 vertebral segments).

Influence zones		
US	MLT IR	MLT Rd
1; 2; 3	4; 8; 23	4; 10; 15



## J18 PNEUMONIA

**Pneumonia** - inflammation of infectious origin, manifested organic and functional lesions of the bronchi, and interstitial parenchymal tissue, blood and lymph vessels of the lungs.

### **Etiopathogenesis**

The most common cause - Gram-positive bacteria: pneumococci (from 40 to 60%), Staphylococcus (from 2 to 5%), streptococci (2.5%); Gram-negative bacteria: bacillus Friedlander (from 3 to 8%), Haemophilus influenzae (7%), viral and fungal infections. Also pneumonia may develop from exposure of non-infectious factors on chest: ionizing radiation, toxins, allergic agents.

The pathogens Infectious pneumonia penetrate into the lungs bronchogenic, hematogenous or lymphogenous ways. When having a reduced bronchopulmonary protective barrier in the alveoli, develop infectious inflammation, which through interalveolar the permeable walls extend to other departments of the lung tissue. The alveoli formed exudate, which preventing the gas exchange oxygen between the lung tissue and blood vessels. After are developing the oxygen failure and respiratory failure, and in complicated pneumonia - heart failure.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	75-99	75; 80	УЗ - 3 on one area, до 12 totally; MLT - 15

### **METHOD OF TREATMENT**

Position of the patient - lying.

Position transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 8-12.

Repeated treatment: spend 1-3 rate intermittently 1.5-2 months.

Possible combination with other treatments:

- Drug therapy;
- EHF-puncture;
- Phytotherapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors set (stable) on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

Thorax divided into six fields: the right and left front, right and left rear side and 2.

Usually 2 field is used for one session for the impact of UST (excluding the blasts of the sternum and the heart) and 2 zones for the impact of MLT.

UST - Zone 1 (the right and left field in front of the chest)

- Zone 2 (the right and left field back of the chest)

- Zone 3 (the right and left field side of the chest).

MLT R - Zone 15 (the projection of the thymus gland)

- Zone 4 (zone of the medulla oblongata)

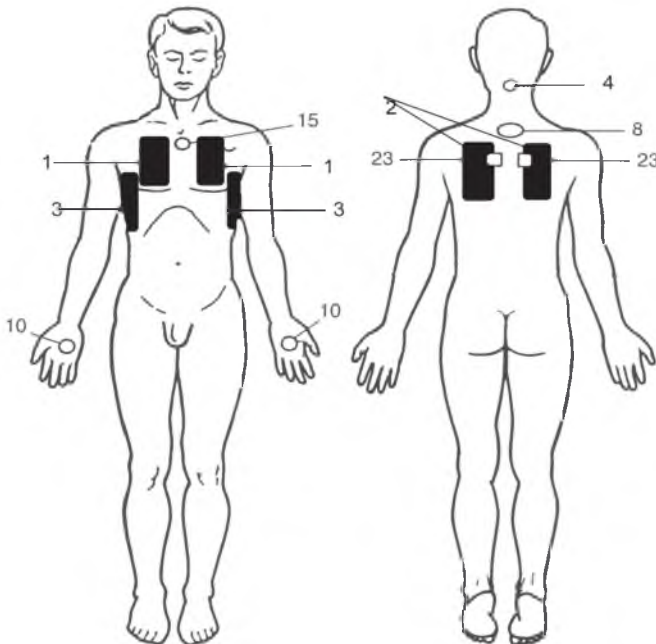
- Area 10 (palmar surface of the hand).

MLT IR - Zone 23 (paravertebrally, D3 - D6 area segmental innervation of the bronchi)

- Zone 4 (zone of the medulla oblongata).

- Zone 8 (C8 projection D2 vertebral segments)

Influence zones		
US	MLT IR	MLT Rd
1; 2; 3	4; 8; 23	4; 10; 15



## J.45 BRONCHIAL ASTHMA

**Bronchial asthma** - allergic or infectious and allergic disease, manifested periodically by advancing attacks of breathlessness, having different strength and duration (from several hours to several days).

### **Etiopathogenesis**

The emergence of an attack is caused by spasm of the bronchial tubes, mucous membrane swelling and obstruction of discharge of mucus secreted in abundance. Infectious agents also are an important component in the pathogenesis of asthma, since microorganisms, their metabolic products can act as allergens causing sensitization. In addition, continuous contact supports infection inflammation of the bronchial tree in the active phase, which reduces the body's sensitivity to exogenous allergens.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	75-99	8,0	US - 2 times zone № 5; 2 times zone № 16; 30 sec. - zone № 12. MLT - 10 -15

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: in the acute phase - daily, while improving the state - in a day.

Number of treatments: 10.

Repeated treatment in a month.

Possible combination with other treatments:

- Drug therapy;
- Laser and EHF-puncture;
- physiotherapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed via the contact medium - 2% novocaine lanolin ointment; hydrocortisone.

Impact MLT carried out simultaneously with a contact UST. Inductors set (stable) on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

UST - Zone 5 (projection sleepy glomus - side of the neck)

- Area 12 (subclavian area)

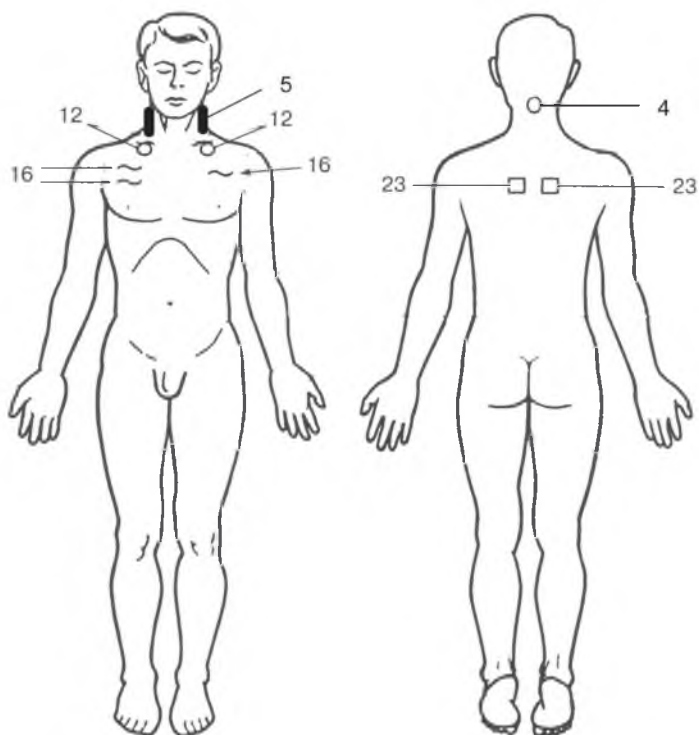
- A zone 16 (6-8 intercostal space on the left and right).

Zones number 5 and 12 to alternate every other day.

MLT Red - Zone 4 (zone of the medulla oblongata).

MLT IR - Zone 23 (paravertebrally, D3 - D6 area segmental innervation of the bronchi).

Influence zones		
US	MLT IR	MLT Rd
5; 12; 16	23	4





## J01 ACUTE SINUSITIS (ANTRITIS)

**Sinusitis** - inflammation of the maxillary (maxillary paranasal) sinuses. It is accompanied by difficulty of nasal breathing, muco-purulent nasal passages, intense pain in the nose and wings of the nose, swelling of the cheeks and a century from the defeat, rise in body temperature.

### **Etiopathogenesis**

Polyetiology disease, which is based on a whole range of reasons. Sinusitis develops due to decreased protective function of the mucous membrane of the paranasal sinuses and nasal cavity disorders, general and local immunity. A considerable role in morbidity can play anatomical factors (congenital or traumatic deformity of the nasal septum, polypous growths in the nasal cavity), climatic factors. The inflammatory process may be potentiated both bacterial (streptococcus, Haemophilus influenzae, Moraxella, E. coli), and viral (adenovirus, parainfluenza, respiratory syncytial virus) microflora. It is believed that the nasal septum deformation sooner or later entail a violation of air circulation in the paranasal sinuses, which prevents the removal of these mucus. The oxygen partial pressure decreases. All this reduces protection of mucosal nasal against the penetration of infections.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	75-99	2,5	UST – 3-5 on the sinuses, MLT - 10-15

### **METHOD OF TREATMENT**

Position of the patient - lying.

Position transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 8-10.

Repeated treatment: 1,5-2 months.

Possible combination with other treatments:

- Drug therapy;
- Laserpuncture;
- Phytotherapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through the contact medium (water lens, medication, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors set (stable)

on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

UST - Zone 7 (projection of the maxillary sinus to the right / left).

MLT R - Zone 15 (the projection of the thymus gland)

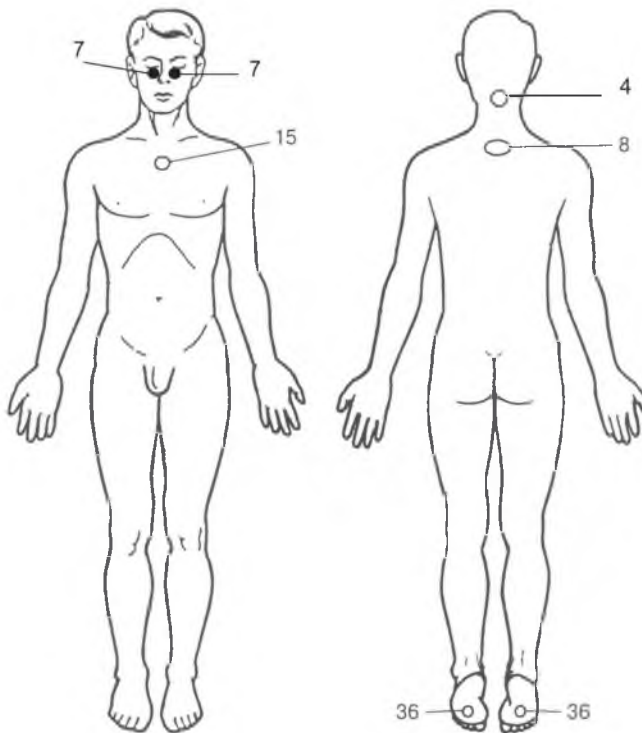
- Area 36 (the plantar surface of the foot).

MLT IR - Zone 4 (zone of the medulla oblongata)

- Zone 8 (C8 projection D2 vertebral segments).

Chance of phonophoresis of hydrocortisone, aloe, FIBS

Influence zones		
US	MLT IR	MLT Rd
7	4; 8;	15, 36



## J01 ACUTE SINUSITIS (FRONTAL SINUSITIS)

Frontitis is an inflammation of frontal sinus.

### **Etiopathogenesis**

The infection (bacterial, virus, fungal) getting into bosoms from a nose at acute cold (rhinitis) is the reason of acute frontitis. Most often the acute frontitis develops as complication after flu and ARVI, and also some infectious diseases (scarlet fever, diphtheria, etc.). Among other reasons are the injuries of a nose and perirhinal bosoms.

Procedures with the use of the device HELIOS reduce puffiness, promote increase in outflow of contents of a bosom, and accelerate recovery. Procedures are appointed in a chronic stage

### **TREATMENT SCHEME:**

On the forward panel of the device we expose the parameters:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	50-75	8,0	US – up to 10 totally MLT - up to 15 totally

### **METHOD OF TREATMENT**

Position of the patient - lying.

Position transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 8-10.

Repeated treatment: 1,5-2 months.

Possible combination with other treatments:

- Drug therapy;
- Laserpuncture;
- Phytotherapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through the contact medium (water lens, medication, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors set (stable) on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

UST - Zone 7 (projection of the maxillary sinus to the right / left).

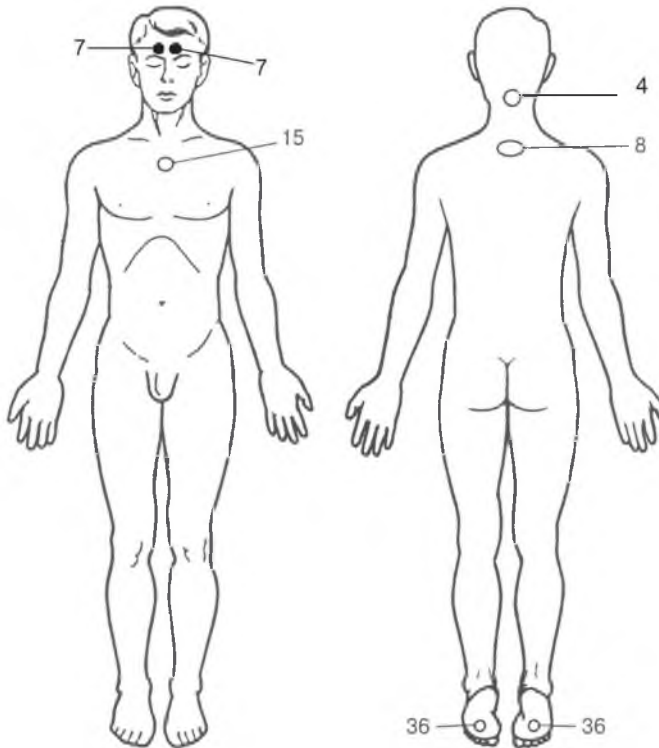
MLT R - Zone 15 (the projection of the thymus gland)

- Area 36 (the plantar surface of the foot).

MLT IR - Zone 4 (zone of the medulla oblongata)

- Zone 8 (C8 projection D2 vertebral segments).  
 Chance of phonophoresis of hydrocortisone, aloe, FIBS.

Influence zones		
US	MLT IR	MLT Rd
7	4, 8	15, 36



## J03 ACUTE TONSILLITIS

**Tonsillitis** - inflammation of the tonsils.

### **Etiopathogenesis**

Polietiologichesky disease, the pathogenesis of which is largely determined by the state of immunological activity of lymphoid tonsil tissue.

The occurrence of inflammation of the tonsils caused by a bacterial infection, failure of immunological defense mechanisms of the tonsils.

A significant role in the pathogenesis of chronic tonsillitis has: intoxication, general and local cooling, poor nutrition, poor working and living conditions. Of decisive importance in the origin and development of tonsillitis belongs reactive change the body's ability.

Predisposing factors of tonsillitis include:

- recurrent acute tonsillitis,
- presence of chronic foci of inflammation in the oral cavity,
- presence of foci of chronic inflammation of the nose,
- presence of chronic foci of inflammation of the paranasal sinuses

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	50-75	2,9	US - 2-3 on zone, MLT - to 15 totally

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 3-7.

Re-treatment: 2 months.

Possible combination with other treatments:

- Drug therapy;
- Laser-puncture;
- Phytotherapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly through the contact medium (drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors set (stable) on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

*ATTENTION!*

UST - 6a zone (area of the jugular notch to the right / left)

- Zone 6 (submandibular area below the angle of the mandible).

MLT R - 15 area (the projection of the thymus gland)

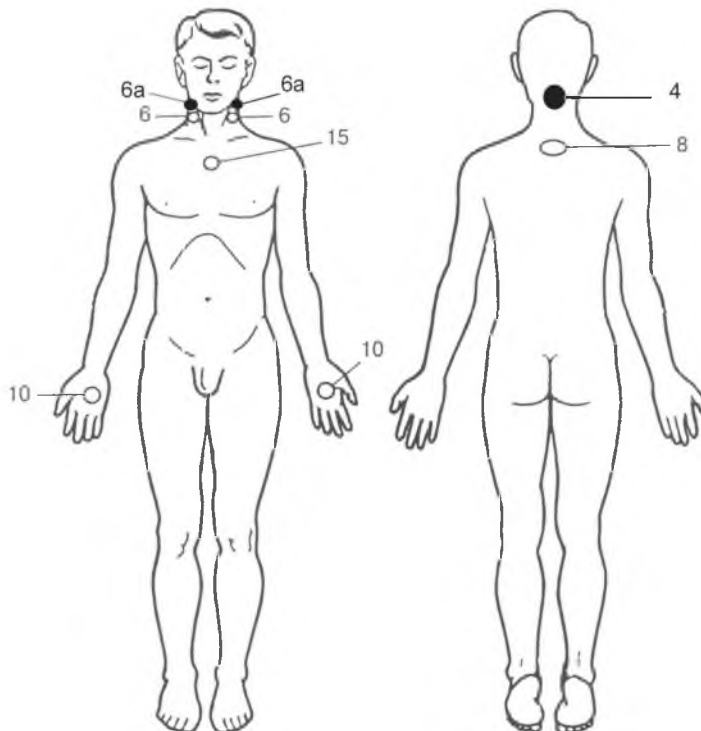
- 10 zone (palmar surface of hands).

MLT IR - 4 zone (zone of the medulla oblongata)

- Zone 8 (projection of the vertebral segments C8 D2).

Chance of phonophoresis of hydrocortisone, aloe juice

Influence zones		
US	MLT IR	MLT Rd
6, 6a	4; 8	15, 10



## **100 ACUTE NASOPHARYNGITIS (RHINITIS)**

**Rhinitis** - characterized by constant discharge of mucus from the nose, from time to time coming difficulty of nasal breathing, because the nasal mucosa is often thickened, growing that often leads to a narrowing of the nasal passages.

Etiopathogenesis

Acute rhinitis is often one of the symptoms of infectious diseases (acute respiratory disease, SARS, influenza, whooping cough, scarlet fever, measles, mumps, and others.), At least - it appears as a distinct disease with the direct effect on the mucous membrane of the nasal cavity infections, thermal, mechanical, chemical, stimuli.

The main value in the occurrence of the common cold has reduced total and local reactivity of the organism, violation of protective neuromuscular reflex mechanisms.

Contributing factors in the majority of cases is a cooling of the total or parts of the body.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	50-75	2,5	US - 5 totally MLT - 10 totally

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 10.

Re-treatment: 2 months.

Possible combination with other treatments:

- Drug therapy;
- Laser-puncture;
- Fitoorosheniya.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is carried out directly via the contact medium - water lens).

Impact MLT carried out simultaneously with a contact UST. Inductors set (stable) on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

**ATTENTION!**

*Hyperplastic and atrophic rhinitis usually spend phonophoresis of hydrocortisone, peloidin, splenin (with atrophic form); hydrocortisone or chymotrypsin lidazy (in hyperplastic form). To improve the absorbability of drugs added to the medium in contact dimexide (Dimexidum 2.6 g per 100 ml of distilled water).*

UST - Zone 2 (rest and nose rays).

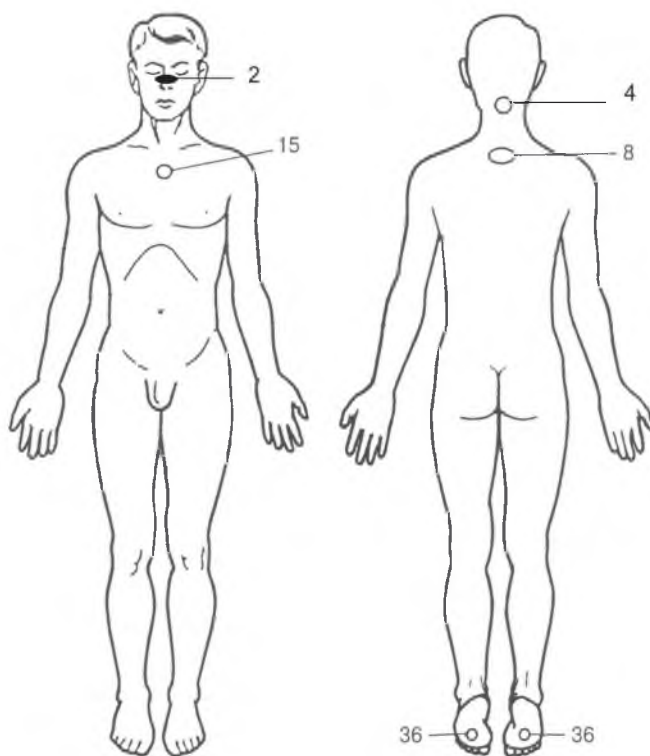
MLT R - Zone 15 (the projection of the thymus gland)

- Area 10 (palmar surface of hands).

MLT IR - Zone 4 (zone of the medulla oblongata)

- Zone 8 (C8 projection D2 vertebral segments).

Influence zones		
US	MLT IR	MLT Rd
6, 6a	4, 8	15, 10





## J31.2 CHRONIC PHARYNGITIS

**Chronic pharyngitis** is a chronic inflammation of pharyngeal mucosa.

Symptoms: feeling of irritation, a foreign matter in a throat, moderate pain when swallowing, a congestion of the large number viscous mucous separated that causes the necessity to clear the throat or expectorate constantly.

### **Etiopathogenesis**

Development of disease is caused by local long irritation of a mucous membrane of a throat. Developing of chronic pharyngitis is promoted by repeated acute inflammations of a throat, chronic tonsillitis, long-lasting inflammatory diseases of a nose and perirhinal sinuses, and violation of nasal breath.

The hypertrophic form of pharyngitis is characterized by a thickening of all layers of a mucous membrane, increase in number of ranks of an epithelium. The mucous membrane becomes thicker and more dense, blood and lymphatic vessels are expanded, in perivascular space lymphocytes are defined. The lymphoid educations disseminated through a mucous membrane are normal in the form of hardly noticeable granules, considerably are thickened and extend: there is a hyper secretion.

Sharp thinning and dryness of a mucous membrane of a throat is characteristic of atrophic chronic pharyngitis; in the expressed cases it shining «varnished». The size of mucous glands and their number are reduced; the desquamation of an epithelial cover is observed.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	50-75	9,5	US - 10 totally MLT - 10 totally

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 6-10.

Repeated treatment in a month.

### **ATTENTION!**

MLUST combine electrophoresis followed by 0.5% zinc sulfate (+) by the electrophoresis method larynx.

Possible combination with other treatments:

- Drug therapy;
- Laser-puncture;

- Phytotherapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed via the contact medium (water glass, petroleum jelly, ultrasound gel, medication, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors set (stable) on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

UST - Zone 3 (larynx).

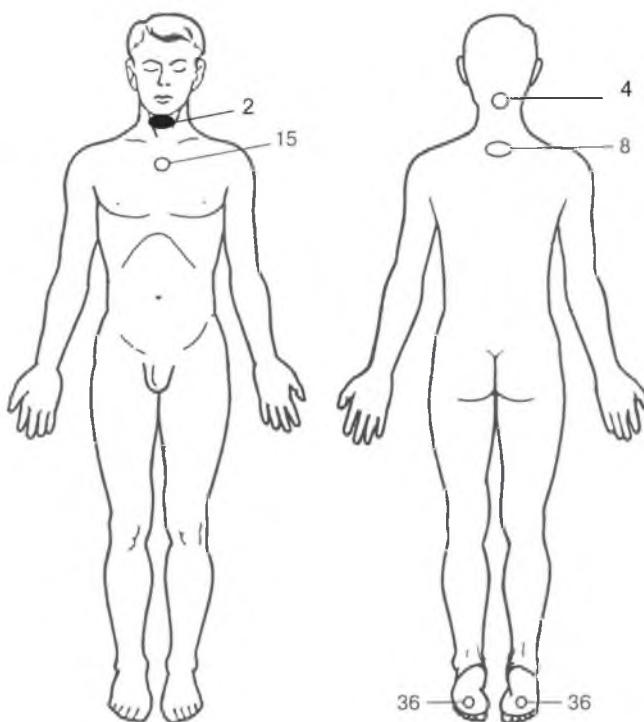
MLT R - Zone 15 (the projection of the thymus gland)

- Area 10 (palmar surface of hands).

MLT IR - Zone 4 (zone of the medulla oblongata)

- Zone 8 (C8 projection D2 vertebral segments)

Influence zones		
US	MLT IR	MLT Rd
3	4; 8	15, 10



## J37 CHRONIC LARYNGITIS AND TRACHEITIS

**Chronic laryngotracheitis** - chronic inflammation of the mucosa of the larynx and trachea, with accompanying inflammation of other portions of the upper respiratory tract (nose, pharynx).

### **Etiopathogenesis.**

In the event of chronic laryngotracheitis matter:

- Repetitive and untreated acute inflammatory diseases of the larynx,
- The presence of chronic foci of the upper and the lower respiratory tract inflammation,
  - Infectious diseases,
  - Occupational hazards (chemical irritants, dust, overvoltage votes, vapors, gases, dry air)
  - Sharp temperature fluctuations,
  - Tobacco smoke and alcohol.
  - Disorders of blood circulation and metabolism,
  - Degenerative disorders
  - Allergic condition of the body.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	50-75	9,5	US - 5 totally MLT - 15 totally

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 7-12.

Repeated treatment in a month.

**ATTENTION!**

The drug at phonophoresis - hydrocortisone.

Possible combination with other treatments:

- Drug therapy;
- Aerosol;
- Balneotherapy.

Methods of exposure: labile and stable in the recommended areas.

Impact UST is performed via the contact medium (water glass, petroleum jelly, ultrasound gel, medication, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors set (stable) on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

UST - Zone 3 (larynx)

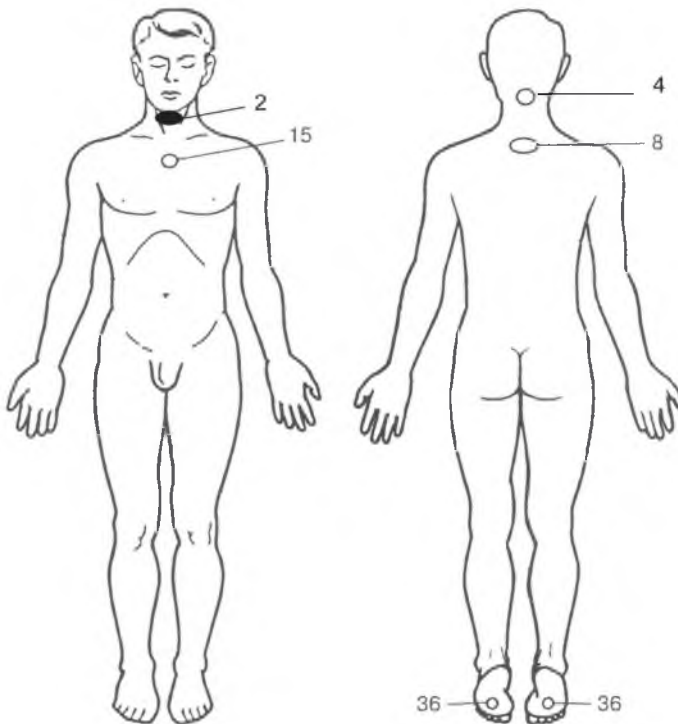
- Zone 9 (the side surface of the thyroid cartilage).

MLT R - Zone 15 (the projection of the thymus gland)

- Area 36 (the plantar surface of the foot).

MLT IR - Zone 8 (C8 projection D2 vertebral segments).

Influence zones		
US	MLT IR	MLT Rd
3; 9	8	15, 36



## H65- H66 CHRONIC SUPPURATIVE OTITIS MEDIA

**Chronic suppurative otitis media** - inflammation of the middle ear.

Symptoms: prolonged suppuration of the ear, hearing loss.

### **Etiopathogenesis**

Often it causes several pathogens simultaneously. Transition of acute otitis media in chronic due to the action of a number of adverse factors: the virulence of the pathogen, which can be resistant used antibacterial agents, reducing the body's resistance, violation of local and general immune defense, blood diseases, diabetes, rickets and other significant role in the development of chronic otitis media plays a pathological condition of the upper respiratory tract, such as adenoids, the curvature of the nasal septum, chronic sinusitis, hypertrophic rhinitis. Observed in this violation of the drainage and ventilation functions Eustachian tube leads to the difficulty of evacuating the contents of the tympanic cavity and disruption of the aeration of the middle ear cavity. This in turn interferes with the normal healing of the tympanic membrane perforation after acute suppurative otitis media, which leads to the formation of the perforation counter.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-4	75-99	3,3; 5,8; 9,2	US - 3 totally MLT - up to 5 on one zone

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 7-8.

Repeated treatment in a month.

Possible combination with other treatments:

- Drug therapy;

- Ultrasound puncture.

Methods of exposure: labile and stable in the recommended areas.

Exposure toultrasoundis performed via the contact medium (Vaseline, ultrasound gel, medication, etc.).

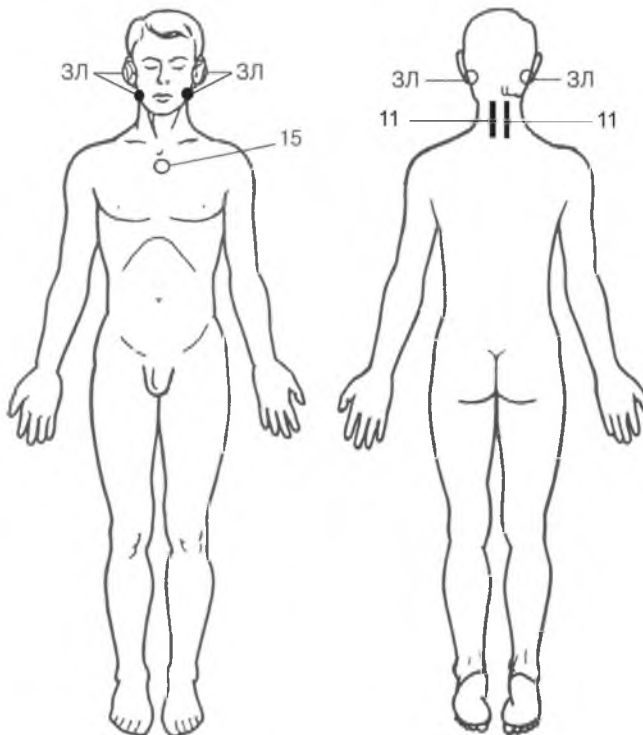
Impact MLT carried out simultaneously with a contact UST. Inductors set (stable) on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

UST - Zone 11 (paravertebrally projection of C2-C8 vertebral segments).

MLT R - Zone 15 (the projection of the thymus gland).

MLT IR - ZL Zone (locus zone - pathological changes - the area of the external auditory canal, mastoid, the angle of the mandible on the affected side of the ear).

Influence zones		
US	MLT IR	MLT Rd
11	ZL	15



## H81.0 MÉNIÈRE'S DISEASE, SENSORINEURAL HEARING LOSS

### **Etiopathogenesis**

Hearing impairment can be acquired and congenital. In the event of proven IGT acquired the role of: infectious diseases, cardiovascular disorders, stress, exposure to ototoxic industrial and household substances, a number of drugs, injury, hearing loss, which occurs as a result of physiological aging. Among congenital neurosensory of impairment hearing are isolated hereditary causes and pathology at birth (hypoxia).

The main pathogenic factor is an increase in the number of labyrinth fluid (endolymph) and increase inter labyrinth pressure.

The majority of patients are detected activation of lipid peroxidation and reduced antioxidant activity of the blood system due to the presence of their co-morbidities. Emerging with disorders of brain and systemic microcirculation is one of the pathogenetic factors kohleovistibulyarnyh violations.

### **TREATMENT SCHEME:**

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-4	75-99	5; 10; 50; 99	UST - 2 to zone, to 10 totally MLT -3 to zone, 15 totally

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 21.

Re-treatment: after 6 months.

Possible combination with other treatments:

- Drug therapy;
- Laser-puncture.

Methods of exposure: labile and stable in the recommended areas.

Exposure toultrasoundis performedvia the contactmedium(Vaseline, ultrasound gel, medication, etc.).

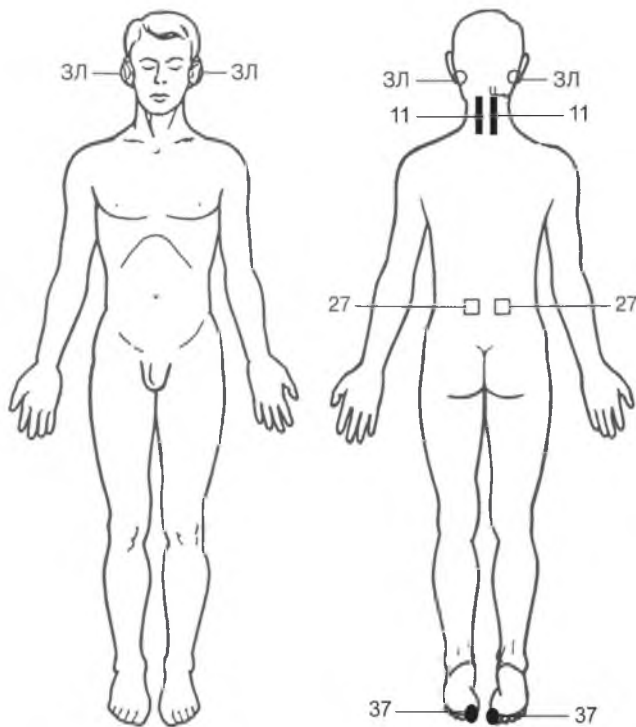
Impact MLT carried out simultaneously with a contact UST. Inductors set (stable) on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

UST - Zone 11 (paravertebrally projection of C2-C8 vertebral segments).

MLT R - Zone 27 (paravertebrally D11-L1, the projection of the segmental innervation of the kidney,  
 - Area 37 (the big toes pads).

MLT IR - ZL Zone (locus zone - pathological changes - the area of the external auditory canal, mastoid)

Influence zones		
US	MLT IR	MLT Rd
11	ZL	27; 37





## **K00-K14 DISEASES OF ORAL CAVITY, SALIVARY GLANDS AND JAWS**

### **Etiopathogenesis**

The main etiological factor inducing inflammation, microorganisms are so-called dental plaque, which is tightly adherent to the tooth surface. On its formation is influenced by many factors of the local and general: poor oral hygiene, reduction of local immunity of the mouth, a change in the acid-base balance of the saliva in the direction acidosis, which contributes to the colonization of microorganisms, increasing the viscosity of the mixed saliva, decrease salivation, accompanied by a decrease in immunoglobulin levels and particularly a secretory IgA, lysozyme, and other protective factors.

And local factors which affect the retention of the microbial plaque, colonization of microorganisms are important the presence of cavities; the materials from which made fillings and dentures.

Exposure is carried out before a meal or 2 hours after a meal (alcohol and smoking are contraindicated, requires an appropriate diet).

5 minutes before the start of the procedure to drink 300 ml of liquid (herbal solutions, mineral water, etc.).

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
4-5	50-75	1,7; 2,9; 9,5	US - 10 totally MLT - 20 totally

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 7-8.

Re-treatment: two weeks.

Possible combination with other treatments:

- Dental procedures; - Drug therapy;
- Herbal medicine;
- Vacuum massage;
- Laserpuncture.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through a contact

medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST- region 25 (projection D7-L2 segmental innervation zone of the liver)

- Area 27 (paravertebrally, D7-L2 segmental innervation area of the kidneys)
- Area 17 (the projection of the liver)
- Area 21 (the projection of the celiac plexus)

MLT R - Zone 10 (palmar surface of hands)

- Area 36 (the plantar surface of the foot).

MLT IR - ZL Zone locus (lesions)

- Zone 4 (the projection of the brain stem)
- Zone 8 (C7-D2 projection of the vertebral segments).

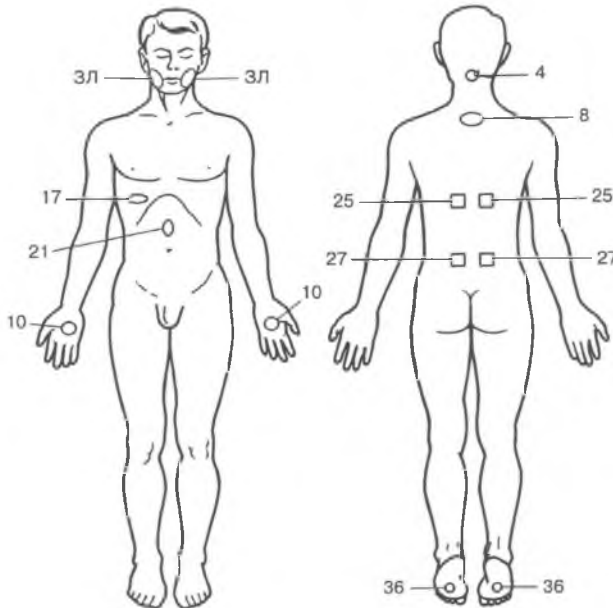
ATTENTION!

impact zones alternate in the following order:

Day 1 - 17, 25 (UST); 10 (MLT R); 4 (MLT IR).

Day 2 - 21, 27 (UST); 36 (MLT R); 8 (MLT IR), etc.

Influence zones		
US	MLT IR	MLT Rd
25; 27	ZL	17; 21; 4; 8; 10; 36



## M19.2- M24.6 ARTHROSIS OF THE TEMPOROMANDIBULAR JOINT

Inflammatory or inflammatory-dystrophic diseases of the temporomandibular joint.

### **Etiopathogenesis**

Common causes of disease should include metabolic disorders in the body, neurodystrophic, endocrine disorders, and infectious diseases. Local concern: long current inflammatory process in the joints, excessive load on the articular surface of the head of the lower jaw, which may be associated with neuromuscular disorders of the maxillofacial region, with the absence of teeth, especially the side, the deformation of the surface okklyuzionnoi dentition and abnormal abrasion. These factors can be combined with each other.

Degenerative processes in the joint may develop as a result of the impact of general and local factors - a violation of both cellular and extracellular mechanisms for trophism. The general mechanism of development of osteoarthritis of the TMJ is that gradually the cartilage covering the articular surface of the condyle head undergoes degeneration. Infection occurs hematogenous-metastatic or by contact, inflamed joint capsule, and then there is the destruction of cartilage and meniscus

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
4-5	50-75	57; 95	US - 2 at zone. MLT - 15 totally.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 7-8.

Re-treatment: two weeks.

Possible combination with other treatments:

- Drug therapy;
- Phytotherapy.
- Laserpuncture.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

US - Zone 25 (projection D7-L2 segmental innervation zone of the liver)

- Area 27 (paravertebrally, D7-L2 segmental innervation area of the kidneys)

- Area 17 (the projection of the liver)

- Area 21 (the projection of the celiac plexus).

MLT R - Zone 10 (palmar surface of hands)

- Area 36 (the plantar surface of the foot). MLT IR - ZL locus zone (pathological changes - below the ear lobe at the angle of the mandible), - Zone 4 (the projection of the brain stem), - Zone 8 (the projection of the vertebral segments).

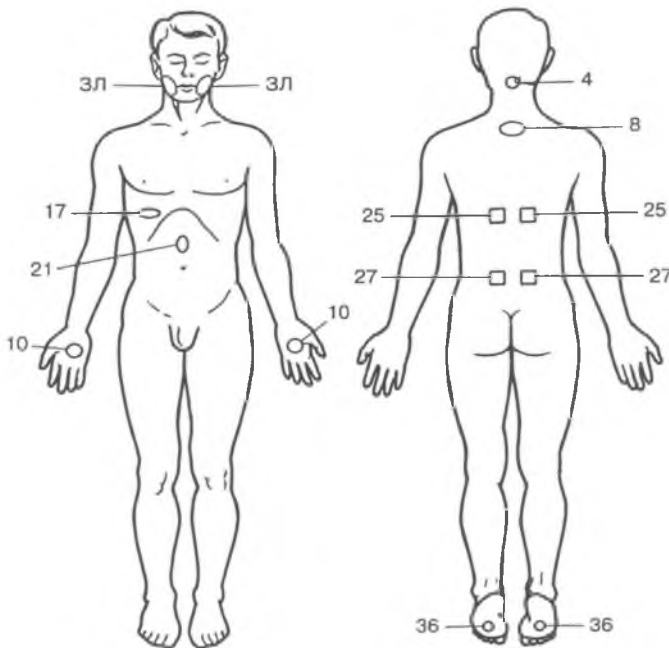
ATTENTION!

impact zones alternate in the following order:

Day 1 - 17, 25 (UST); 10 (MLT R); 4 (MLT IR).

Day 2 - 21, 27 (UST); 36 (MLT R); 8 (MLT IR), etc.

Influence zones		
US	MLT IR	MLT Rd
25; 27	ZL	17; 21; 4; 8; 10; 36



# N00-N99 DISEASES OF THE GENITOURINARY SYSTEM

## F98 ENURESIS

**Enuresis** - enuresis, often during sleep in children.

### **Etiopathogenesis**

Etiology - helminth infections, fatigue, genitourinary disease and ENT organs, beriberi, nevrozy. In pathogenesis an important role is played by autonomic disorders. A role in the occurrence of enuresis plays neurosis. It is believed that the situation is psychotraumatic upset the normal activity of the cortex of the cerebral hemispheres. An important factor contributing to the emergence of enuresis, some researchers believe dysfunction secretion of biologically active substances that affect the bladder (serotonin, histamine, prostoglyutsin, and most important - vasopressin).

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-5	75-99	2,8	US - up to 10 totally, MLT – 20 totally.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: every other day.

Number of treatments: 10.

Retreatment: if necessary, after 30 days.

Possible combination with other treatments:

- Zonal EHF-therapy and EHF puncture;
- Homeopathy;
- Herbal medicine;
- Psychological correction.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

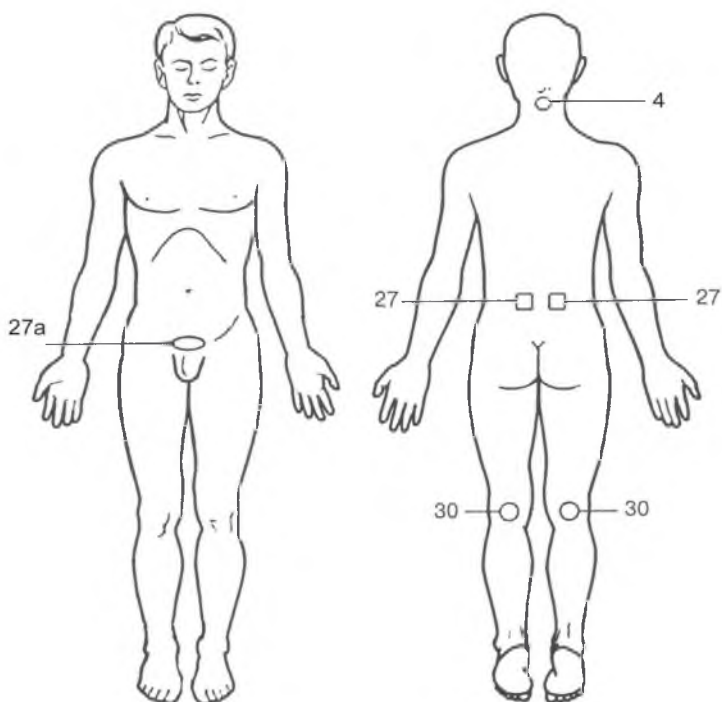
UST - zone 27a (the projection of the bladder).

MLT R - Zone 4 (the medulla oblongata)

- Area 30 (popliteal fossa).

MLT IR - Zone 27 (paravertebrally projection D7-L1 segmental innervation of the kidney area).

Influence zones		
US	MLT IR	MLT Rd
27a	27	4; 30



## N48.4 IMPOTENCE

**Erectile dysfunction (impotence)** - the inability to achieve and / or maintain an erection sufficient for satisfactory sexual activity.

### **Etiopathogenesis**

Multifactorial condition. Any factors that lead to a decrease in blood flow to the cavernous bodies (arterial insufficiency of the penis), or to increase the outflow from them (veno-occlusive dysfunction) may be the cause of erectile disorders. It can be: chronic disease (atherosclerosis, hypertension, saharnymy diabetes, depression, neurosis-like disease.

Erectile disorders often occur under the influence of environmental factors - radiation, electromagnetic radiation..

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	75-99	9,4; 20; 73; 75	US - 8 totally, MLT - 10 totally.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 10-12.

Retreatment: if necessary, after 30 days.

Possible combination with other treatments:

- Fiziorefleksoterapiya;
- Psychological correction;
- Homeopathy;
- Phytotherapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

US - Zone 1 (the perineum).

MLT R - Zone 4 (the medulla oblongata)

- A zone 36 (the foot plantar surface of the left / right)

- Area 15 (the projection of the thymus gland)

- Area 30 (popliteal fossa on the right / left).

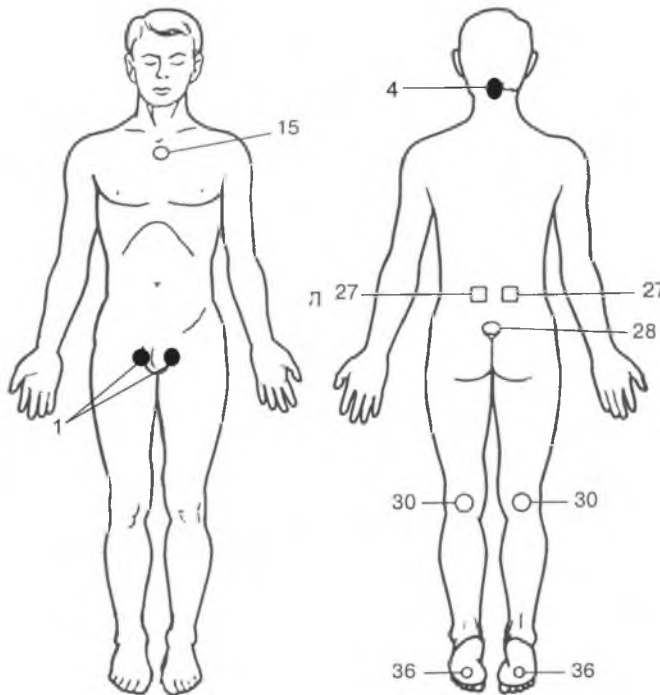
MLT IR - Zone 27 (paravertebrally projection D7-L2 segmental innervation area of the kidneys), - Zone 28 (diamond Michaelis).

impact zones alternate in the following order:

1st Day - 1 (UST); 4; 30 (MLT IR); 27 (MLT IR).

Day 2 - 1 (UST); 15; 36 (MLT R); 28 (MLT IR), etc.

Influence zones		
US	MLT IR	MLT Rd
1	28; 27	4; 15; 36; 30





## N41.1 CHRONIC PROSTATITIS

**Prostatitis** - acute or chronic inflammation of the prostate (prostate).

Symptoms: a burning sensation or pain in the perineum, frequent urination, fever, pain in the sacrum.

### **Etiopathogenesis**

Chronic prostatitis occurs in the implementation of micro-organisms in the prostate tissue and an important role is played by chlamydial infection (60-70% of cases). Equally important are other micro-organisms (viruses, mycoplasmas, Gardnerella, Trichomonas, etc.) And their associations.

Etiological predisposing factors: immune deficiency, age-related changes, hormonal disorders, especially of the venous system. In the development of chronic prostatitis special attention given to poor circulation in the veins of the pelvic and emerging stagnation (hypothermia, inflammation of hemorrhoidal veins, inactivity). Play a role innervation disorders, hormonal changes, immunological disorders.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	75-99	9,4; 20; 73; 75	US - 10 totally, MLT – 20 totally.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 12-15.

Retreatment: if necessary, after 30 days.

Possible combination with other treatments:

- Fiziorefleksoterapiya;
- Psychological correction;
- Drug therapy;
- Prostate massage.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through the contact medium (drug - hydrocortisone).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST- zone 1 (the perineum)

- Area 27 (paravertebrally projection D7-L2 segmental innervation area of the kidneys).

MLT Cr - Zone 36 (the plantar surface of the foot to the left / right)

- Area 15 (the projection of the thymus gland)

- Area 30 (popliteal fossa on the right / left).

MLT IR - Zone 28 (diamond Michaelis)

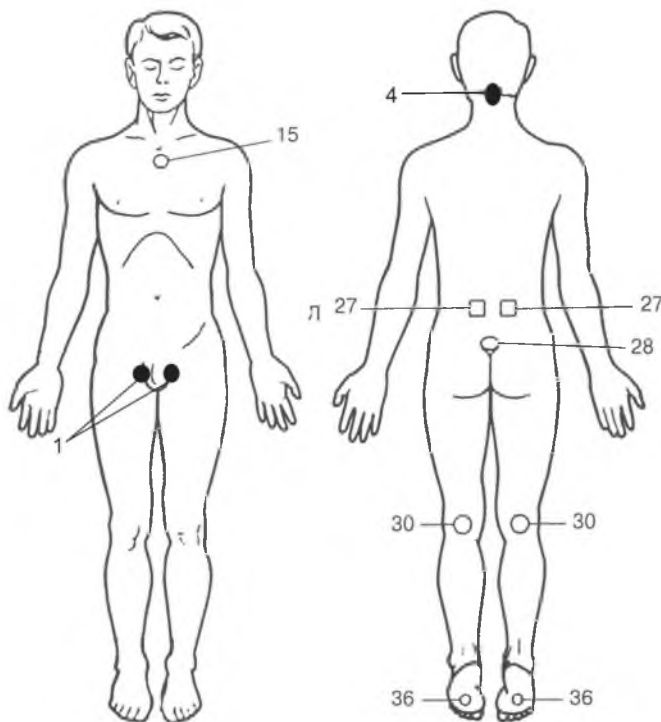
- Zone 4 (the medulla oblongata).

impact zones alternate in the following order:

1st day - 1; 27 (UST); 15; 30 (MLT R); 4 (MLT IR).

Day 2 - 1; 27 (UST); 15; 36 (MLT R); 28 (MLT IR), etc.

Influence zones		
US	MLT IR	MLT Rd
1; 27	28; 4	15; 36; 30



## N34 URETHRITIS AND URETHRAL SYNDROME

**Urethritis** - inflammation of the urethra. Symptoms: burning and itching in the urethra and perineum while urinating, pain in the lumbosacral region. Urinating often painful.

### **Etiopathogenesis**

Gonococcal infection causes gonococcal urethritis, nongonococcal urethritis can be infectious and noninfectious. Infectious urethritis caused by bacteria, viruses, spirochetes, etc.

Noncommunicable urethritis occur when damage urethra during diagnostic and therapeutic procedures (traumatic urethritis), and as a reaction to the food and drug allergies (allergic urethritis). Infection with the urethral mucosa is embedded in the gaps and glands, causing inflammation. When venereal urethritis possible co-infection with two or more pathogens (Trichomonas, chlamydia and others.). Morphological changes of different origin with urethritis almost similar.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-3	75-99	1,2	US - 6 totally, MLT - 15 totally.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 5-7.

Retreatment: if necessary, after 30 days.

Possible combination with other treatments:

- Fiziorefleksoterapiya;
- Psychological correction;
- Drug therapy.

Methods of exposure: labile and stable in the recommended areas.

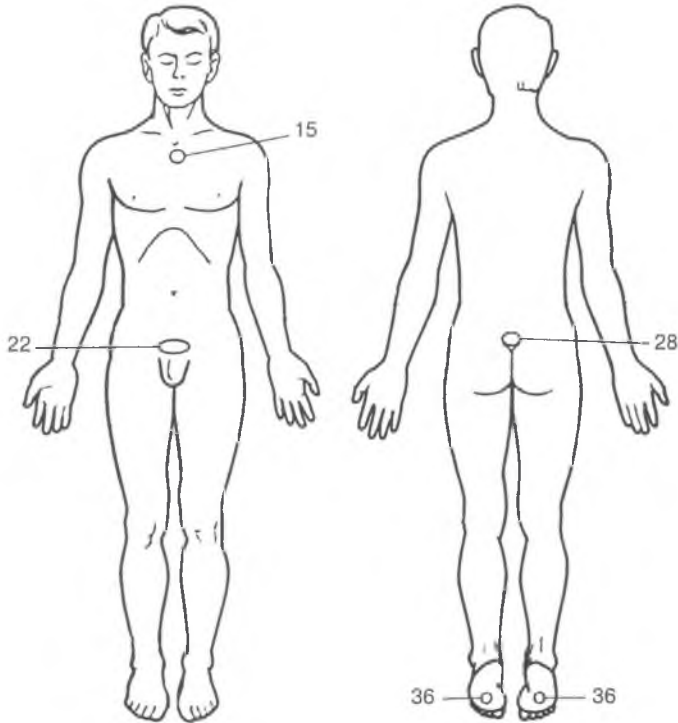
Exposure to ultrasound is performed directly on the body or through the contact medium (drug, ultrasound gel, Vaseline).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 22 (the projection of the anatomical neck and the bladder triangle).

MLT the R - Zone 36 (the plantar surface of the foot to the left / right) - Zone 15 (the projection of the thymus gland).  
 MLT IR - Zone 28 (diamond Michaelis).

Influence zones		
US	MLT IR	MLT Rd
22	28;	15; 36



## N11 CHRONIC PYELONEPHRITIS

**Chronic pyelonephritis** - nonspecific infectious kidney disease.

### **Etiopathogenesis**

Frequent causative agent of pyelonephritis - E. coli, enterococci, staphylococci.

The infection gets into the kidney in the following ways:

Hematogenous by: bacteria penetrate the bloodstream into the kidney from the primary foci of infection (bones, skin, endothelium, and others.) Due to diseases such as acute tonsillitis, otitis media, or abrasions, etc. By rising urino-gennym by: from the lower urinary tract. This process occurs as a result of violations of urine dynamics (reverse flow promotes entry of urine from the bladder back into the kidney). Rising through the wall of the urinary tract (ureter).

Is affected the renal parenchyma, interstitial tissue, pelvis and calyx.

The pathogenesis of chronic pyelonephritis:

1. Violation of processes of urodynamic and lymph flow.
2. Effect of immunemechanisms.
3. Genetic factors

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-4	75-99	3,5; 8,1; 53; 63; 86	US - 1-3 on zone, 6 totally; MLT - 3-5 on zone, up to 10 totally

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: 3-4 sessions daily, the next - after 1-2 days.

Number of treatments: 14-15.

Retreatment: if necessary, after 30 days.

Possible combination with other treatments:

- Fizioreflaksoterapiya;
- Antibacterial medication.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through the contact medium (ultrasoundgel, Vaseline, a drug).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

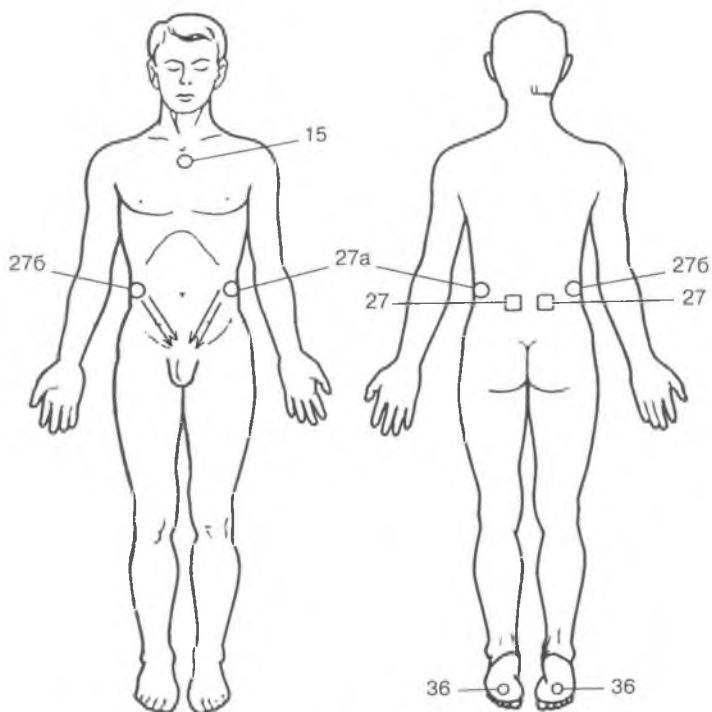
UST - Zone 27 (paravertebrally projection D7-L2 segmental innervation area of the kidneys).

MLT R - Zone 36 (the plantar surface of the foot to the left / right)

- Area 15 (the projection of the thymus gland)

MLTIR - zone 27a, 27b (naruzhnovnutrennyaya surface of the abdomen, the end of the 12 left / right edges).

Influence zones		
US	MLT IR	MLT Rd
27	227a; 276	15; 36



## N20-N23 UROLITHIASIS

**Urolithiasis** - polietiologic disease characterized by the presence of a stone or more stones in the kidney and / or urinary tract.

### **Etiopathogenesis**

Causes: Hereditary disorders of urodynamics, urinary tract infection, gastrointestinal disease, liver and biliary tract, congenital and acquired disorders of urodynamics of the upper and / or lower urinary tract; prolonged immobilization secondary disturbances of activity of enzymes, hormones or deficit / surplus of vitamins; disease leading to kidney stone disease (osteoporosis, leukemia, bone metastases).

The pathogenesis of stone disease is associated with one of the three main hypotheses:

- Precipitation of crystallization;
- The formation of the matrix - nucleation;
- Lack of crystallization inhibitors.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
4-5	75-99	10-100 (P2 mode)	UST - 1-3 on zone; 7 - totally. MLT - 3-5 on zone; 15 totally

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: 3-4 sessions daily, the next - after 1-2 days.

Number of treatments: the treatment is determined by the efficiency (in srednem 7-10).

Retreatment: if necessary, after 2 months.

Possible combination with other treatments:

- Additional electrical or magnetic stimulation moche-tochnika or pelvis after MLUZT procedures;
- Simultaneous with MLUZT electrical stimulation of the bladder;
- Drug therapy;
- Drinking regime (preferably mineral water «NAFTA»);

- A warm bath before the procedure MLUST.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through the contact medium (ultrasound gel, Vaseline, a drug).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

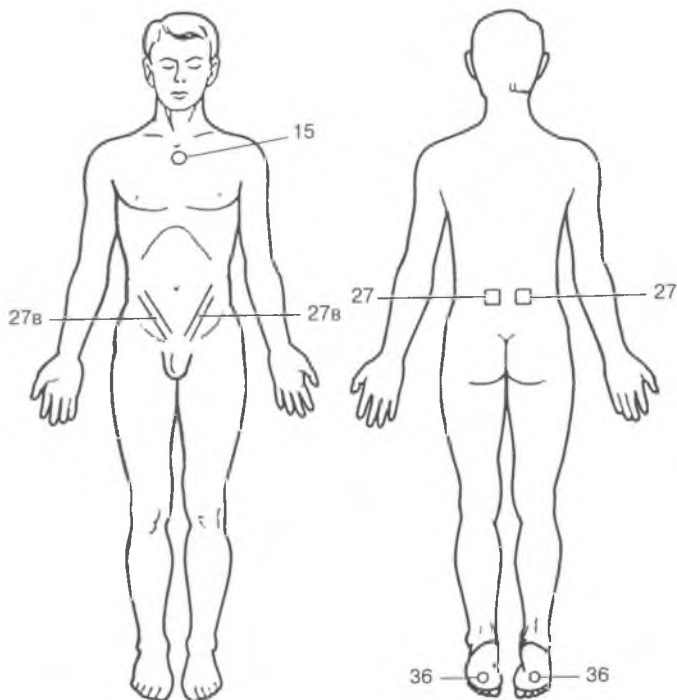
UST - area 27b (the projection of the pelvis and ureter to the bladder side of the sand or the «rock track»).

MLT R - Zone 36 (the plantar surface of the foot to the left / right)

- Area 15 (the projection of the thymus gland).

MLT IR - Zone 27 (paravertebrally projection D7-L2 segmental innervation area of the kidneys).

Influence zones		
US	MLT IR	MLT Rd
27B	27	15; 36





# 000-099 PREGNANCY, CHILDBIRTH AND THE PUERPERIUM

## 092.1 CRACKED NIPPLES

**Cracked nipples** - defect, damage the integrity of the skin on the nipple of the mammary glands. Shows sharp soreness radiating to the shoulder blade while feeding your baby.

### **Etiopathogenesis**

In addition to violations of feeding technology, the appearance of cracks on the nipples can contribute to hypovitaminosis, malaise. Cracks often occur in women who have the nature of inverted nipples are underdeveloped, thin-skinned sensitive skin, weakened by neuromuscular system. Excitable baby can damage the nipple during feeding and the development of cracks may contribute to the lack of hygiene of the nipples.

The cause of the cracks - it is the lack of capturing the child during breast-feeding, poor weaning, too frequent washing of the nipples.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2 - 3	75-99	9,4; 1,5; 3,6; 7,7	US - 1,5 at zone, MLT - 10 totally.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 5-7.

Retreatment: if necessary, after 30 days.

Possible combination with other treatments:

- Fiziorefleksoterapiya;
- Psychological correction;
- Drug therapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through a contact medium (drug sterile cocoa butter or other plants).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

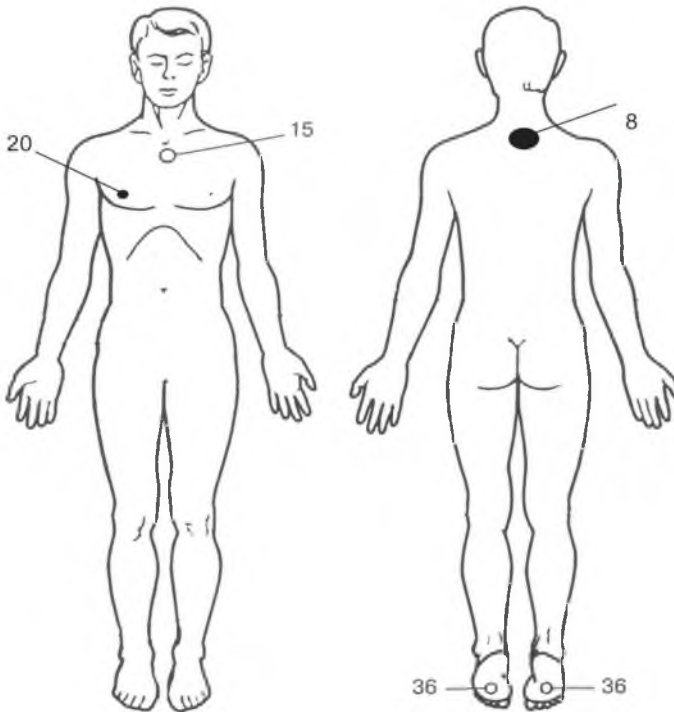
UST - Zone 20 (the injured nipple).

MLT R - Zone 36 (the plantar surface of the foot to the left / right)

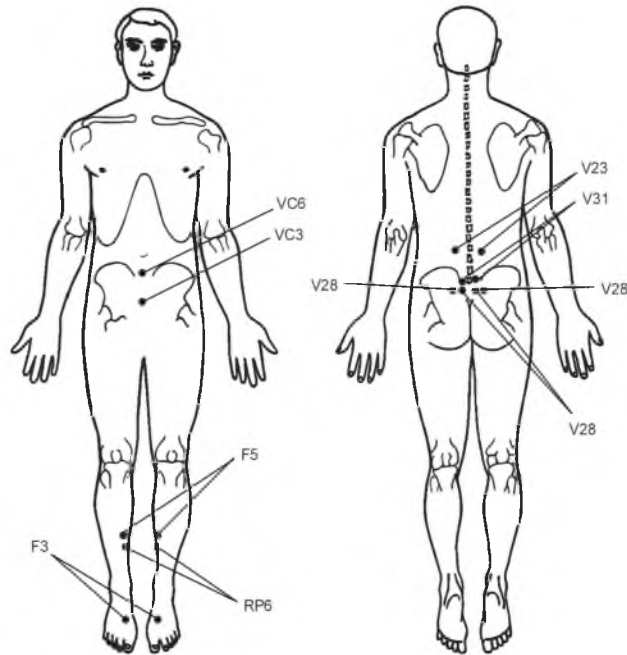
- Area 15 (the projection of the thymus gland).

MLT IR - Zone 8 (C7-D2 projection of the vertebral segments).

Influence zones		
US	MLT IR	MLT Rd
20	8;	15; 36



## MAIN POINTS OF ACUPUNCTURE IN GYNECOLOGY



### N61 MASTITIS

**Mastitis** - an inflammatory disease of the breast.

#### Pathogenesis

The causative agents of mastitis - staphylococci, streptococci and other pyogenic bacteria.

The input gates of infectious agents often serve as cracked nipples, less milk ducts.

Acute onset of the disease, manifested by pain in the breast, body temperature rises.

#### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	75-99	9,4; 98	US - 6 totally, MLT - 15 totally.

#### METHOD OF TREATMENT

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 4-8.

Possible combination with other treatments:

- EHF-puncture;
- Laserpuncture;
- Psychological correction;
- Drug therapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the body or through a contact medium (drug sterile cocoa butter or other plants).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

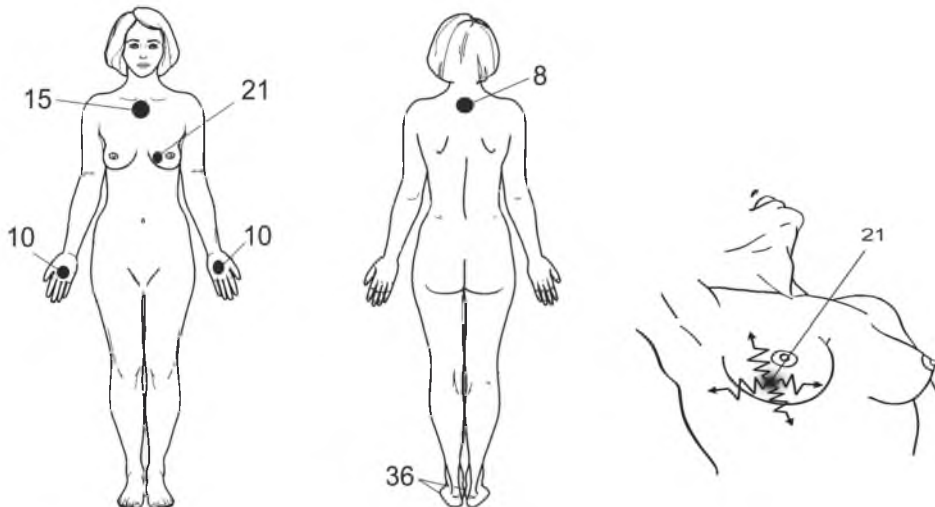
UST- zone 21 (the affected segment of the breast).

MLT R - Zone 36 (the plantar surface of the foot to the left / right)

- Area 15 (the projection of the thymus gland).

MLT IR - Zone 8 (C7-D2 projection of the vertebral segments).

Influence zones		
US	MLT IR	MLT Rd
21	8;	15; 36; 10



## N70.1 CHRONIC ADNEXITIS

**Adnexitis** - an inflammatory disease of the female reproductive organs (ovaries, fallopian tubes and the surrounding peritoneum). Accompanied by abdominal pain, tension and soreness of the lower portion of the abdominal wall, fever, frequent urination, belyami, uterine bleeding.

### Etiopathogenesis

Non-specific (negonoreyny) salpingoophoritis caused by pathogenic agents and opportunistic. Among them: Staphylococcus golden, and Staphylococcus epidermidis, group B streptococci, enterococci, E. coli, etc., often the cause - a mixed infection..

First, on the mucosa of the fallopian tubes (endo-salpinks) there are all signs of inflammation: redness, microcirculation disorders, exudation, edema, cellular infiltration. Then, the inflammation extends to the muscular layer of the fallopian tube, it appears edema. The tube thickens and lengthens, it becomes painful palpation. Microbes from tube and its contents fall into the abdominal cavity, infect the serous cover of tube and surrounding peritoneum. There perysalpingitis and pelvioperitonit. After the rupture of the ovarian follicle pathogens fall within infect granulosa skin follicle and inflammation occurs in the ovary (salpingo).

### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-5	75-99	1,2; 9,4; 73	US - 2 when vaginally; 4-8 with the outer MLT - 15 totally.

### METHOD OF TREATMENT

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 7-12.

Retreatment: a month later.

patients with disease duration of 5 years is prescribed two courses, and more than 5 years, and all patients with obstruction of the fallopian tubes - 3 courses with 2 months intervals.

Possible combination with other treatments:

- EHF-puncture; laserpuncture;
- Drug therapy;
- Herbal medicine;
- Homeopathy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed through the contact medium (drug cocoa butter or other plants).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 19 (the projection of the ovaries)

- Area 20 (the projection of the fallopian tubes).

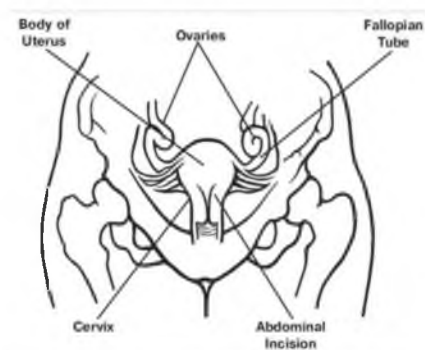
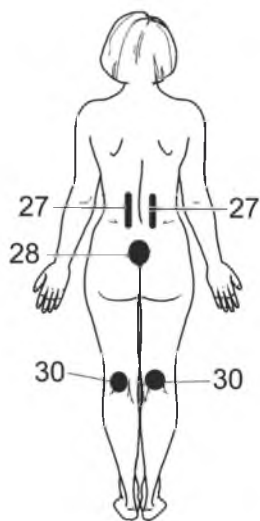
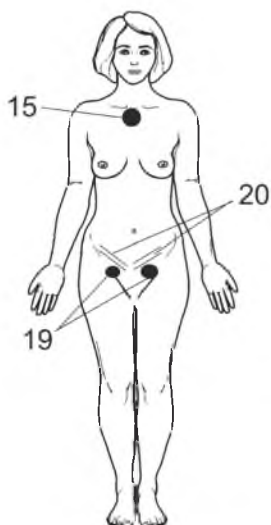
MLT R - Zone 30 (popliteal fossa)

- Area 15 (the projection of the thymus gland).

MLT IR - Zone 28 (diamond Michaelis)

- Area 27 (paravertebrally projection D11-L1 segmental innervation of the kidney).

Influence zones		
US	MLT IR	MLT Rd
19; 20	27; 28;	15; 30



## N71 ENDOMETRITIS

**Endometritis** - inflammation of the lining of the uterus.

### **Etiopathogenesis**

It arises from the ingress of pathogens into the uterus. Infection can occur ascending, hematogenous and lymphogenous ways. Often it develops after birth, abortion. Accompanied by abdominal pain, tension and soreness of the lower portion of the abdominal wall, fever, general malaise, belyami.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-5	75-99	2,5; 3,5; 4,9; 9,4; 57	US - 5-7 totally. MLT - 15 totally.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 5-10.

Retreatment: a month later.

Possible combination with other treatments:

- EHF-puncture; laserpuncture;
- Drug therapy;
- Herbal medicine;
- Homeopathy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed through the contact medium (drug cocoa butter or other plants, ultrasound gel).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - ZL - locus area (pelvic organs, on the area parallel hypogastriums occlusive disease, over the symphysis pubis).

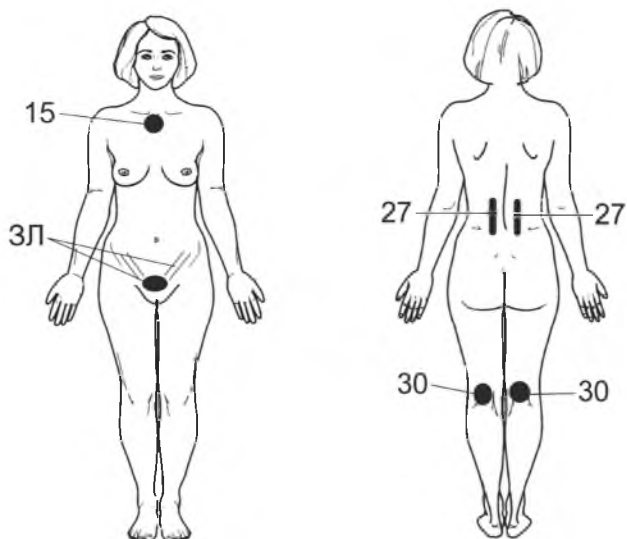
- Area 20 (the projection of the fallopian tubes).

MLT R - Zone 30 (popliteal fossa)

- Area 15 (the projection of the thymus gland).

MLT IR - Zone 27 (paravertebrally projection D10-L1 segmental innervation of the uterus).

Influence zones		
US	MLT IR	MLT Rd
3П	27	15; 30





## N94 ALGOMENORRHEA

**Algomenorheya** (algomenorrhoea, dysmenorrhoea) - a cyclical disease process, manifested by pain in the abdomen during menstruation days, accompanied by a complex psycho-emotional and metabolic-endocrine symptoms.

Algomenoreya I - primary (spasmodic) - pain is not associated with organic diseases of the reproductive system and explain the pathogenesis of dysfunction of the hypothalamic-pituitary-ovarian system and a violation of the synthesis of prostaglandins

Algomenoreya II - secondary (organic) - pain occur against the background of gynecological diseases and etiologically associated with them.

### **Etiopathogenesis**

As a result of dysfunction of the hypothalamic-pituitary-ovarian system is disturbed the balance of estrogen and progesterone, causing absolute or relative hyperestrogenia. Estrogens stimulate the production of prostaglandins and oxytocin vasoactive substances. Increased secretion and release of prostaglandins in the cavity of the uterus during menstruation - the most convincing explanation for raising abnormal uterine activity, her contractions during menstruation, resulting in ischemia of its tissue, irritation of the nerve endings, increase their sensitivity and increased perception of pain.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-5	75-99	4; 4,9; 9,5	US - 6-8 totally. MLT - 15 totally.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 5-10.

Retreatment: a month later.

Possible combination with other treatments:

- EHF-puncture; laserpuncture;
- Drug therapy;
- Herbal medicine;
- Homeopathy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed through the contact medium (drug cocoa butter or other plants, ultrasound gel).

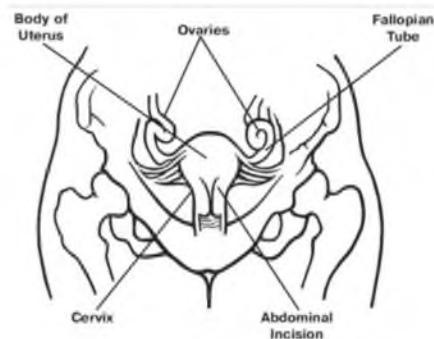
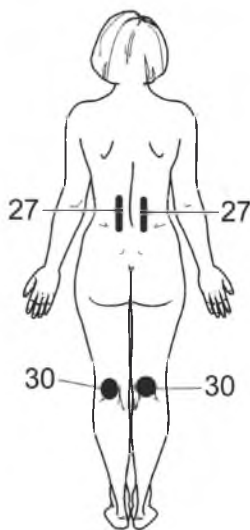
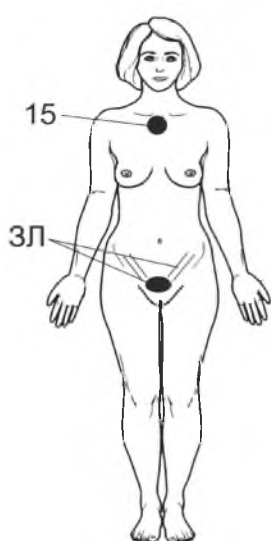
Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - ZL - locus area (pelvic organs, on the area parallel hypogastriums occlusive disease, over the symphysis pubis). - Area 20 (the projection of the fallopian tubes).

MLT the R - Zone 30 (popliteal fossa) - Zone 15 (the projection of the thymus gland).

MLT IR - Zone 27 (paravertebrally projection D10-L1 segmental innervation of the uterus).

Influence zones		
US	MLT IR	MLT Rd
3П	27	15; 30



## N91.0- N91.1 AMENORRHEA

**Amenorrhea** - absence of menstruation for the period of 6 months or more at the age of 16-45 years.

Etiopathogenesis

The most common cause of amenorrhea - premature ovarian failure. The most common causes of primary amenorrhea - congenital diseases (Turner syndrome, gonadal dysgenesis, CNS tumors).

The most common causes of secondary amenorrhea: body mass deficit or morbid obesity, polycystic ovary syndrome, decompensated endocrine diseases.

For the development of ovarian sex requires two X chromosomes, ie female karyotype - 46 XX. During meiotic division of germ cells may cause abnormal set of sex chromosomes. At the confluence of these germ cells abnormal number of chromosomes in the fertilized egg gets. As a result of the wrong morphology and function of the ovaries can not produce sex steroids.

### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-5	75-99	20	US - 45 seconds on point MLT - 15 totally

### METHOD OF TREATMENT

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 5-10.

Retreatment: a month later.

Possible combination with other treatments:

- Drug therapy;
- Herbal medicine;
- Homeopathy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed through the contact medium (drug cocoa butter or other plants, ultrasound gel).

Impact of MLT is carried out simultaneously with a contact UST. Inductors mounted on the projection of pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

RECOMMENDED RECIPE of SONO-puncture:

To make use of ultrasonic puncture point waveguide.

1) V23 (2) + VC3 + E28 (2) + F3 (2);

2) V32 (2) + VC6 + VB26 (2) + RP6 (2);

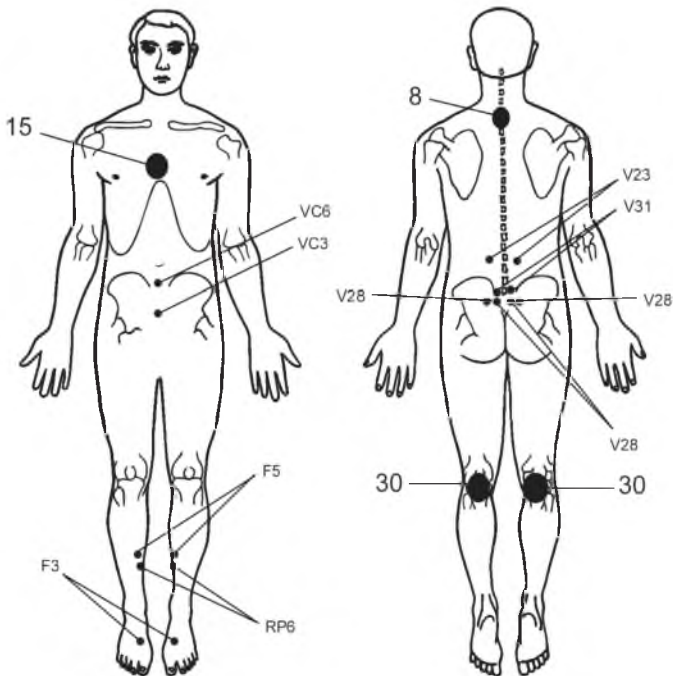
3) VC3 + VC6 + F3 (2) + RP6 (2).

MLT R - Zone 30 (popliteal fossa)

- Area 15 (the projection of the thymus gland).

MLT IR - Zone 8 (C8-D2 projection of the vertebral segments).

Influence zones		
US	MLT IR	MLT Rd
Acupuncture points	8	15; 30



## **N73 INFLAMMATORY DISEASES OF THE PERITONEUM AND TISSUES OF THE SMALL PELVIS**

**Parametritis** - inflammation of the tissue surrounding the uterus. Occurs when the spread of infection from the uterus after childbirth, abortion, curettage uterine lining, operations on the cervix, using the IUD. The infection enters the parametrial tissue limfogen nym way. Options begin with the appearance of infiltration and the formation of serous inflammatory exudate in the site of the lesion. At congenial infiltrate and exudate is absorbed, but in some cases the site of inflammation develops fibrous connective tissue, which leads to uterine displacement toward defeat. When there is a purulent exudate festering parameter that can be resolved pus in the rectum, at least - into the bladder, abdominal cavity.

MLUST prescribed in the chronic stage.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
4-5	75-99	4; 4,9; 99	UST - 2-5 totally MLT - 10 totally

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 7-10.

Retreatment: When disease duration of more than 5 years spend up to 3 treatments with an interval of two months. Begins immediately after menstruation (5-7 day cycle).

Possible combination with other treatments:

- EHF-puncture; laserpuncture;
- Drug therapy;
- Herbal medicine;
- Homeopathy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed through the contact medium (drug cocoa butter or other plants, ultrasound gel). Perhaps the use of phonophoresis of hydrocortisone.

Impact MLT carried out simultaneously with a contact UST. Inductors mounted

on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

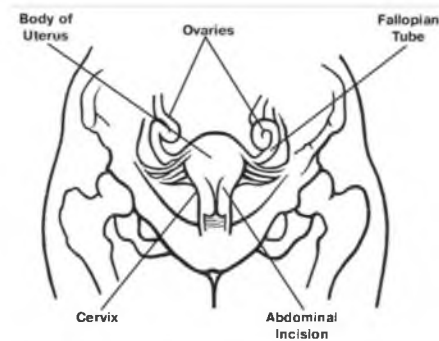
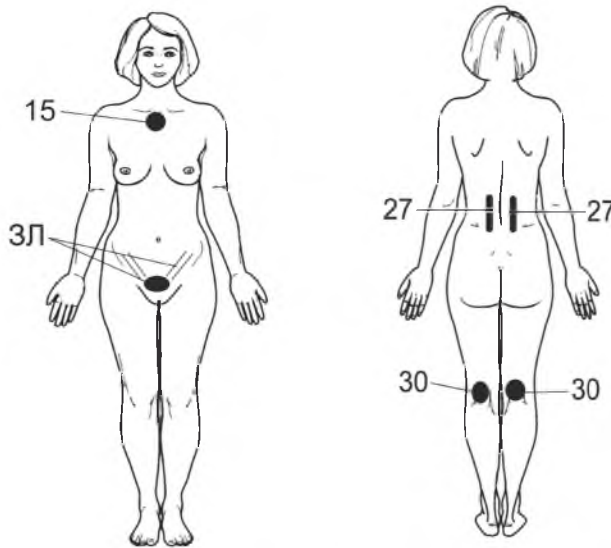
US - ZL - locus area (pelvic organs, adhesions projection).

MLT Cr - Zone 30 (popliteal fossa)

- Area 15 (the projection of the thymus gland).

MLT IR - Zone 27 (paravertebrally projection D10-L1 segmental innervation of the uterus).

Influence zones		
US	MLT IR	MLT Rd
ZL	27	15; 30



## N86 CERVICAL EROSION

**Cervical erosion** - a superficial ulceration of the mucous membrane of the vaginal portion of the cervix. There is usually on a background of cervicitis under the influence of irritating of white vaginal discharge. It may be a long time. Proceeds virtually asymptomatic.

### **Etiopathogenesis**

Wide-spread concept of the etiological role of inflammatory diseases, particularly endocervicitis which accompanied by increased secretion of glands cervical mucosa. Less essential have abnormal discharge from the uterus. Under the influence of long-term abnormal discharge surface epithelium from the vaginal portion of the cervix is exposed to maceration, followed by desquamation dystrophy. The surface of the true erosion is populated by micro-organisms coming from the canal of the cervix and vagina.

Theory dishormonal origin of this disease suggests that the main role is played by an imbalance of sex steroid hormones. To reinforce this theory are observing the emergence of erosion during pregnancy and regress after delivery, when installed hormonal homeostasis.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-5	75-99	9,4	UST - 1-2 on zone; to 5 totally MLT - 15 totally.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 5-10.

Retreatment: when needed in a month.

Possible combination with other treatments:

- EHF-puncture;
- Drug therapy;
- Phytotherapy.

Methods of exposure: labile and stable in the recommended areas.

Perhaps the introduction of a special nozzle in the vagina and on the impact of the fixed method.

Exposure to ultrasound is performed through the contact medium (drug cocoa butter or other plants, ultrasound gel).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

US - ZL - locus area (cervical projection or intracervical scoring).

MLT Cr - Zone 30 (popliteal fossa)

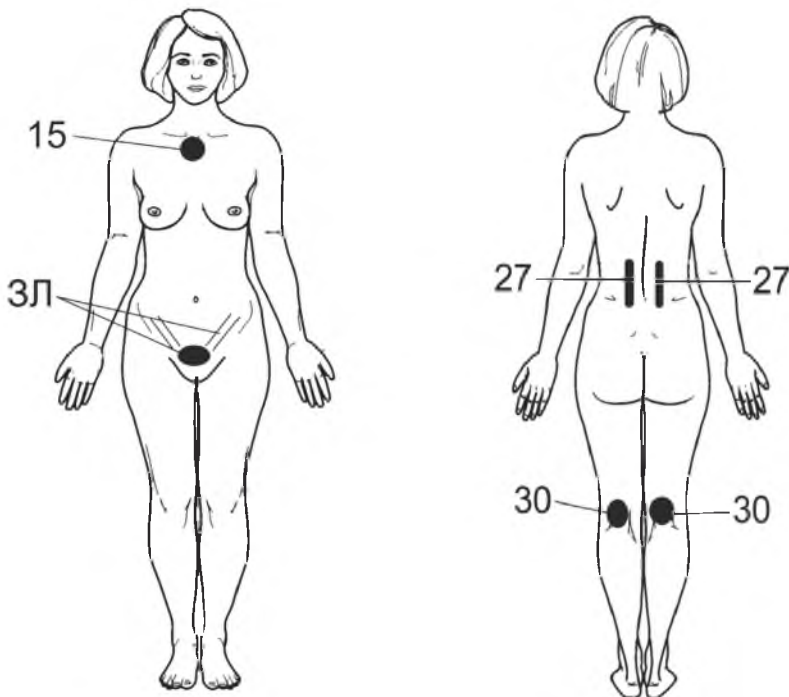
- Area 15 (the projection of the thymus gland).

MLT IR - Zone 27 (paravertebrally projection D10-L1 segmental innervation of the uterus).

**ATTENTION!**

*Perhaps a special laser intravaginal intracavitary gynecological magneto-infrared laser head.*

Influence zones		
US	MLT IR	MLT Rd
ZL	27	15; 30





## N90.5 KRAUROSIS OF THE VULVA

**Kraurosis vulvae** - a disease of the vulva, which is expressed in dystrophic, atrophic and sclerotic changes in their skin. Usually it combined with leukoplakia observed in menopause.

### **Etiopathogenesis**

Kraurosis vulva appears as an inadequate reaction of the surface layers of stratified squamous epithelium on various external and internal factors. Kraurosis vulva provoked available neuroendocrine disorders: hypofunction of the adrenal cortex, ovary, thyroid disorders bioelectric activity of the cerebral cortex a role in the pathogenesis of chronic inflammation kraurosis play the vulva, including long persistent HPV infection, HSV. It is not excluded immunopathological mechanism of development of degenerative changes in kraurosis vulva. Women with kraurosis vulva, as a rule, are obese, diabetic, disregard the rules of personal hygiene

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-5	50-75	1,6; 1,8	UST - 3-6 totally; MLT - 15 totally

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 5-10.

Retreatment: when needed in a month.

Possible combination with other treatments:

- Drug therapy;

- Phytotherapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed through the contact medium (drug cocoa butter or other plants, ultrasound gel). In most cases apply phonophoresis of hydrocortisone.

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

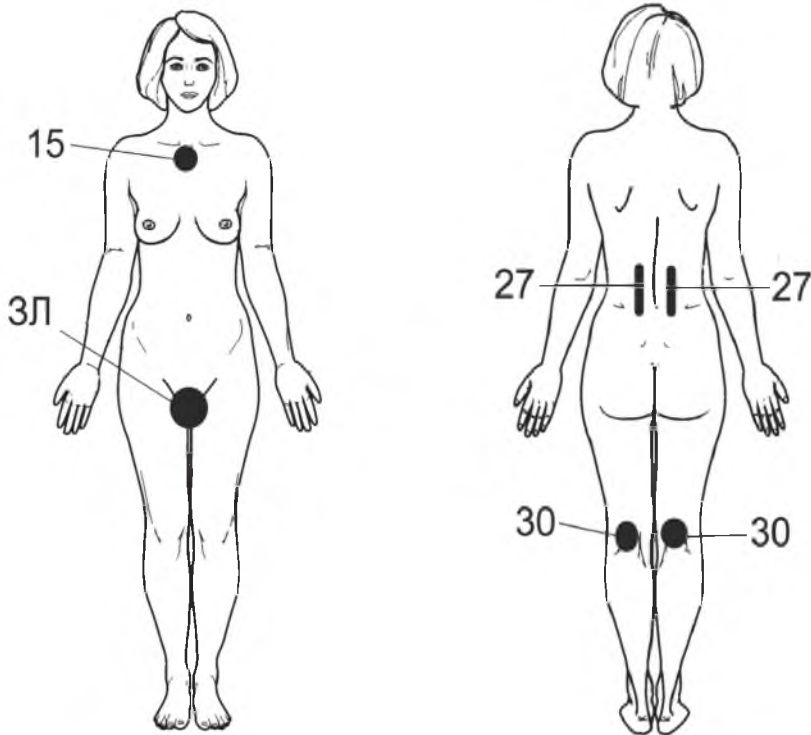
KM - ZL - locus area (labia, clitoris, pomezhnost).

MLT R - Zone 30 (popliteal fossa)

- Area 15 (the projection of the thymus gland).

MLT IR - Zone 27 (paravertebrally projection D10-L1 segmental innervation of the uterus).

Influence zones		
US	MLT IR	MLT Rd
ZL	27	15; 30



## N89 VAGINAL DISCHARGE

**Vaginal discharge** from the genitals do not cause or cause (pathological leucorrhoea), irritation of the skin and mucous membranes of the external genitalia.

### **Etiopathogenesis**

The most common causes are inflammatory diseases of the cables of external and internal genitalia (60-70%) due to gardnerellami, Trichomonas vaginalis, fungi of Candida genus, associations opportunistic aerobic and anaerobic bacteria, or HSV and HPV.

The optimal condition of the vaginal microecosystem depends on complex chemical and biological protective factors: education in the epithelium of vaginal sufficient amount of glycogen, a balanced process of enzymatic digestion, maintaining a certain concentration of hydrogen ions and the normal microflora, the full functioning of the ovaries. Changing any of these factors, individually or collectively violate the delicate balance within the system, which entails the adaptive or maladaptive changes, clinical reflection which often become abnormal discharge from the genital tract.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-5	77-99	1,6; 1,8	US - 1,5 at a point MLT - 15 totally

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Methods of exposure: still on AT (acupuncture points).

Frequency of treatments: daily or every other day.

Number of treatments: 5-10.

Retreatment: when needed in a month.

Possible combination with other treatments:

- Drug therapy;
- Phytotherapy.

Methods of exposure: labile and stable in the recommended areas.

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - acupuncture point

Recommended recipe:

PC48 (2) + HC140 (2) + F2 (2)

V27 (2) + PC150 (2) + F3 (2)

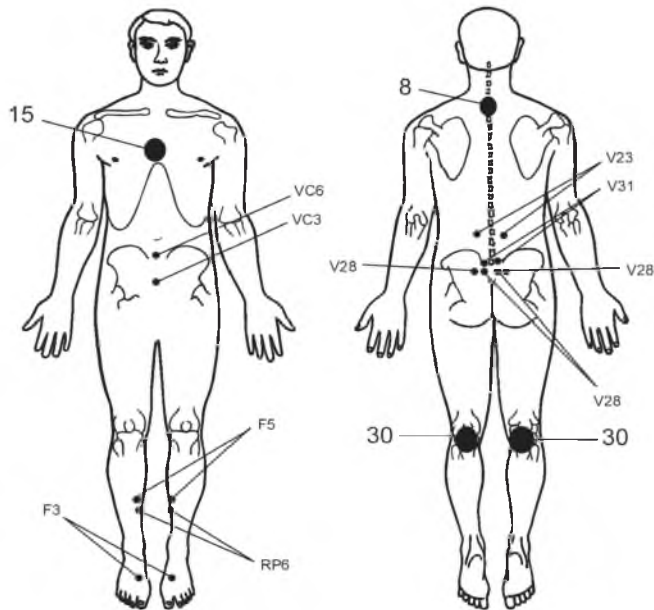
PC48 (2) + PC140 (2) + F8 (2)

MLTR - Zone 30 (popliteal fossa)

- Area 15 (the projection of the thymus gland).

MLT IR - Zone 8 (C8-D2 projection of the vertebral segments).

Influence zones		
US	MLT IR	MLT Rd
AP	8	15; 30



## N97 INFERTILITY

ML UST prescribed for tubal infertility.

### **Etiopathogenesis**

Causes of female infertility: the psychosexual disorder, hyperprolactinemia, pituitary level lesions (tumor), amenorrhea with high levels of FSH, amenorrhea, irregular menstruation and / or anovulation, congenital malformations, bilateral obstruction of pipes, adhesive process in small pelvis, endometriosis, acquired uterine pathology and cervical acquired tubal pathology, acquired ovarian pathology; unexplained infertility, systemic diseases.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-4	75-99	1; 6,2; 72; 95	UST - 5 totally; MLT - 15 totally

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 10-15.

Re-treatment: 2 courses carried out with an interval of two months.

Possible combination with other treatments:

It is advisable to combine with gidroturbatsiy.

- Drug therapy;
- Herbal medicine;
- Psychological correction.

Methods of exposure: labile and stable in the recommended areas.

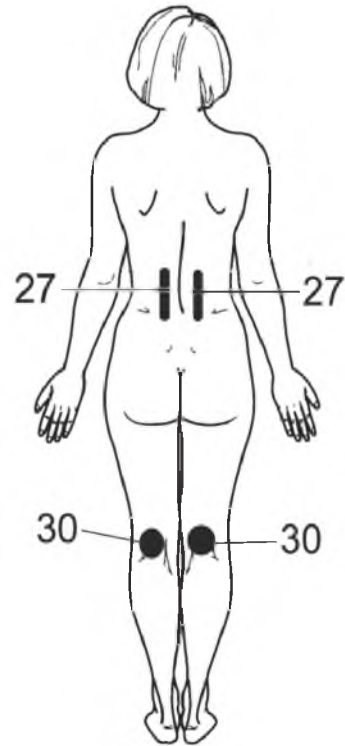
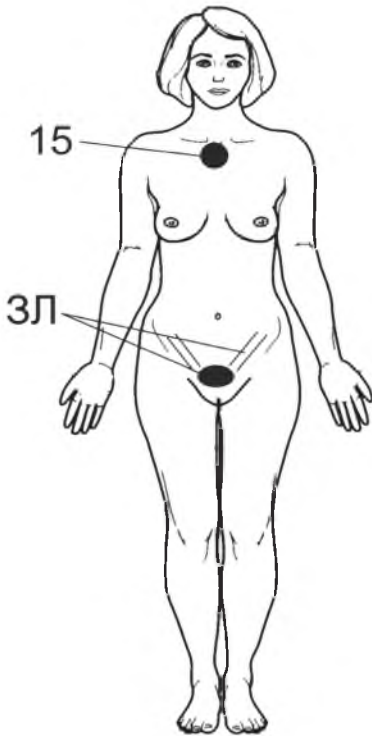
Exposure to ultrasound is performed through the contact medium (drug cocoa butter or other plants, ultrasound gel).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

US - ZL - Zone locus (pelvic organs; hypogastriums area parallel occlusive

disease; over the symphysis pubis). MLT the R - Zone 30 (popliteal fossa) - Zone 15 (the projection of the thymus gland). MLT IR - Zone 27 (paravertebrally projection D10-L1 segmental innervation of the uterus).

Influence zones		
US	MLT IR	MLT Rd
ZL	27	15; 30



## **O12- O14- O15 GESTATIONAL TOXICOSIS (GESTOSES)**

By gestational toxicosis include a number of pathological conditions that occur during pregnancy, complicating its course, and tend to disappear after its completion.

### **Etiopathogenesis**

Is expressed a lot of speculation about the causes of early abortion pregnant. Particular attention is paid to the study of the pathogenesis of vomiting during pregnancy. Vomiting (vomiting and excessive) associated with pregnancy poisoning organism toxic products of metabolism, disruption of the endocrine glands, believed that vomiting as a result of sensitization has much in common with allergic reactions. Due to the changes that occur in the nervous system, the body's physiological processes of adaptation to pregnancy is not carried out. A significant development was the hormonal theory toxicosis pregnant. The reason for their appearance, some authors considered impaired function of the adrenal cortex, the other - to change the secretion of estrogen hormones, and others - hormonal insufficiency of the placenta.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	12-15	10	US - 2-5 on every side MLT - 10 totally

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Exposure to ultrasound is performed through the contact medium (drug cocoa butter or other plants, ultrasound gel).

Frequency of treatments: daily.

Number of treatments: 10-15.

Retreatment: when needed in a month.

Possible combination with other treatments:

- Herbal medicine;
- Psychological correction.

Methods of exposure: labile and stable in the recommended areas.

Impact MLT carried out simultaneously with a contact UST. Inductors mounted

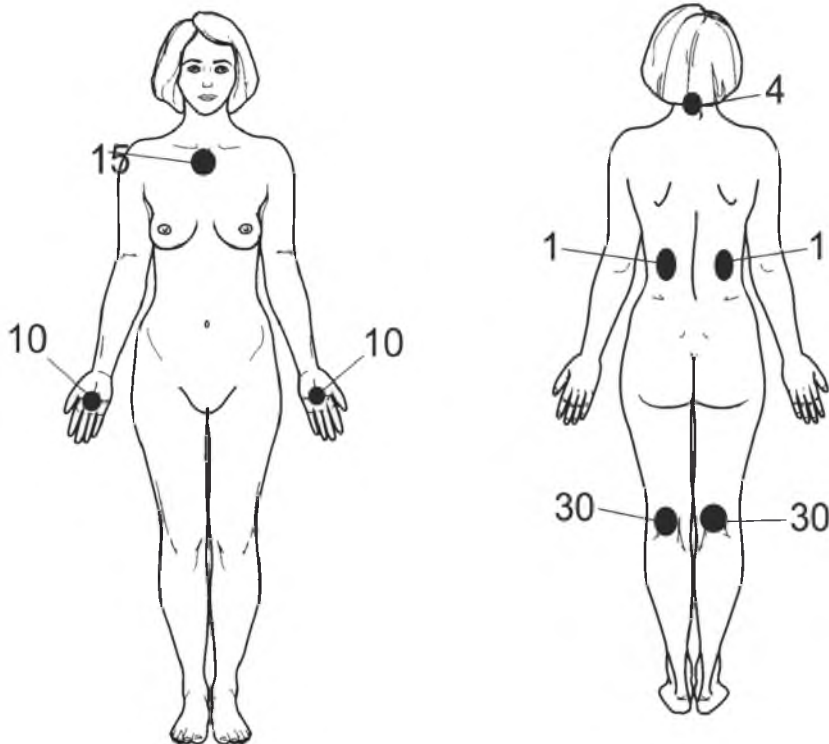
on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 1 (kidney projection).

MLT the R - Zone 10 (palmar surface of the hand on the right / left) - Zone 4 (zone of the medulla oblongata)

MLT IR - Zone 15 (the projection of the thymus gland). - Area 30 (popliteal fossa).

Influence zones		
US	MLT IR	MLT Rd
1	15; 30	4; 10





# 00-199 DISEASES OF THE CIRCULATORY SYSTEM

## I10 HYPERTENSIVE HEART DISEASE

**Hypertensive heart disease** - persistent increase in blood pressure above the boundaries of the physiological norm (140/90 mm Hg.) In patients who are not receiving antihypertensive therapy.

### **Etiopathogenesis**

The basis of this disease is high voltage (increased tone) of the walls of small arteries (arterioles) of the body, which leads to their narrowing and reduction of their lumen. This hampers the movement of blood from one portion of the vascular system (artery) into another (the vein), resulting in pressure on the arterial wall increases.

Stage I: 140-159 mm Hg. - Systolic; 90-99 mm Hg. for diastolic.

Stage II: 160-179 mm Hg. . - Systolic; 100-109 mm Hg. for diastolic.

Stage III:  $\geq 180$  mm Hg. . - Systolic;  $\geq 110$  mm Hg. for diastolic.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	75-99	3,3; 9,4; 6; 9,2; 9,5; 65; 96	UST – totally to 3; MLT – totally not more 10.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 10.

Retreatment: if necessary, after 30 days.

Possible combination with other treatments:

- Drug therapy;
- Herbal medicine;
- EHF-puncture;
- Psychological correction.

Methods of exposure: labile and stable in the recommended areas.

Impact of US conduct drug - fonoforez 1% solution analgin or a mixture of dipyrone with a 1% solution of hydrocortisone or a mixture of rum dipyrone and mud (40 ml per 100 g of body weight).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted

on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 24 (paravertebrally, D 1-6 segmental innervation area of the heart).

MLT R - Zone 12 (over-and subclavian area);

- Area 11 (ulnar fovea right / left);

- Area 30 (popliteal fossa on the right / left).

MLT IR - Zone 21 (the projection of the celiac plexus);

- Zona17 (liver projection)

- Area 31 (the projection of the tibial artery on the right /left);

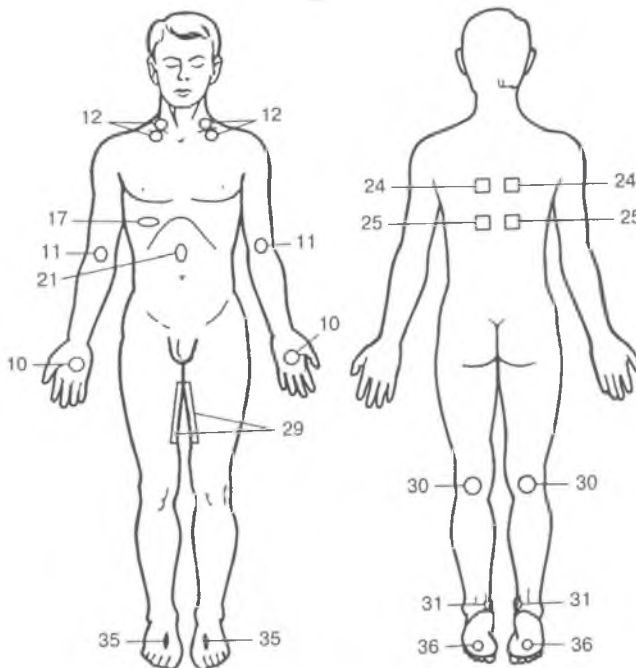
- Area 35 (the projection of the dorsal artery of the foot)

- Area 29 (the projection of the femoral artery).

**ATTENTION!**

*For the impact of MLT and MLT R IR use 2-3 zone (of the proposed) in one session.*

Influence zones		
US	MLT IR	MLT Rd
24	17; 21; 10; 29; 35; 31; 36	12; 11; 30



## 122 MYOCARDIAL INFARCTION

**Myocardial infarction** - is necrosis of individual sections of the heart muscle on the basis of acute ischemia resulting from non-compliance of the coronary circulation of the myocardium requests.

### **Etiopathogenesis**

Risk factors: hypercholesterolemia and hypertriglyceridemia, or rather, the presence of primarily type II and IV hyperlipidemia with a high content of beta-atherogenic and pre-beta lipoproteins, reduction in blood protidogenic a-lipoproteins, glucose intolerance, elevated levels of ar-globulins, signs of blood hypercoagulable and suppression of fibrinolysis, left ventricular hypertrophy, atherosclerosis, with its preclinical and clinical manifestations, hypercholesterolemic xanthomatosis, age over 40 years (especially in men), family history (the presence of myocardial infarction in the immediate family), limited physical activity, hypertension, diabetes, obesity, smoking, psycho-emotional stress and stressful situations. For immediate risk factors for heart attack include angina. High risk factor for myocardial infarction is a myocardial infarction melkoochagovyy relating to the intermediate forms of ischemic heart disease and to the true state preinfarction as 20-30% of cases

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-3	9-12	43; 95	US - 10. MLT - 15.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: 3-4 times a week.

Number of treatments: 12.

Retreatment: if necessary, after 30 days.

Possible combination with other treatments:

- Drug therapy;
- Herbal medicine;
- EHF-puncture.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed through the contact medium (drug cocoa butter or other plants, ultrasound gel). In most cases, carried out phonophoresis

«Venoruton» ointments(Switzerland),«Troxevasm»(Bulgaria),«Nitromaz»(Finland).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 12 (over-and subclavian area).

MLT R - Zone 11 (ulnar fovea right / left);

- Area 30 (popliteal fossa on the right / left).

MLT IR - Zone 24 (paravertebrally, D 1-6 segmental innervation area of the heart);

- Area 21 (the projection of the celiac plexus);

- Zona17 (liver projection);

- Area 31 (the projection of the tibial artery on the right /left);

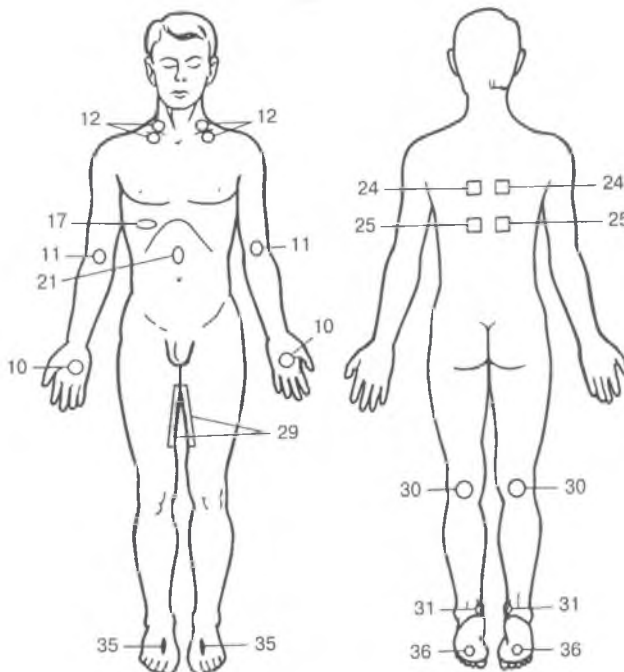
- Area 35 (the projection of the dorsal artery of the foot);

- Area 29 (the projection of the femoral artery).

**ATTENTION!**

***For the impact of MLT and MLTR IR use 2-3 zone (of the proposed) in one session.***

Influence zones		
US	MLT IR	MLT Rd
12	24; 25; 17; 21; 10; 29; 35; 31; 36	11; 30



## I49 EXTRASYSTOLE (OPTION 1)

**Extrasystole** - the most common kind of arrhythmia. Depending on the location of occurrence of arrhythmia is divided into atrial, ventricular and atrioventricular.

### **Etiopathogenesis**

The reason of arrhythmias may be different intoxications - endogenous, the main importance is the hyperthyroidism, and exogenous - digitalis intoxication, taking diuretics (potassium depletion of the body), aminophylline, insulin, as well as the use of strong tea or coffee, excessive smoking.

The immediate cause of arrhythmia is to increase the excitability of the heart muscle in any of its plot. This is possible with the weakening of the automatism of the sinus node, in violation of the sinus impulse propagation in any portion of the myocardium as a result of focal lesions, in connection with which this outbreak occurs independent excitation pulse. Beats may occur in many parts of myocardium and therefore has a different clinical significance.

Pathogenetic basis it is to increase the automaticity of individual sections of the myocardium, and the possible mechanism of re-entry, as well as trigger mechanism.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-3	75-99	6	US - 2 min on AP for local points; 1 min on AP for distal points. MLT - totally to 15.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: 3-4 times a week.

Number of treatments: 12.

Retreatment: if necessary, after 30 days.

Possible combination with other treatments:

- Drug therapy;
- Herbal medicine;
- EHF-puncture.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly on the BAT.

Impact MLT carried out simultaneously with a contact UST. Inductors mounted

on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - acupuncture points.

Recommended recipe:

1) P1 (2) + MS 5 (2);

2) V15 (2) + C7 (2).

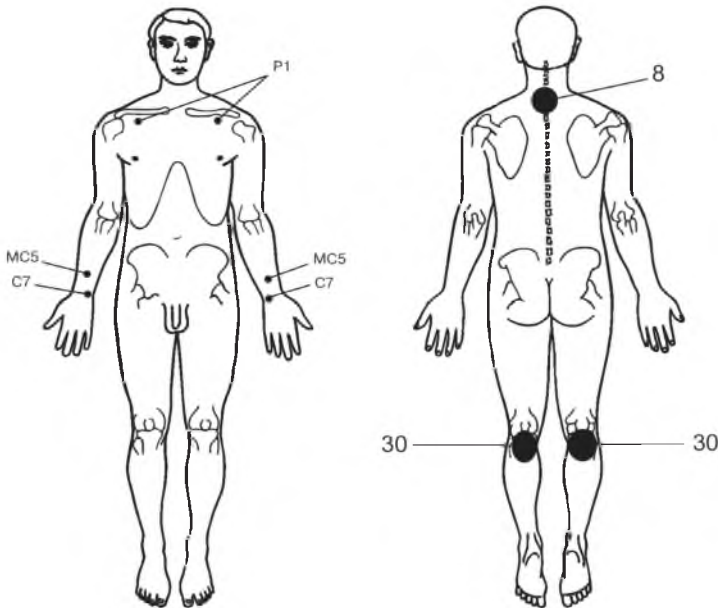
MLT R - Zone 30 (popliteal fossa on the right / left).

MLTIR - Zone 8 (C8 projection D2 vertebral segments).

**ATTENTION!**

***For the impact of MLT and MLT R IR use 2-3 zone (of the proposed) in one session.***

Influence zones		
US	MLT IR	MLT Rd
BAP	8	30



## 149 EXTRASYSTOLE (OPTION 2)

### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-3	9-12	6	UST - to 5 on zone, 15 totally. MLT – to 10 on zone, 25 totally.

### METHOD OF TREATMENT

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: 1-2 days.

Number of treatments: 10-15.

Re-treatment: 3-4 months.

Possible combination with other treatments:

- Drug therapy;
- Diet therapy;
- LFK.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly or via the contact medium (ultrasound gel medicament cocoa butter or other plants).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 17 (the projection of the liver)

- Area 24 (paravertebrally, D2-6 segmentarnvya innervation of the heart)
- Area 25 (the projection of the liver and gall bladder).

MLT R - Zone 30 (popliteal fossa on the right / left)

- Area 10 (palmar surface of hands)
- Area 12 (over-and subclavian area)
- Area 11 (ulnar fossa).

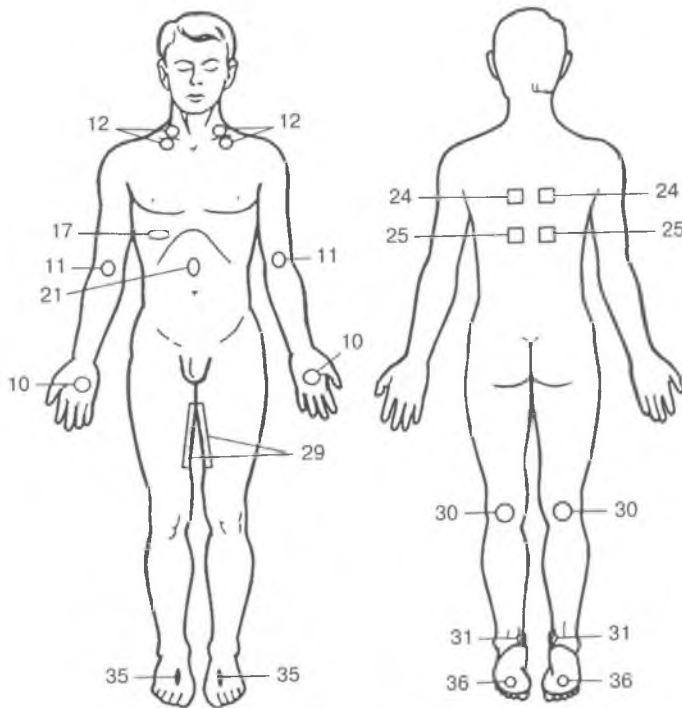
MLT IR - Zone 21 (the projection of the celiac plexus)

- Area 29 (the projection of the femoral vessels)
- Area 31 (the projection of the tibial artery)
- Area 35 (the projection of the dorsal artery of the foot).

ATTENTION!

During one session use the same area for UST and 2 areas (of the proposed) for MLT and MLT R IR. All zones alternate in independence of the affected vessel

Influence zones		
US	MLT IR	MLT Rd
24; 25; 17	21; 29; 31; 35	10; 11; 30; 12





## E10-E14 DIABETES

**Diabetes** (diabetes, sugar diabetes, diabetes mellitus) - a chronic endocrine-metabolic and vascular disease, which is based on absolute or relative deficiency of insulin, leading to disruption of carbohydrate, fat, protein and another types of exchanges, as well as functions of major organs and body systems.

### **Etiopathogenesis**

Diabetes is a multifactorial disease with genetic predisposition. Risk factors for developing type 2 diabetes include: obesity, ethnicity (especially when changing the traditional way of life in the West); sedentary lifestyle; especially diet (high intake of refined carbohydrates and low fiber content); arterial hypertension. Pathogenetically T2D is a heterogeneous group of metabolic disorders, this is what determines its significant clinical heterogeneity. At the heart of it lies the pathogenesis of insulin resistance (decreased insulin-mediated glucose utilization of tissues), which is implemented on the background of the secretory dysfunction of  $\beta$ -cells. Thus, there is a violation of the balance sensitivity to insulin and insulin secretion. Secretory  $\beta$ -cell dysfunction is decelerating 'early' release of insulin secretory response to an increase in blood glucose levels. At the same time the 1st (rapid) phase of secretion, which is emptied vesicles accumulated insulin is virtually absent; 2-I (slow) phase of secretion is carried out in response to hyperglycemia is stabilized permanently in tonic regime, and despite the excess secretion of insulin, blood glucose levels on a background of insulin resistance are not normal.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-5	75-99	2,4 (zone 17) 9,4 rest zones	UST – not more than 15 totally. MLT - totally to 25.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: the first week - every other day; the second - after 2 days; third - 2 times a week.

Number of treatments: up to 20 sessions.

Re-treatment: 2-3 months.

Possible combination with other treatments:

- Drug therapy;
- Phytotherapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly or via the contact medium (ultrasound gel, Vaseline, medicament).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

Day 1:

UST - zone 19a, 19b (the projection of the pancreas front and rear);

MLT R- zone 36 on the right (the plantar surface of the foot).

MLT IR - Zone 36 on the left (the plantar surface of the foot).

The intensity of exposure - 25%, exposure time - 3 minutes per zone.

Day 2:

UST - Zone 17 (the sixth intercostal space on the right, the liver projection).

The intensity of exposure - 50%, exposure time - 3 minutes per zone.

MLT R - Zone 36 (the plantar surface of the foot).

The intensity of exposure - 50%, exposure time - 4 minutes per zone.

MLT IR (in alternation with the US) - Zone 26 (paravertebrally, left / right on the D10-11 vertebral level).

The intensity of exposure - 75%, exposure time - 7 minutes per zone.

Day 3:

UST - zone 19a, 19b (the projection of the pancreas front and rear).

The intensity of exposure - 75%, exposure time - 5 minutes per zone.

MLT IR - zone 37, 38 (additional area).

The intensity of exposure - 100%, exposure time - 7 minutes per zone.

Day 4:

UST - Zone 17 (the sixth intercostal space on the right, the liver projection).

The intensity of exposure - 100%, exposure time - 7 minutes per zone.

MLT R - Zone 36 (the plantar surface of the foot).

The intensity of exposure - 100%, exposure time - 10 minutes per zone.

MLT IR - Zone 37 (additional area).

The intensity of exposure - 100%, exposure time - 10 minutes per zone.

Day 5:

UST - zone 19a, 19b (the projection of the pancreas front and rear).

The intensity of exposure - 100%, exposure time - 7 minutes per zone.

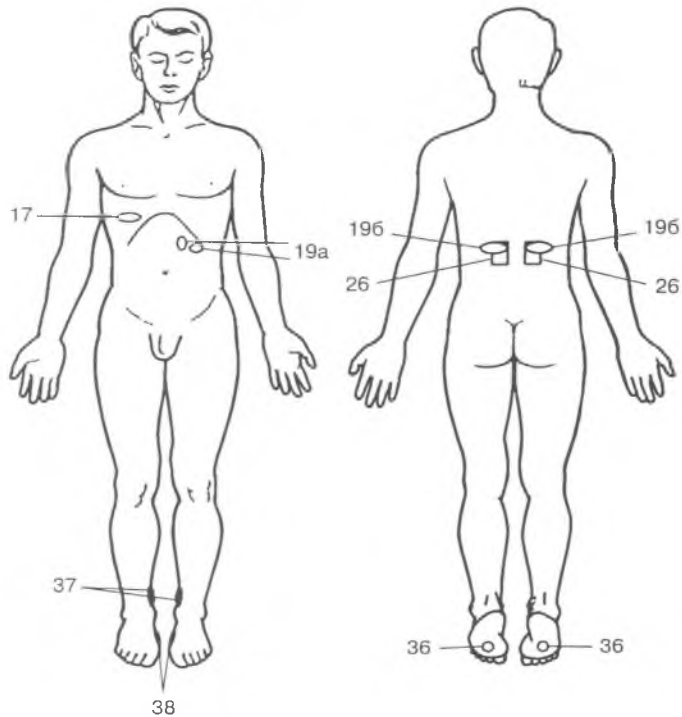
MLT R - Zone 36 (the plantar surface of the foot).

The intensity of exposure - 100%, exposure time - 15 minutes per zone.

MLT IR - Zone 37 (additional area).

The intensity of exposure - 100%, exposure time - 15 minutes per zone.

Influence zones		
US	MLT IR	MLT Rd
17; 19a; 196	26; 37; 38	36



## I20-I25 CORONARY HEART DISEASE

**The coronary heart disease (CHD)** includes several self-addressed forms of heart disease: angina pectoris, focal degeneration, myocardial infarction.

### **Etiopathogenesis**

The basis of coronary heart disease is always is coronary insufficiency, caused by atherosclerosis of the coronary arteries of the heart. CHD contribute to many internal and external factors, called risk factors: lipid metabolism, is usually characterized by high blood cholesterol, hypertension, diabetes, smoking, physical inactivity, prolonged emotional stress.

The basis of the pathogenesis of myocardial ischemia in all forms of coronary heart disease is a mismatch between the demand of the heart muscle for oxygen and nutrients, and their receipt because of narrowing of the coronary arteries. Of great importance in the pathogenesis of coronary insufficiency in ischemic heart disease have impaired platelet function and increase blood clotting, which can impair the microcirculation in the capillaries of the myocardium and lead to thrombosis of the

arteries, which contribute to atherosclerotic changes in their walls and the slowing of blood flow in areas of narrowing of the arteries.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-3	75-99	1,2 (zones 8; 14); 37 (zone 24); 1-10 (zones 17; 25); 9,4 (zones 19, 26).	US – not more than 15 totally; MLT - totally to 25.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: the first week - every other day; the second - after 2 days; third - 2 times a week.

Number of treatments: 15.

Re-treatment: 2-3 months.

Possible combination with other treatments:

- Drug therapy;
- Phytotherapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly or via the contact medium (ultrasound gel, Vaseline, medicament).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

Day 1:

UST - Zone 19 (the projection of the pancreas);

- Area 26 (paravertebrally, left / right on the D10-11 vertebral level).

MLT R - Zone 8 (C8 projection D2 vertebral segments).

MLT IR - Zone 14 (apical region of the heart push);

The intensity of exposure - 25%, exposure time - 3 minutes per zone.

Day 2:

UST - Zone 17 (the sixth intercostal space on the right, the liver projection).

MLT R - Zone 25 (projection C8 D2 vertebral segments).

MLT IR - Zone 14 (apical region of the heart push).

The intensity of the impact of 50%, exposure time - 3 minutes per zone.

Day 3:

US - Zone 19 (the projection of the pancreas).

MLT R - Zone 8 (C8 projection D2 vertebral segments).

MLT IR - Zone 14 (apical region of the heart push).

The intensity of exposure - 75%, exposure time - 3 minutes per zone.

Day 4:

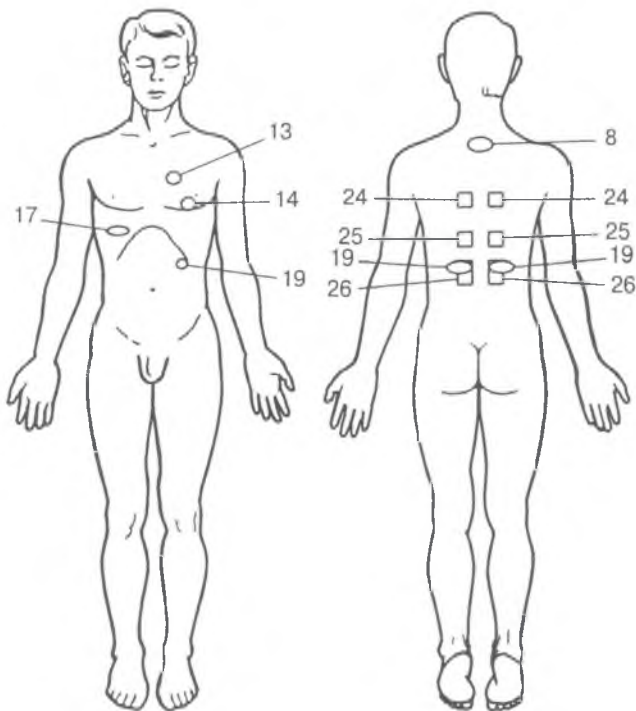
UST - Zone 17 (the sixth intercostal space on the right, the liver projection).

MLT R - Zone 25 (projection C8 D2 vertebral segments).

MLT IR - Zone 14 (apical region of the heart push).

The intensity of exposure - 100%, exposure time - 3 minutes per zone.

Influence zones		
US	MLT IR	MLT Rd
17; 19; 26	14; 24	8; 25



## E06.3 AUTOIMMUNE THYROIDITIS

**Autoimmune thyroiditis** - a heterogeneous group of inflammatory diseases of the thyroid autoimmune etiology, in pathogenesis of which is a different expression of the destruction of follicles and follicular thyroid cells. Etiopathogenesis

The disease develops as the genetically determined defect of the immune response, resulting in T-lymphocytic aggression against its own thyrocyte and their destruction. Pathological significance for the body of autoimmune thyroiditis is almost exhausted by the fact that it is a risk factor for hypothyroidism. The fact of carrier thyroid antibodies, which are markers of autoimmune thyroiditis, multiple greater than the incidence of hypothyroidism in the population, suggests that in most cases the disease does not result in hypothyroidism.

### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-5	50-75	9,4 (zones TG, 15, 20) 1-10 regeem P1 (another zones)	UST – not more 15 totally. MLT - totally to 25.

### METHOD OF TREATMENT

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: the first week - every other day; the second - after 2 days; third - 2 times a week. Possible supporting sessions MLUZT 1 session in a week or two weeks depending on the efficacy of treatment.

Number of treatments: 20.

Re-treatment: 2-3 months.

Possible combination with other treatments:

- Drug therapy;
- Spa treatment.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly or via the contact medium (ultrasound gel, Vaseline, medicament).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

Day 1:

MLT R - Zone 1 (the parietal protuberance, projection area of the pineal gland, AT - T20).

MLT IR - Zone 15 (the projection of the thymus gland, the sternum at the level of the 4th intercostal space);

- Zone 8 (C7-D2 projection of the vertebral segments).

The intensity of exposure - 25%, exposure time - 3 minutes per zone.

Day 2:

UST - Zone 20 (the projection of the spleen, the area of the left hypochondrium).

The intensity of exposure - 50%, the total exposure time - 3 min.

MLT R- Zone 3 (eye - effect through closed eyelids).

The intensity of exposure - 50%, exposure time - 5 minutes per zone.

MLT IR - Zone 10 (palmar surface of hands right / left).

The intensity of the impact of 75%, exposure time - 7 minutes per zone.

Day 3:

UST - Zone 19 (the projection of the pancreas);

- Area 15 (the projection of the thymus gland, the sternum at the level of the 4th intercostal space);

The intensity of exposure - 75%, exposure time - 7 minutes.

MLT R- Zone 1 (the parietal protuberance, projection area of the pineal gland,

AT - T20);

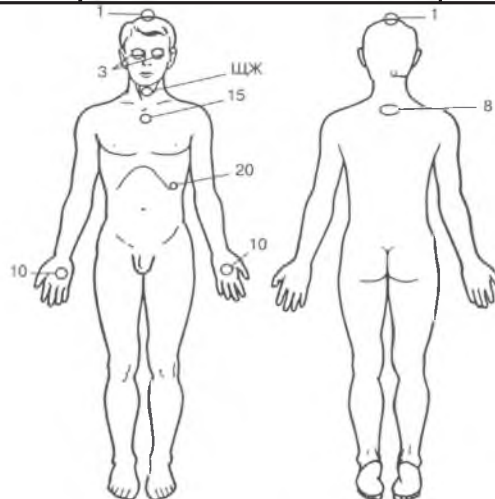
- Zone 8 (C8 projection D2 vertebral segments).

-75% Intensity exposure, exposure time - 5 minutes per zone.

MLT IR - Zone 10 (palmar surface of hands right / left).

The intensity of the impact of 75%, exposure time - 10 minutes per zone.

Influence zones		
US	MLT IR	MLT Rd
20	10; 15	1; 3; 8



## I63 ISCHEMIC STROKE

**Stroke (attack).** This term is used for across the different etiology and pathogenesis of the state, which implements the link of an acute vascular accident of the arterial and venous bed. In to a stroke include acute cerebral circulatory disorders, which are characterized by a sudden (within minutes, at least - hours) the emergence of focal neurological disorders (motor, speech, sensory, coordinates, visual, cortical functions, memory) and / or of brain disorders (change of consciousness, headache , vomiting, etc.) that persist for more than 24 hours, or lead to death of the patient in a shorter period of time due to causes of cerebrovascular origin.

### **Etiopathogenesis**

The main causes of intracerebral hemorrhage are hypertension, intracranial aneurysm (including microaneurysms, formed as a result of a traumatic brain injury or sepsis), arteriovenous malformation, cerebral amyloid angiopathy, the use of anticoagulants or thrombolytics, diseases accompanied by hemorrhagic syndrome (leukemias, uremia, thrombocytopenic purpura disease, etc.).

The most common two types of ischemic stroke (cerebral infarction) - thrombotic due to primary thrombotic occlusion of a cerebral vessel, and embolic, due to embolism from a remote source.

The most effective use of techniques developed in the first 2 weeks of illness.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-5	6-15	37 (Ischemic hearth) 1-10 Mode P1 (rest area)	UST - no more than 15 in total. MLT - a total of 25

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: the first 3-4 days - 2 times a day, then 1 treatment per day up to 12 days after stroke.

Number of treatments: 10-15.

Retreatment:

Possible combination with other treatments:

- Medical treatment including antioxidant therapy;
- Electrostimulation of paretic limbs with 5 days of the disease;



- Special styling of the patient and the possible elements of passive and active physical therapy

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly or via the contact medium (ultrasound gel, Vaseline, medicament).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

1st session (morning):

MLT R - Zone 6a (projection of the carotid artery by ischemia).

The intensity of exposure - 25%, exposure time - 10 minutes per zone.

MLT IR - Zone 1a (projection focus ischemia, transcranial)

The intensity of exposure - 50%, exposure time - 7 minutes per zone.

2nd session (evening)

MLT IR - Zone 1a (projection focus ischemia, transcranial)

The intensity of exposure - 75%, exposure time - 10 minutes per zone.

- Zone 8 (C8 projection D2 vertebral segments).

The intensity of exposure - 50%, exposure time - 7 minutes per zone.

3rd session (morning):

MLT IR - Zone 1a (projection focus ischemia, transcranial)

The intensity of exposure - 100%, exposure time - 10 minutes per zone.

MLT R - Zone 6a (projection of the carotid artery by ischemia).

The intensity of exposure - 50%, exposure time - 10 minutes per zone.

4th session (evening)

MLT IR - Zone 1a (projection focus ischemia, transcranial)

The intensity of exposure - 100%, exposure time - 10 minutes per zone.

- Zone 8 (C8 projection D2 vertebral segments).

The intensity of exposure - 75%, exposure time - 7 minutes per zone.

MLT R - 6b area (the projection of the carotid artery on the opposite side of ischemia).

The intensity of exposure - 50%, exposure time - 10 minutes per zone.

5th session (morning):

MLT IR - Zone 1a (projection focus ischemia, transcranial).

The intensity of exposure - 100%, exposure time - 10 minutes per zone.

MLT R - Zone 6a (projection of the carotid artery by ischemia).

The intensity of exposure - 50%, exposure time - 10 minutes per zone.

UST - Zone 17 (the projection of the liver).

The intensity of exposure - 100%, exposure time - 7 minutes per zone.

6th session (evening)

MLT IR - Zone 1a (projection focus ischemia, transcranial).

The intensity of exposure - 100%, exposure time - 10 minutes per zone.

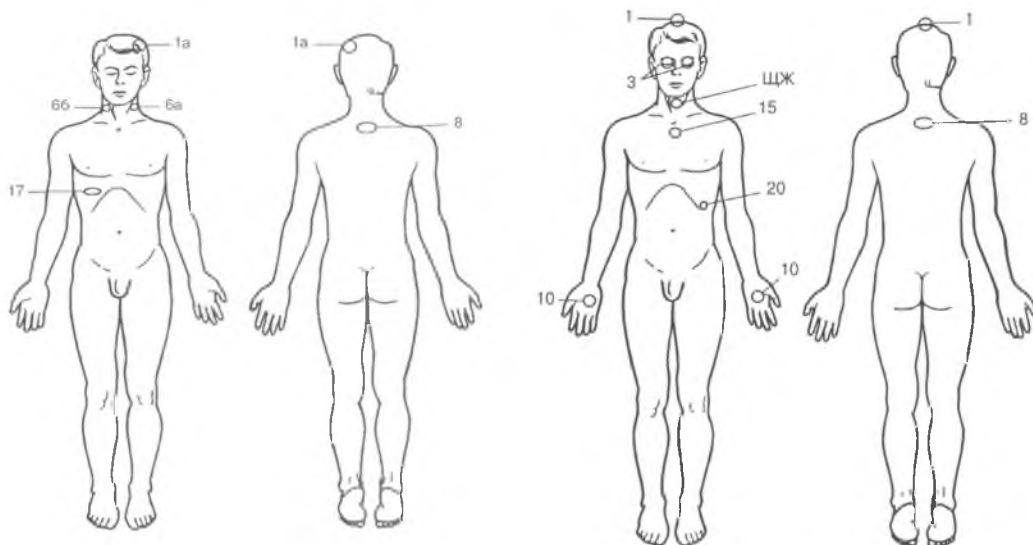
- Zone 8 (C8 projection D2 vertebral segments).

The intensity of exposure - 100%, exposure time - 7 minutes per zone.

MLT R- zone 6b (the projection of the carotid artery on the opposite side of ischemia).

The intensity of exposure - 50%, exposure time - 10 minutes per zone.

Influence zones		
US	MLT IR	MLT Rd
17	1a; 8	6a; 6б



Methods of MLT in acute ischemia in the basin of the vertebral arteries is similar to that during ischemia in the basin of the carotid arteries.

The only difference is that for the percutaneous laser irradiation of blood is selected projection of the vertebral arteries (under the occipital bone, paravertebrally). Time and exposure parameters, as well as monitoring of treatment efficacy are similar.

Influence zones		
US	MLT IR	MLT Rd
20	10; 15	1; 3; 8

## G43 MIGRAINE

### Etiopathogenesis

Migraine - a disease characterized by paroxysmal re headache from 4 to 72 hours, often accompanied by visual and gastrointestinal symptoms.

Migraine attacks are accompanied by regional changes in cerebral blood flow due to the expansion of intracranial arteries. Vasomotor changes are caused by sporadic decrease systemic of concentration of serotonin. Prodromal symptoms may be due to intracranial vasoconstriction. One of the main factors of migraine is a constitutional predisposition to it, which is often hereditary According to the vascular theory of migraine is treated as suddenly develops generalized breakdown of the vasomotor regulation, which manifested by lability tone of cerebral and peripheral vascular disease.

### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	12-15	37; 75; 77	US - totally up to 10. MLT - totally not more than 15.

### METHOD OF TREATMENT

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily during the acute (pain) period, a day in between attacks.

Number of treatments: up to 14-15.

Retreatment: in case of need in two weeks.

Possible combination with other treatments:

- Drug therapy;
- Physical therapy;
- Acupuncture.

Methods of exposure: labile and stable in the recommended areas.

Impact UST conducted directly or via a coupling medium (ultrasound gel, Vaseline, medicament).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 17 (the projection of the liver)

- Area 21 (the projection of the celiac plexus)

- Area 25 (the projection of the liver and gall bladder).

MLT R - Zone 6 (projection of the carotid artery);

- Area 10 (palmar surface of the right / left).

MLT IR - PPL (possible areas of pain localization)

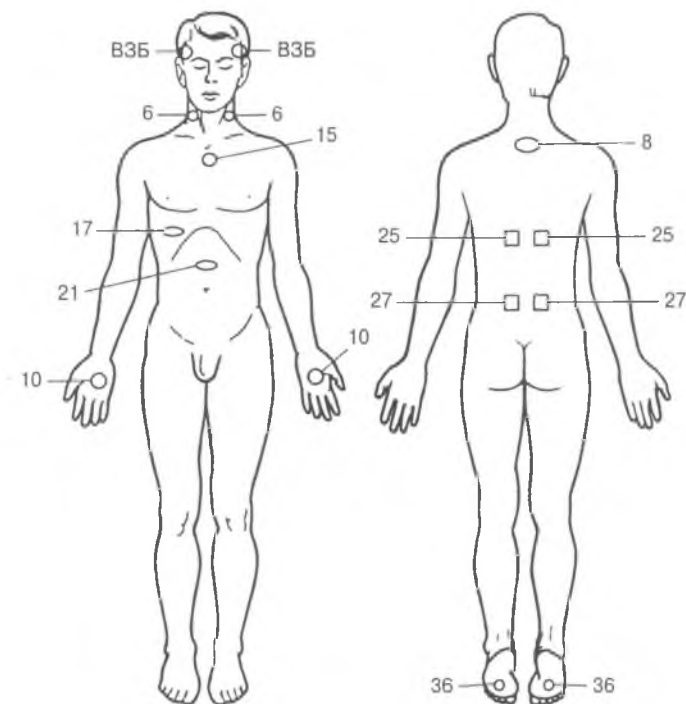
- Zone 8 (C8 projection D2 vertebral segments).

Additional area: US (27); MLT IR (36).

**ATTENTION!**

**For the impact of MLT and MLTR and IR use 2-3 zone (of the proposed) in one session.**

Influence zones		
US	MLT IR	MLT Rd
17; 21; 25; 27	B3Б; 8; 36	6; 10



**N00-H59 DISEASES OF THE EYE AND ADNEXA**  
**H47.0 OPTIC NERVE SUBATROPHY**  
**H35 RETINITIS PIGMENTOSA**

**Optic nerve subatrophy** - a disease of the optic nerve and retina. It develops most often as a result of craniocerebral injury, cerebral vascular disease, or arachnoiditis. It is characterized by a decrease: the visual functions and pallor of the optic disc.

**Etiopathogenesis**

Causes: various pathological processes in the optic nerve and the retina (inflammation, degeneration, swelling, poor circulation, compression of the optic nerve damage), diseases of the central nervous system (brain tumors, abscesses, meningitis, syphilitic lesions), hypertension, atherosclerosis, profuse bleeding, intoxication, hereditary reasons.

Pathogenesis: the destruction of nerve fibers and their replacement by glial connective tissue, obliteration of capillaries that feed the optic nerve.

**TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5  growing with each session, a maximum  the 5th session	50-75-99  growing with each session, maximum the 5th session	1-5th sessions - 1-10 (P 1) 6-7 th sessions - 9.4 8-9 th sessions - 18 10-11 minutes sessions - 37 12-15 minutes sessions - 75 16-21 minutes 10-100 sessions (P2)	US - to 7. MLT - not more than 10 per zone.

**METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily first 5 sessions, the following 5 - in a day, then 3 sessions per week.

Number of treatments: 21.

Re-treatment: two or three months.

Possible combination with other treatments:

- Drug therapy;

- Superelektroforez (endonasal technique) hydrocortisone or vitamin E (in the solvent used kachastve 20% solution Dimexidum.)

Methods of exposure: labile and stable in the recommended areas.

Impact UST conducted directly or via a contact medium (UST gel, Vaseline, medicament).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

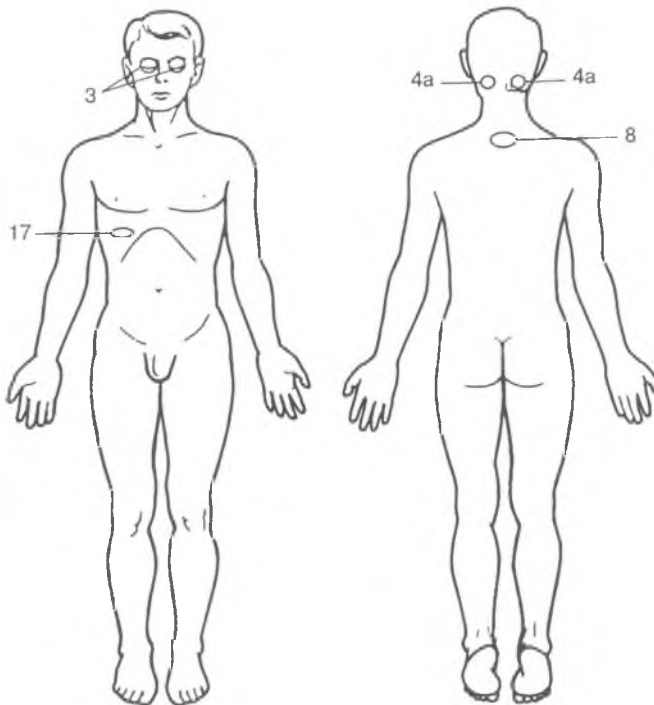
UST - Zone 17 (the projection of the liver).

MLT R- Zone 3 (eye exposure through closed eyelids).

MLT IR - 4a (the projection of the occipital lobe of the brain)

- Zone 8 (C8 projection D2 vertebral segments).

Influence zones		
US	MLT IR	MLT Rd
17	8; 4a	3



## H00-H59 MYOPIA

**Nearsightedness (myopia)** - blurred vision, especially in distance. When operating in close proximity may occur pain in the eyes, on the forehead and temples.

### **Etiopathogenesis**

It is now recognized that the origin of myopia plays the role of a combination of genetic (polygenic mode of inheritance, often in an autosomal recessive manner), and environmental factors. The impact of the latter may appear as in utero (toxoplasmosis, rubella, toxicosis pregnant women, are often the cause of prematurity), and in the postnatal period (acute and chronic infections, especially accompanied by hyperthermia, prolonged course, weight loss, lack of proteins and food, heavy physical and visual-intensive work).

In the pathogenesis of progressive myopia and its complications plays a role not only abnormal elongation eyes, but the increase of its dimensions (horizontal, vertical, oblique) and volume respectively. In this region of the equator and rear pole eyes in different patients are involved in the pathological process in varying degrees, which leads to damage of various departments of the fundus.

Nearsightedness (myopia) - decrease in visual acuity, especially away. When operating in close proximity may occur pain in the eyes, on the forehead and temples.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5  growing with each session, a maximum  the 5th session	50-75-99  growing with each session, maximum the 5th session	1-10 (P1) alternated with 37 by session	UST - to 7. MLT - not more than 10 per zone.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: the first 2-3 sessions a day, the following - 2 sessions per week.

Number of treatments: 14-15.

Re-treatment: 2-3 months.

Possible combination with other treatments:

- Drug therapy;

- Special exercises for the muscles of the eye;
- Electrical circular muscles of the eye on both sides;
- Acupuncture.

Methods of exposure: labile and stable in the recommended areas.

Impact UST conducted directly or via a contact medium (UST gel, Vaseline, medicament).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

US - Zone 17 (the projection of the liver).

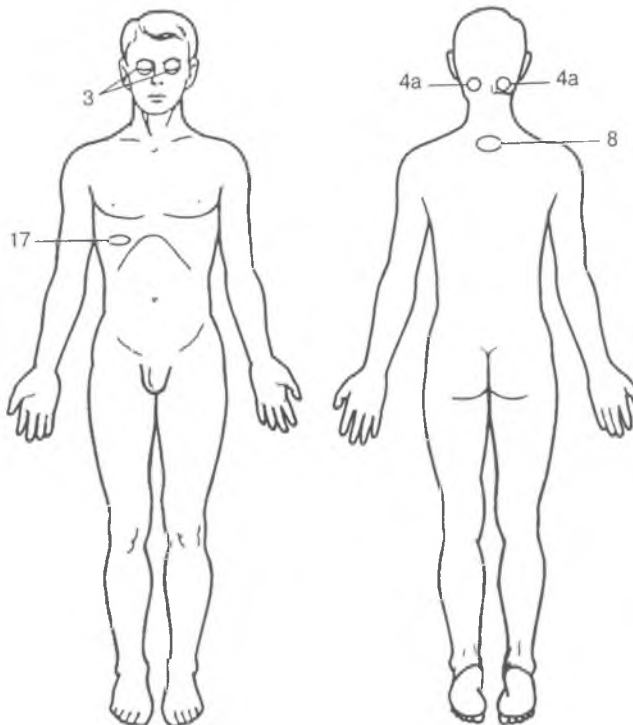
MLT R- Zone 3 (eye exposure through closed eyelids).

MLT IR - 4a (the projection of the occipital lobe of the brain) - Zone 8 (C8 projection D2 vertebral segments).

**ATTENTION!**

**Sessions allegedly carried out in the early morning hours (10-12 hours).**

Influence zones		
US	MLT IR	MLT Rd
17	8; 4a	3





## H 36.0 DIABETIC RETINOPATHY

This form of microangiopathy is highlighted in a separate complication of diabetes due to the large, not only medical, but also social value (impact on the quality of life of patients and their ability to work).

### **Etiopathogenesis**

The primary factor that plays a role in the development of diabetic retinopathy is hyperglycemia. Other metabolic disturbances which occur in diabetes to a lesser extent affect the development of microangiopathy retinal vessels.

The first link in the pathogenesis of this case is the failure of retinal vascular wall by the type of microangiopathy in diabetes mellitus. Vascular lesion leads to a decrease in blood perfusion of the retina, leading to the development of chronic hypoxia. In turn, chronic hypoxia causes development dystrophies, in the retina often develop fatty degeneration or calcification occurs. In addition, chronic hypoxia stimulates vascular neogenesis that is compensatory character in terms of hypoxia. Neovascularization occurs due to proliferation of cell wall elements existing vessels.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5 growing with each session, a maximum the 5th session	50-75-99 growing with each session, maximum the 5th session	1-10 (P1) alternated with 37 by session	US - to 7. MLT - not more than 10 per zone.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: the first 2-3 sessions a day, the following - 2 sessions per week.

Number of treatments: 20-21 (usually 14-15).

Re-treatment: 2-3 months.

Possible combination with other treatments:

- Drug therapy;
- Diet therapy;
- Electrophoresis of r-ra potassium iodide on Bourguignon or endonasal.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed directly or via the contact medium (UST gel, Vaseline, medicament).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

1st session:

UST - Zone 17 (the projection of the liver).

MLT R - Zone 3 (eye exposure through closed eyelids).

MLT LGB - 25 (the projection of the liver and gall bladder).

The intensity of exposure - 25%, exposure time per zone - 3 minutes.

2nd session:

UST - Zone 19 (the projection of the pancreas).

MLT R - Zone 3 (eye exposure through closed eyelids);

- Zone 4a (projection of the occipital lobe of the brain).

MLT IR - 26 (paravertebrally projection segmental innervation of the pancreas, D10-12).

The intensity of exposure - 50%, exposure time per zone - 4 minutes.

3rd session:

MLT R - Zone 6 (chrezkochnoe irradiation of blood, the projection of the carotid arteries).

The intensity of exposure - 50%, exposure time to the zone - 10 minutes.

MLT IR - Zone 8 (C8 projection D2 vertebral segments).

The intensity of exposure - 75%, exposure time per zone - 5 minutes.

4th session:

MLT R - Zone 3 (eye exposure through closed eyelids);

- Zone 4a (projection of the occipital lobe of the brain).

The intensity of exposure - 50%, exposure time per zone - 5 minutes.

UST - Zone 17 (front projection of the liver).

MLT IR - Zone 25 (paravertebrally, D7-L2 segmental innervation zone of the liver).

The intensity of exposure - 75%, exposure time per zone - 5 minutes.

5th session:

UST - Zone 19 (the projection of the pancreas).

MLT IR - zone 4a (projection of the occipital lobe of the brain).

- Area 26 (paravertebrally projection segmental innervation of the pancreas, D10-12).

The intensity of exposure - 100%, the exposure time per zone - 7 minutes.

6th session:

MLT R - Zone 6 (percutaneous irradiation of blood, the projection of the carotid arteries).

The intensity of exposure - 50%, exposure time to the zone - 15 minutes.

7th session:

MLT R - Zone 3 (eye exposure through closed eyelids);

- Zone 4a (projection of the occipital lobe of the brain).

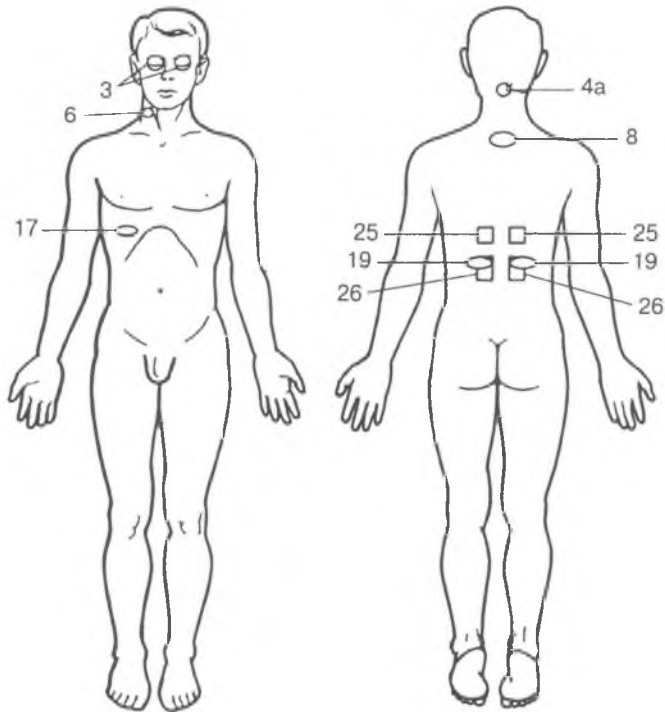
The intensity of exposure - 50%, exposure time to the zone - 10 minutes.

UST - Zone 17 (front projection of the liver).

MLT IR - Zone 25 (paravertebrally, D7-L2 segmental innervation zone of the liver).

The intensity of exposure - 100%, the exposure time per zone - 7 minutes.

Influence zones		
US	MLT IR	MLT Rd
17; 19; 26	8; 4a; 25; 26	3; 4a; 6



## L00-L99 DISEASES OF THE SKIN AND SUBCUTANEOUS TISSUE

### L40 PSORIASIS

**Psoriasis** - a chronic skin disease that affects the skin, hair, sebaceous glands. The disease has a multifactorial nature. There is at any age, non-communicable.

#### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
3	75-99	2,5	UST - on the hearth 3, a total of 10. MLT - 5 at the center, a total of 20.

#### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 10-15.

Retreatment: if necessary, after 30 days.

Possible combination with other treatments:

- Drug therapy;
- Herbal medicine;
- EHF-puncture;

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed via the contact medium - refined sunflower oil. As a medicament for use hydrocortisone phonophoresis.

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - L area (lesions);

- Area 17 (the projection of the liver).

When multiple foci affect the segmental zone paravertebrally ultrozvukom with a frequency of 100 kHz.

MLT R - Zone 11 (ulnar fovea right / left);

- Area 30 (popliteal fossa on the right / left);
- Area 20 (the projection of the spleen);
- Area 12 (over-and subclavian area).

Use 1-2 zone in onesession.

MLT IR - Zone 23 (paravertebrally

D 2-5 segmental innervation zone of the lung);

- Area 25 (paravertebrally, D7 - L2 segmental innervation zone of the liver);

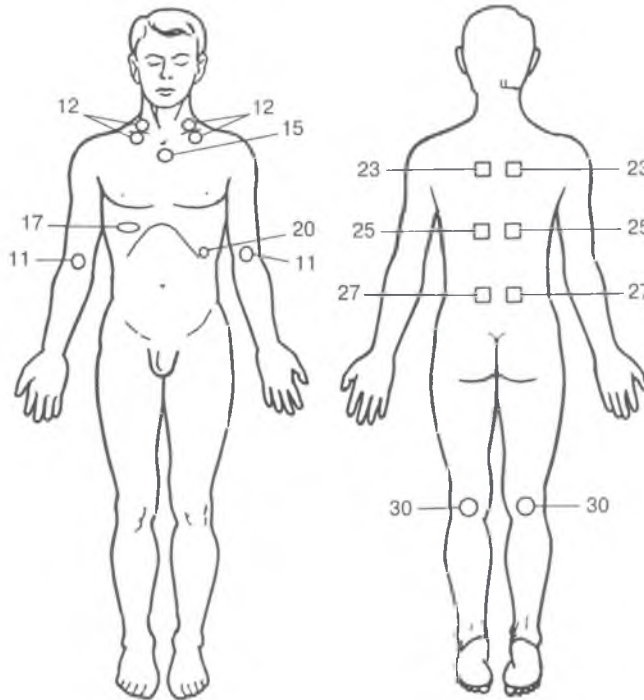
- Area 27 (paravertebrally, D11 - L2 segmental innervation area of the kidneys).

Possible combinations of treatment zones.

Day 1 - OP (US); 12; 30 (MLT Cr); 23, 25, 27 (MLT IR).

Day 2 - 17 (US); 11, 20 (MLT Cr); OP (MLT IR), etc.

Influence zones		
US	MLT IR	MLT Rd
Affected area; 17	23; 25; 27; 15	11; 30; 12; 20



## L43 RED FLAT ZOSTER

**Ringworm red flat** - a skin disease that affects the skin, mucous membranes, nails less.

### **Etiopathogenesis**

At the heart of the development of lichen planus are violations of the regulation of immune and metabolic processes leading to inadequate tissue response under the influence of endogenous and exogenous trigger factors. Established family history planus with autosomal dominant inheritance. There are different theories of the disease: neural, viral and toxic-allergic. Well-known cases of lichen planus after stress, effective hypnosis and reflex-segmental therapy, indicating the role of the nervous system in the pathogenesis of the disease. The development of isolated lichen planus has a toxic-allergic version of the mucous membrane of the mouth of great importance. Occurrence planus on the oral mucosa to some extent dependent on the presence of disease in patients with gastrointestinal (gastritis, colitis etc.), Liver and pancreas.

The most common theory of infection (probably viral) and neurogenic origin of the disease. Ill mostly adults.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-3	75-99	1,2; 1,5; 52; 75	UST - a total of 6-10. 3 MLT- zone total to 20.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 7-12.

Retreatment: if necessary, after 30 days.

Possible combination with other treatments:

- Drug therapy;
- Diadynamic;
- Electrosleep.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed via the contact medium - refined sunflower oil. As a medicament for ultraphonophoresis can use hydrocortisone.

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 23, 25, 27 (paravertebrally, segmental zones of the lungs, liver, kidney);  
 - Area 17 (the projection of the liver).

MLT R - Zone 11 (ulnar fovea right / left);  
 - Area 30 (popliteal fossa on the right / left);  
 - Area 20 (the projection of the spleen);  
 - Area 12 (over-and subclavian area).

Use 1-2 zone in one session.

MLT IR - OP area (lesions);

**ATTENTION!**

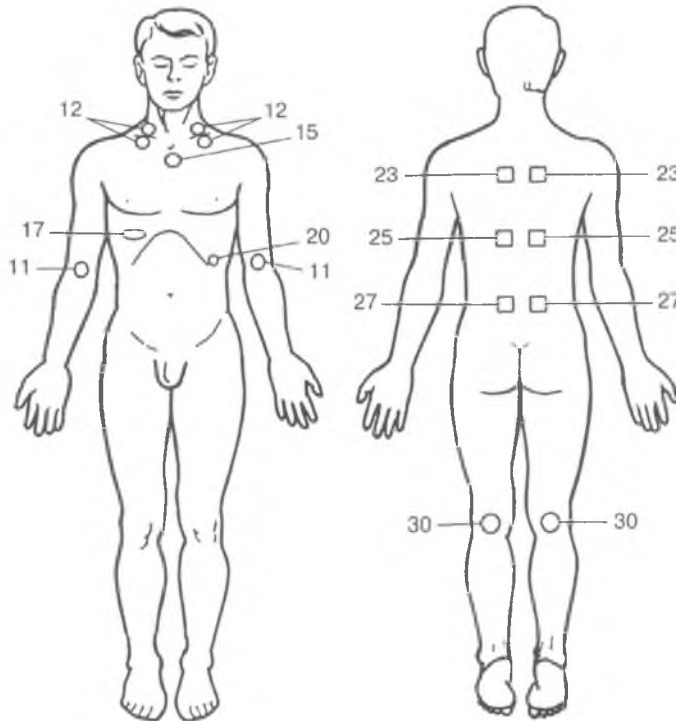
***When verrucous form of the disease through ultrasound combined with MLTIR day locally.***

Possible combinations of treatment zones.

Day 1 - 23, 25, 27 (UST); 12; 30 (MLT R); OP (MLT IR).

Day 2 - 17 (UST); 11, 20 (MLT R); OP (MLT IR), etc.

Influence zones		
US	MLT IR	MLT Rd
23; 25; 27; 17	Affected area	11; 30; 12; 20



## L20-L30 DERMATITIS AND ECZEMA

**Dermatitis** - inflammation of the superficial layers of the skin neuro-allergic nature that occurs in response to external or internal stimuli, different polymorphic rash, itching and prolonged recurrent course.

### **Etiopathogenesis**

It is considered eczema polyetiological disease. The weakness of the immune system in the presence of infectious antigenic stimuli is shown persistence of microbial and bacterial antigens to the formation of chronic recurrent inflammation in the epidermis and dermis. This gives rise to abnormal circulating immune complexes with the damaging formation of microstructures own series autoantigens autoaggressive initiating formation of antibodies.

### **TREATMENT SCHEME: (ACUTE STAGE)**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	75-99	eczema, dermatitis - 0.7 acne vulgaris -1.7 pustular eczema, weakness, fatigue - 2.2 diastolic hypertension - 9.2	UST-5 on each side MLT-3 zone, total to 20.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: every other day.

Number of treatments: 10-12.

Retreatment: if necessary, after 30 days.

Exposure to ultrasound is performed via the contact medium - refined sunflower oil. As a medicament for ultraphonophoresis can use hydrocortisone.

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 23, 25, 27 (paravertebrally, segmental lung area, liver, kidney);

MLT R- Zone 11 (ulnar fovea right / left);

- Area 30 (popliteal fossa on the right / left);

- Area 20 (the projection of the spleen);

- Area 12 (over-and subclavian area).



Use 1-2 zone in one session.

MLT IR - Zone L (lesions);

Treatment regimen (chronic phase).

The front panel of the device are the following parameters of the procedure:

### **TREATMENT SCHEME: (CHRONIC STAGE).**

На передней панели аппарата выставляем параметры процедуры:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3	75-99	Eczema, Dermatitis - 0.7 Eczema, dermatitis, abrasions, acne vulgaris -1.7 Eczema pustular, weakness, fatigue - 2.2 Eczema, diabetes, diastolic hypertension - 9.2	UST - Zone2, a total of6-10. MLT - 3 zone, total to 20.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily or every other day.

Number of treatments: 8-10.

Retreatment: if necessary, after 30 days.

Possible combination with other treatments:

- Drug therapy;
- EHF-puncture;
- Intravenous blood irradiation;
- Psychological correction;
- Diet therapy.

Methods of exposure: labile and stable in the recommended areas.

Impact UST is performed via the contact medium - refined sunflower oil.

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - OP area (lesions).

MLT R- Zone 11 (ulnar fovea right / left);

- Area 30 (popliteal fossa on the right / left);

- Area 20 (the projection of the spleen);

- Area 12 (over-and subclavian area).

Use 1-2 zone in onesession.

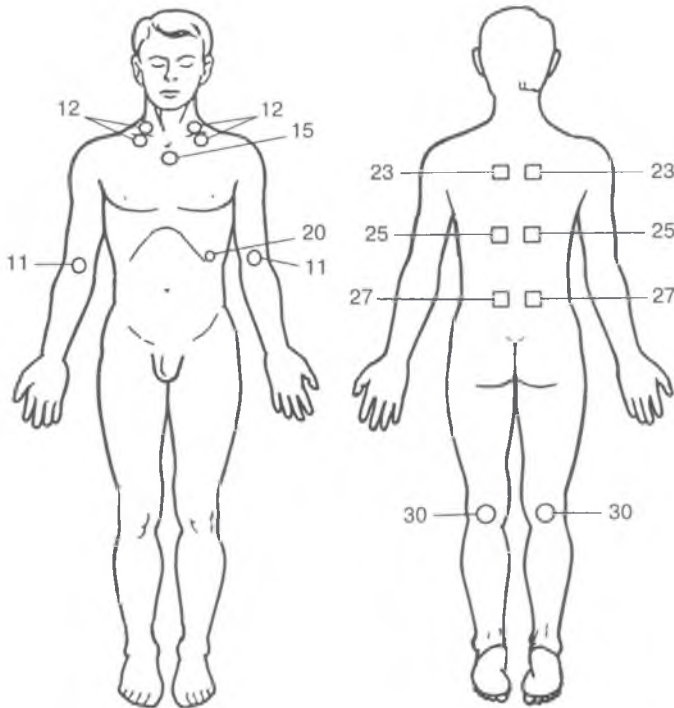
MLT IR - Zone 23, 25, 27 (paravertebrally, segmental lung area, liver, kidney);

**ACUTE STAGE**

Influence zones		
US	MLT IR	MLT Rd
23; 25; 27	Affected area	11; 30; 12; 20

**CHRONIC STAGE**

Influence zones		
US	MLT IR	MLT Rd
Affected area	23; 25; 27	11; 30; 12; 20



## **B00 B00 INFECTION CAUSED BY THE HERPES VIRUS (HERPES SIMPLEX)**

### **Pathogenesis**

The group of herpes viruses include 4 similar morphology of the virus: HSV (herpes simplex), varicella-zoster - virus, the causative agent of herpes zoster and varicella zoster virus Epstein-Barr virus and cytomegalovirus. By the end of 18 months of life, almost everyone in contact with HSV-1, the gateway are usually inhaled. Then the virus enters the cells of the trigeminal ganglion, but throughout life can never cause the clinical manifestations of infection.

With HSV-2 is the first contact usually occurs in early puberty when sexual relations. At the same time after the external manifestations, which may not be the same virus goes into an inactive form and sacral ganglion cells able to maintain long-term.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	75-99	9,4; 20; 40	UST - 4-5 in total; 3 MLT- zone total to 15.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 2-3.

Retreatment: if necessary.

Possible combination with other treatments:

- Drug therapy.

Methods of exposure: labile and stable in the recommended areas.

Impact UST is performed via the contact medium. As a medicament for use ultraphonophoresis interferon ointment (anhydrous lanolin with peach butter).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone L (lesions);

- Area 17 (the projection of the liver).

MLT R- Zone 11 (ulnar fovea right / left);

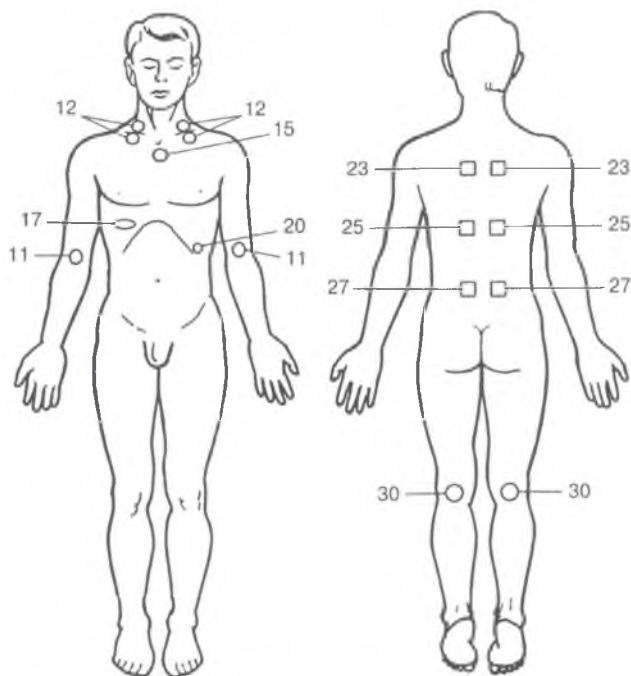
- Area 30 (popliteal fossa on the right / left);

- Area 20 (the projection of the spleen);
- Area 12 (over-and subclavian area).

Use 1-2 zone in onesession.

MLT IR - Zone 23, 25, 27 (paravertebrally, segmental lung area, liver, kidneys).

Influence zones		
US	MLT IR	MLT Rd
Affected area; 17	23; 25; 27	11; 30; 12; 20



## L20.8 NEURODERMATITIS

**Neurodermatitis** - a skin disease characterized by itching, lichenoid papules and chronic relapsing course. It has a clear seasonal dependence.

### **Etiopathogenesis**

Neurogenic theory of the origin of neurodermatitis leading role in the genesis of the disease removes violations of GNI, which is accompanied by discoordination nervous processes, pathological changes in their strength, balance and mobility.

Allergic theory of the genesis of neurodermatitis gives priority to the body's hypersensitivity to certain food, drugs, chemicals.

Hereditary theory considers the etiology and pathogenesis of neurodermatitis in line with a genetic predisposition to atopy. For example, studies suggest that atopic dermatitis develops in 56-81% of people whose parents (one or both, respectively) also suffered from this disease.

Considering the above, it is likely to be thinking about neurogenic-allergic nature of neurodermatitis and its primary development in individuals with hereditary predisposition. The impetus for the beginning and progression of neurodermatitis can serve as psychogenic factors, intoxication, endogenous and exogenous stimuli (exacerbation of chronic infections, food, inhalation, contact allergens, sun exposure, vaccination), endocrine disorders, and so forth.

Main pathogenetic changes neurodermatitis relate to immune disorders, excessive production of vasoactive substances and violation of the regulation of vascular tone. Pathological changes in the skin neurodermatitis presented acanthosis, intercellular edema (spongiosis), hyperkeratosis, the presence of perivascular infiltrates in the dermis.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-3	75-99	1,7; 1,2	UST - 5-7 per side MLT - 5 zone, total to 25.

### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 10-12.

Re-treatment: in the case of relapse.

Possible combination with other treatments:

- Drug therapy;
- EHF-therapy;

- Diet therapy;
- A long climatotherapy.

Methods of exposure: labile and stable in the recommended areas.

Impact UST is performed via the contact medium. As a medicament for use ultraphonophoresis interferon ointment (anhydrous lanolin with peach butter).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 23, 25, 27 (paravertebrally, segmental lung area, liver, kidneys).

- Area 17 (the projection of the liver).

MLT R- Zone 11 (ulnar fovea right / left);

- Area 30 (popliteal fossa on the right / left);

- Area 20 (the projection of the spleen);

- Area 12 (over-and subclavian area);

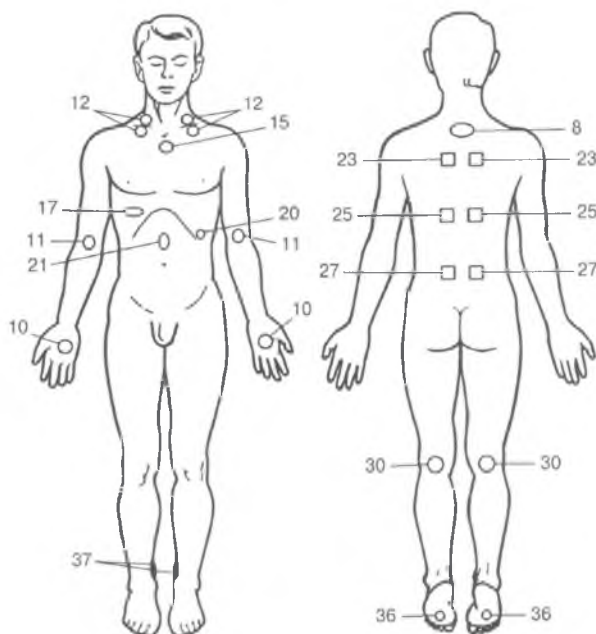
- Area 37 (the lower third of the internal surface of the tibia);

- Area 36 (the plantar surface of the foot).

Use 2-3 zone in onesession.

MLT IR - Zone L (lesions).

Influence zones		
US	MLT IR	MLT Rd
23; 25; 27	Affected area	11; 30; 12; 20; 36; 37



## L94.0 LOCALIZED SCLERODERMA

The disease, in which the connective tissue damage seen during compaction. For Scleroderma is characterized by multifocal fibrous structural and morphological and functional pathological processes with severe chronic course and irreversible skin tightening centers, in which there is progressive fibrosis with obliterative lesions arterioles.

### Etiopathogenesis

The etiology is not known. By precipitating factors rank stressors, acute and hr.infektsionnye illness, physical stimuli (cooling, sun exposure, vibration, ionizing radiation), chemicals (vaccines andserums). Pathogenesis of sclerodermacompliated, complex, with a probability of genetic conditions, but not yet precisely defined set of HLA genotypes. Scleroderma refers to multifactorial diseases with polygenic inheritance. In its pathogenesis a key role to play in impaired functions of fibroblasts and other cells kollagenobrazuyuschih.

### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-3	75-99	37; 50	UST - 2.5-3 per zone not more than 10 in total; MLT - 5 zone, a total of 55.

### METHOD OF TREATMENT

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 7-8.

Re-treatment: in the case of relapse.

Possible combination with other treatments:

- Drug therapy;
- EHF-therapy;
- Diet therapy;
- A long climatotherapy.

Methods of exposure: labile and stable in the recommended areas.

Exposure to ultrasound is performed via the contact medium. As a medicament for use ultraphonophoresis lidazu, ronidazu, aloe, dimexide.

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST- zones 23, 25, 27 (paravertebrally, segmental lung area, liver, kidneys).

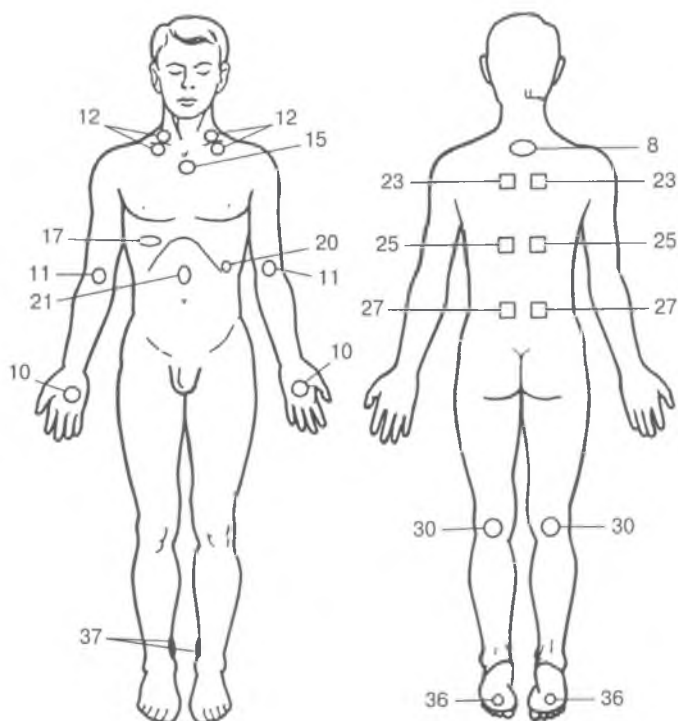
- Area 17 (the projection of the liver).

- MLT R- Zone 11 (ulnar fovea right / left);
- Area 30 (popliteal fossa on the right / left);
  - Area 20 (the projection of the spleen);
  - Area 12 (over-and subclavian area);
  - Area 37 (the lower third of the internal surface of the tibia);
  - Area 36 (the plantar surface of the foot).

Use 2-3 zone in onesession.

MLT IR - Zone L (lesions).

Influence zones		
US	MLT IR	MLT Rd
23; 25; 27	Affected area	11; 30; 12; 20; 36; 37





## SURGICAL DISEASES

MLUST in the treatment of surgical diseases is carried out with a view to enhancing the healing process, reduce treatment periods, preventing festering since thus activated bioenergetic processes in cells and tissues are stimulated redox reaction, increasing the metabolic activity of regenerating tissue cells. This leads to an increase in functional activity of fibroblasts, which causes acceleration of the differentiation and the restoration of collagen, stimulation of granulation processes of formation and scar tissue.

### K65 PERITONITIS

**Peritonitis** - an inflammation of the peritoneum, accompanied by common symptoms of the disease organism from impaired function of vital organs and systems.

#### **Etiopathogenesis**

Peritonitis, regardless of the reason he was called is a bacterial inflammation, pathogens it is pathogenic cocci, Escherichia coli, is often the cause of peritonitis are anaerobes, Bacteroides, etc. In recent years, it found that up to 35% of peritonitis caused by several bacterial pathogens - 'Associations of microbes.

In the pathogenesis of peritonitis main role belongs to intoxication. It is found that the area of the peritoneum is approximately equal to the skin surface. Evolving in a closed cavity suppurative process quickly leads to flood the body with toxins both bacterial and endogenous origin, especially serous cover contribute to the rapid involvement of it in the inflammatory process, which is usually accompanied by severe exudation. During the exudation on the parietal and visceral peritoneum formed fibrin overlay absorbing toxins.

#### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
-	75-99	10	MLT-15(totally)

#### **METHOD OF TREATMENT**

Position of the patient - lying on his back.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 5-7.

Possible combination with other treatments:

- Drug therapy.

Methods of exposure: labile and stable in the recommended areas.

Impact MLT Wires contact. Inductors set (stable) on a projection of pathological hearth, or in paravertebral reflex zones and the zone of the medulla oblongata.

MLT IR

1. Zone 13 (nadvennoe irradiation of blood vessels in the femoral area (on one side of the body) - 10minutes;

2. Zone 15 (the projection of the thymus gland) - 5 minutes.

After 4-6 hours of exposure carried out on the following 1.5 minutes zone:

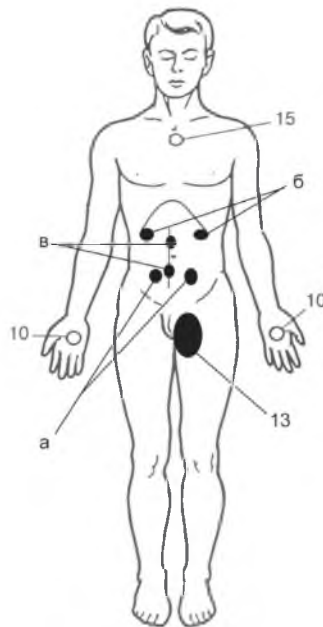
MLT IR - zone and (iliac area on the right / left);

- Zone B (left / right upper quadrant);

- A zone (during the surgical wound in the two points).

MLT R- Zone 10 (palmar surface of hands).

Influence zones		
US	MLT IR	MLT Rd
-	13, 15, a, б, B	10



## L91.0 KELOIDS (PREVENTION SUPPURATION)

### Etiopathogenesis

scar formation is mainly due to the extracellular matrix, including collagen through. Extracellular matrix - is supromolekulyarny complex including various types of chemical compounds (proteins, polysaccharides, proteoglycans, etc.). Of all collagens proteins constitute the main component of the extracellular matrix and are the most abundant proteins body occupying about 1/3 of all its proteins. Growth of excess extracellular matrix in the rumen occurs as a result of «wound» fibroblasts. In the intact (healthy) skin fibroblasts are responsible for the remodeling of components of the dermis, they destroy the old collagen and lay new. In wounds, injuries, burns and surgical interventions in the sores appear myofibroblasts, which tend to «seal the gap» in the tissues, hard putting the components of the extracellular matrix: collagen, glycosaminoglycans, elastin and other proteins. This is due to the proliferation of fibroblasts and excessive production of extracellular matrix and growth scarring occurs.

### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
-	75-99	2-5, the first three days, 37 and 77 the next	MLT-2.5-3 per zone, 15 (total)

### METHOD OF TREATMENT

Position of the patient - lying.

Position transmitter: contact.

Frequency of treatments: daily. Number of treatments: 7-8.

Possible combination with other treatments:

- Drug therapy.

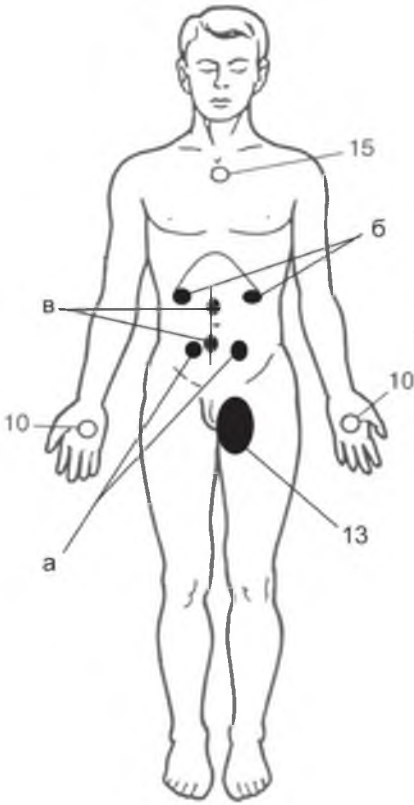
Methods of exposure: a stable, a 10 cm<sup>2</sup> area of the wound - 2 field exposure.

Therapeutic terminal MLT IR placed over a wound and around the wound surface for a distance of 3-5 mm.

Therapeutic terminal MLT Cr act directly on the method for the stable zone (contact).

MLT R - Zone 10 (palmar surface of hands).  
 MLT IR - wound area of the scar. (See. Peritonitis.)

Influence zones		
US	MLT IR	MLT Rd
-	Keloid scar	10



## **T79.3 POST-TRAUMATIC WOUND INFECTION, NOT ELSEWHERE CLASSIFIED**

### **FESTERING WOUNDS**

Damage to the skin and underlying tissues, in which there is pus, swelling, and tissue necrosis, as well as the absorption of toxins.

#### **Etiopathogenesis**

Purulent wound infection may occur when the wound clean (chopped, sliced, chopped, torn, and so on. D.) Or formed as a result of a breakthrough abscess. Pathogens of purulent process in a random and surgical wounds often become so-called pyogenic bacteria (staphylococcus, streptococcus and so. D.).

Currently, as in trauma, and surgery is considered that any random wound is infected, that is, it contains a certain amount of bacteria. However, bacterial contamination does not necessarily entail an abscess. For the development of infection, a combination of the following factors: sufficient tissue damage; presence in the wound cavity devitalized tissue, foreign bodies and blood streamed; sufficient concentration of pathogens. MLT spend on clean wound (purulent discharge absorbs up to 90% of the laser light).

#### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
-	12-15	37 the first three days, 75 following.	MLT - 5 on the area, 10 (total)

#### **METHOD OF TREATMENT**

Position of the patient - lying.

Position transmitter: contact.

Frequency of treatments: daily.

Number of treatments: 13.

Possible combination with other treatments:

- Drug therapy.

Methods of exposure: a stable, a 10 cm<sup>2</sup> area of the wound - 2 field exposure.

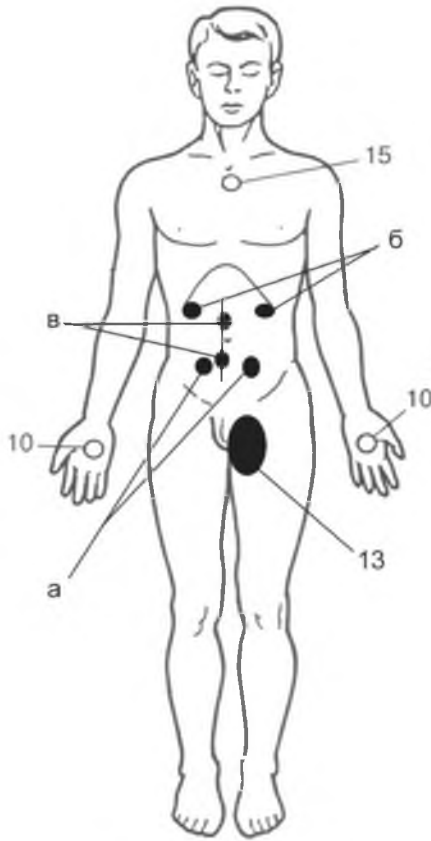
Therapeutic terminal MLT IR placed over a wound and around the wound surface for a distance of 3-5 mm.

Therapeutic terminal MLT Rvozdeystvuyut directly on the method for the stable zone (contact).

MLT R- Zone 10 (palmar surface of hands).

MLT IR - wound area of the scar.

Influence zones		
US	MLT IR	MLT Rd
-	wound, keloid	10



## L02 ABSCESES, BOILS, CARBUNCLES

### L03 PHLEGMON, FELON

#### **Etiopathogenesis**

There are at penetration into the tissue of a homogeneous or mixed flora pyogenic bacteria (staphylococcus, streptococcus, E. coli and others.). May be formed and therefore without tissue necrobiosis microbial flora, such as when administered under the skin of certain chemical substances or drugs.

The development of acute purulent processes contribute to violations of trophism, circulatory disorders, tissue crush injury in trauma, bruises, weakening the body's resistance. abscess formation usually starts with an inflammatory infiltrate in the center which then decomposes with the formation of white blood cells proteolytic enzymes digest the latest necrotic tissue and products of cellular decay, forming a purulent exudate. On the periphery of the inflammatory focus demarcation shaft formed first by lymphocyte multiplication, and then through the development of granulation tissue and connective tissue sheath (pyogenic shell). Rapidly expanding, granulation tissue is moving to the center of the inflammatory focus, filling defect tissues. Before the formation of granulation shaft of the hearth there is increased absorption of toxic products and bacteria through the lymph and blood pathways, resulting in a total intoxication patient. Education granulating shaft prevents the absorption of toxins and microbes.

#### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
-	75-99	5, 10, 20, 31, 50, 80 every day at the new frequency	MLT - 2.5-3 on the field, 15 total

#### **METHOD OF TREATMENT**

Position of the patient - lying / sitting.

Position transmitter: contact.

Methods of exposure: a stable, 2-4 field around the hearth.

Frequency of treatments: daily.

Number of treatments: 5-7.

Possible combination with other treatments:

- Drug therapy.

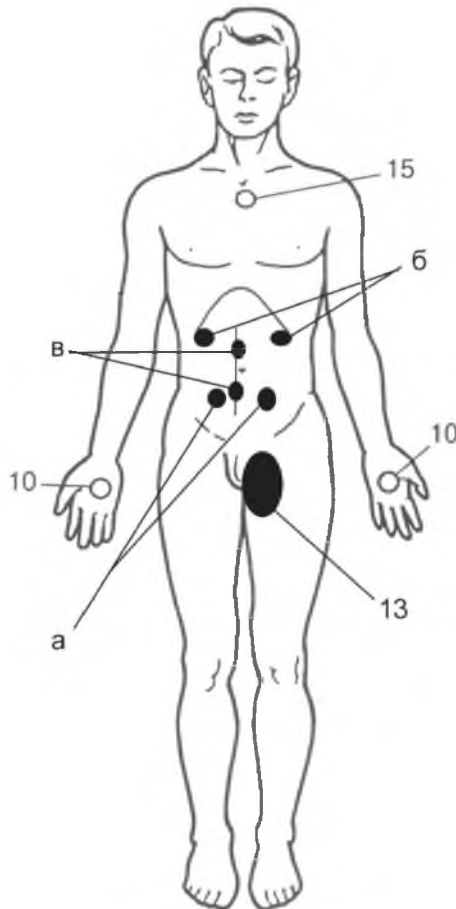
Medical terminal MLT IR placed around the inflammatory focus at a distance of 3-5 mm above the surface.

Therapeutic terminal MLT Cr act directly on the method for the stable zone (contact).

MLT R- Zone 10 (palmar surface of hands).

MLT IR - around the hearth.

Influence zones		
US	MLT IR	MLT Rd
-	Around the hearth	10





## E14.5 TROPHIC ULCERS

The trophic ulcer is the long lasting uncured defect of skin and the tissues located under it.

### **Etiopathogenesis**

Varicose trophic ulcers arise in the lower third of a shin against varicose expanded veins more often. Chronic venous insufficiency (atavricosity, a post-thrombophlebitic illness), deterioration in arterial blood circulation can lead to development of a trophic ulcer (at a hypertensive illness, diabetes, atherosclerosis), violation of outflow of a lymph (lymphedema), a trauma (freezing injuries, burns), chronic diseases of skin (eczema, etc.). The trophic ulcer can develop at some infectious diseases, system diseases (vasculitis), violation of local blood circulation at a long immovability as a result of an illness or a trauma (bedsores).

The violation of a venous bloodstream caused by diseases of venous system leads to deposition of blood in the lower extremities. Blood stands, the cells waste products accumulate in it. Nutrition of tissues worsens. Skin is condensed, conglutinate with hypodermic cellulose. Dermatitis, the becoming wet or dry eczema develop.

Because of ischemia process of healing of wounds and scratches worsens. As a result the smallest injury of skin at chronic venous insufficiency can be the reason of development of the long-flowing, badly giving in to treatment trophic ulcer. Accession of an infection makes heavier the course of a disease and leads to development of various complications.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
-	12-15	37-50, 2-nd course – 75-80	MLT - 10 - 15

### **METHOD OF TREATMENT**

Position of the patient - lying / sitting.

Position transmitter: contact.

Methods of exposure: stable.

Frequency of treatments: daily.

Number of treatments: 7-8.

Re-treatment: a week later.

Possible combination with other treatments:

- Drug therapy.

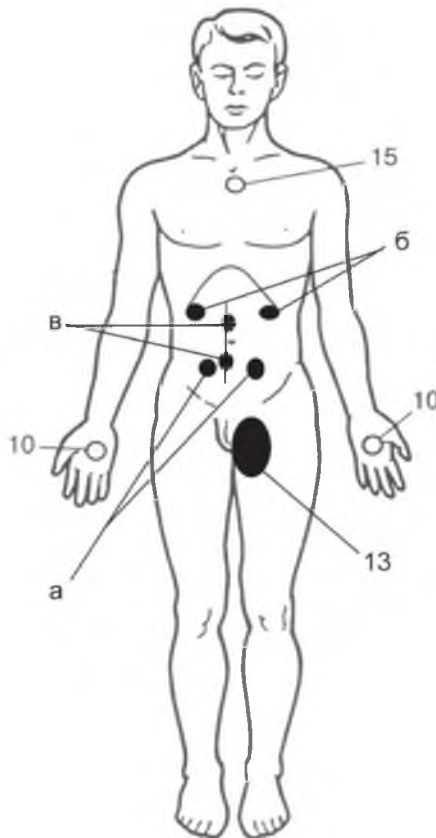
Medical terminal MLT IR is placed directly on the edge of the ulcer or young granulation tissue through a single layer of sterile cloth or protective foil.

Therapeutic terminal MLT R act directly on the method for the stable zone (contact).

MLT R- Zone 11 (ulnar fovea right / left).

MLT IR - Zone ulcer edge.

Influence zones		
US	MLT IR	MLT Rd
-	Edges of an ulcer	11



## 180 PHLEBITIS AND THROMBOPHLEBITIS

**Thrombophlebitis** - inflammation of the vein walls to form a blood clot in the lumen of the vein. Most often, when it comes to thrombophlebitis of the lower limbs.

### **Etiopathogenesis**

Thrombophlebitis Contributing factors are slowing blood flow, changes in its composition, due to which the blood loses its normal rheological properties. Thrombophlebitis may develop on the background of violations of blood coagulation. Often the root cause of thrombophlebitis is an injury to the vascular wall, endocrine disorders, infections or allergic reactions. A number of diseases can be complicated by thrombophlebitis: varicose veins, purulent infections, hemorrhoids, cancer, blood diseases and heart.

Medical manipulation (long-term catheterization) and surgery on the blood vessels and increase the risk of thrombosis.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	75-99	1,2; 25; 8; 10; 89	UST - 3 zone; MLT - 3 zone, up to 10 in total.

### **METHOD OF TREATMENT**

Position of the patient - lying / sitting.

The position of the radiator: a contact.

Methods of exposure: a stable or labile without compression fabric.

Frequency of treatments: daily.

Number of treatments: 7-8.

Repeated treatment: two weeks 1 time per day.

Possible combination with other treatments:

- Drug therapy (detoxification, antibacterial).

Medical terminal MLT IR slowly (1 cm / sec) is moved along the affected vessel in the direction from the center to the periphery of the body, then transferred over the limb to the initial point of contact and then slowly move to the end of the affected area. 1-3 affect the zone depending on the length phlebothrombosis.

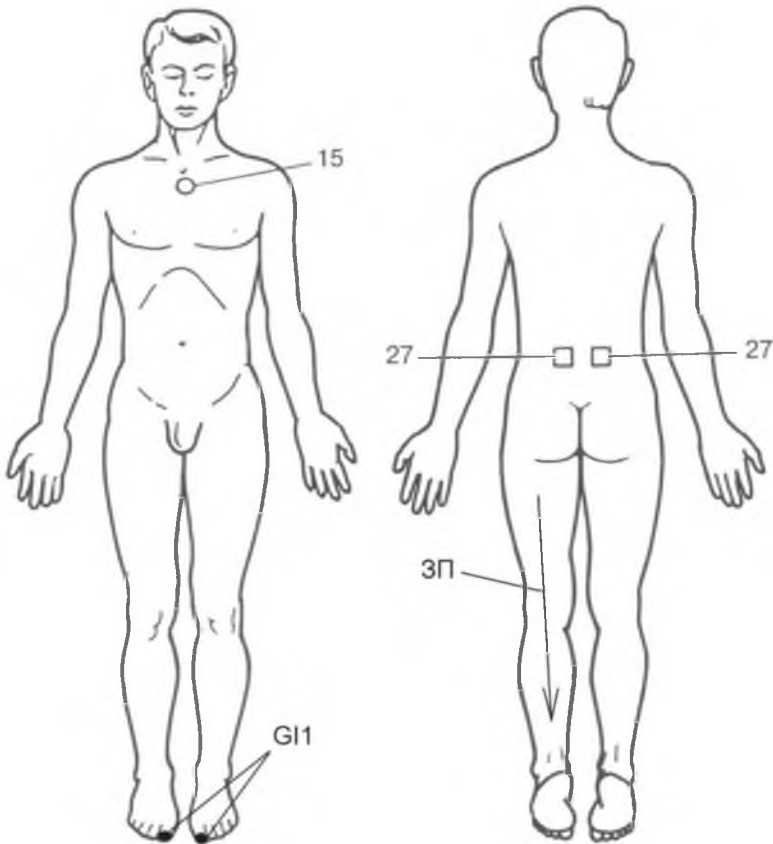
Therapeutic terminal MLT Cr act directly on the method for the stable zone (contact).

MLT R- zone 15 (the projection of the thymus gland).

MLT IR - L (the affected area).

- GI1 (nail plate of the thumb on the right / left), starting with the 4th procedure for 2.5 minutes at the point, the modulation frequency of 75-80 Hz.  
 UST - Zone 27 (paravertebrally, D11-L5).

Influence zones		
US	MLT IR	MLT Rd
27	Affected area; GI1	15



## A46 ERYSIPELAS

**Erysipelas** - anthroponotic acute infectious disease caused by hemolytic streptococci, characterized by fever, intoxication, presence of local focus serous-hemorrhagic skin lesions with a propensity to recurrent course.

### **Etiopathogenesis**

Etiology: b-hemolytic streptococcus group A.

When exogenous variant source of infection - patients with any streptococcal disease (Tonsillitis, pharyngitis, scarlet fever, streptoderma etc.) or healthy carriers of strep, ways of transmission - airborne, contact; with auto-infection pathogen enters the lesion from endogenous foci of streptococcal infection.

Penetration MB lesion by contact (through the skin microtrauma) or hematogenically-lymphogenous (with auto-infection) the activation of mediators of the allergic inflammatory response, development of serous or serous-hemorrhagic inflammation with erythema, edema and infiltration of the affected areas of skin and subcutaneous tissue, the involvement in the process microvascular, lymphatic capillaries, damage the vascular walls and elimination of streptococci through increased phagocytosis and humoral immune system with preservation of skin sensitization, re-entering streptococcus, hardening and re zapustevanie damages blood vessels, chronic lymphostasis until elephantiasis.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	75-99	5	UST - 3 zone, 12 in total; MLT - 7.5 - vascular bundle, 5 - the affected area

### **METHOD OF TREATMENT**

Position of the patient - lying / sitting.

The position of the radiator, the method of exposure: contact at several points or distantly on a stable method.

Frequency of treatments: two times a day.

Number of treatments: 7-8.

Re-treatment: three weeks later the same course in a day.

Possible combination with other treatments:

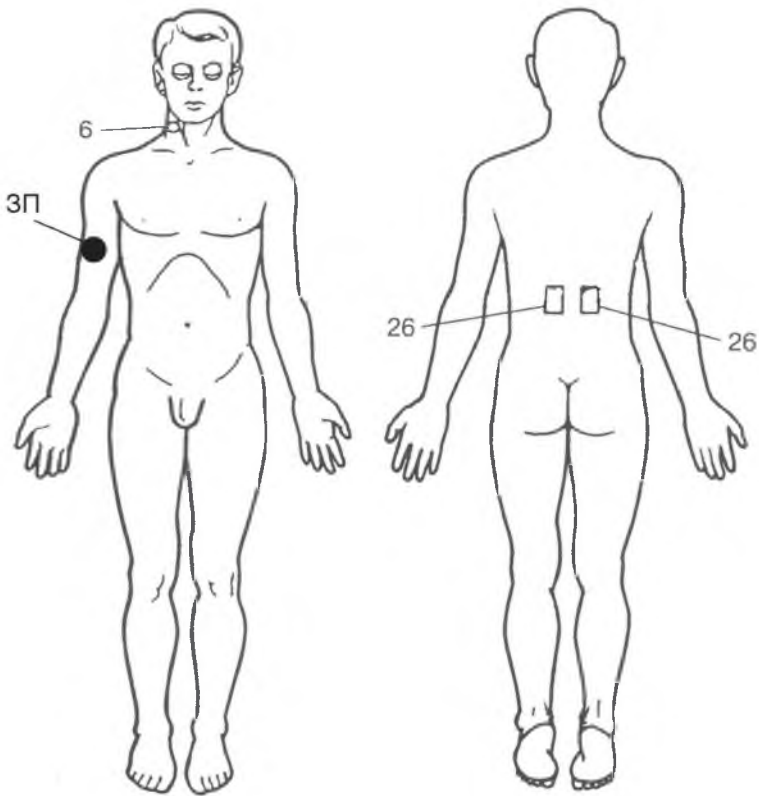
- Drug therapy.

MLT R - Zone nadvennogo irradiation of blood (vascular bundle area above the affected area).

MLT IR - L (the affected area).

UST - Zone 26 (paravertebrally, D11-L1, the projection of the segmental innervation of the adrenal glands and kidneys).

Influence zones		
US	MLT IR	MLT Rd
26	Affected area	6 (the projection of the carotid artery)



## T20-T32 THERMAL AND CHEMICAL BURNS

**Burn** - tissue damage caused by local exposure to high temperatures (more than 55-60 C), aggressive chemicals, electric current, light and ionizing radiation.

Etiopathogenesis

According to the depth of tissue damage are 4 degree burns. Extensive burns lead to the development of the so-called burn disease, dangerous fatal due to irregularities in the cardiovascular and respiratory systems, as well as the occurrence of infectious complications.

Therapy is indicated for the expressed syndrome of exudative inflammation in the case of superficial burns, for the prevention of complications and stimulation of reparative processes in wounds, with subdermal burns to improve blood and lymph circulation in paranecrotic area and stimulating the formation of high-grade granulyatsionnogo cover in the preoperative period with deep burns, and in the postoperative period - to stimulate the regenerative protsessov; for the prevention and treatment of pneumonia and edema secondary immunodeficiency.

### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	75-99	75-80	UST - up to 6 in total; MLT IR - 2 to 3 affected area. MLT R-15 total.

### METHOD OF TREATMENT

Position of the patient - lying / sitting.

The position of the radiator: distantly at a distance of 5-6 mm from the surface of the wound.

Methods of exposure: labile.

Frequency of treatments: two times a day.

Number of treatments: 7-8.

Re-treatment: three weeks later the same course in a day.

Possible combination with other treatments:

- Drug therapy.

Magnitolazernoj effects produced early after injury ozho-govoy open wound on the surface through the dressing. Exposure time of 8 seconds per point (to rejection necrosis), 4 seconds - after the removal of necrotic tissue. 3-4 affect the point at 1% of the area.

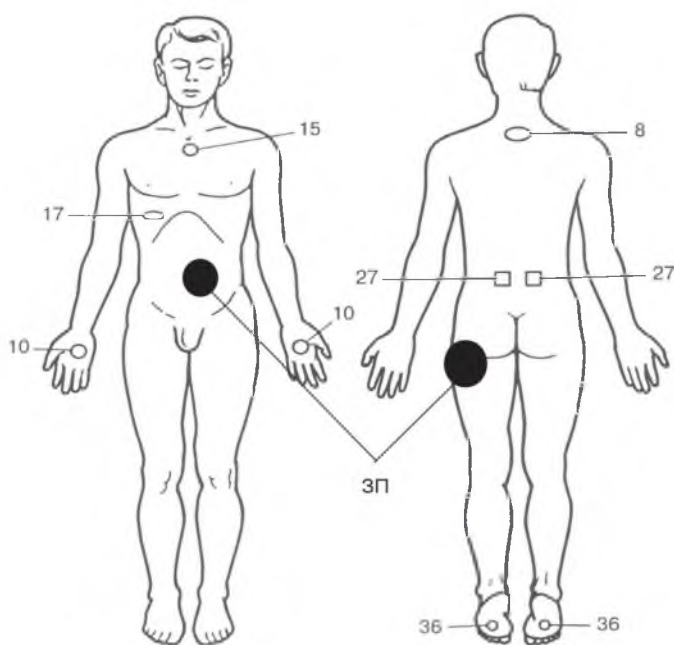
MLT R - Zone 6 (projection of the carotid artery);

- Area 10 (palmar surface of the hand on the right / left);
- Area 36 (the plantar surface of the foot).
- MLT IR - PO (the affected area);
- Zone 8 (C8 projection D2 vertebral segments).

UST - Zone 27 (paravertebrally, D11-L1, the projection of the segmental innervation of the adrenal glands and kidneys);

- Area 17 (the projection of the liver).

Influence zones		
US	MLT IR	MLT Rd
17; 27	Affected area; 8	6; 10; 36





## M42 OSTEOCHONDROSIS

Diseases of the musculoskeletal system, which is characterized by lesions of the destruction of articular cartilage and underlying bone. Previously, the term defines a group of osteochondrosis of various degenerative diseases of the skeleton. Today, this term was fixed for the defeat of the joints of the spine and intervertebral discs.

### **Etiopathogenesis**

The etiology of osteoarthritis is not enough clear. Of great importance are genetic predisposition, age-related changes in the intervertebral discs, their acute or chronic trauma, circulatory disorders segmental.

In the pathogenesis of osteoarthritis are important changes pulpido core, in particular its dehydration, which leads to loss of drive amortization functions changing load conditions on the annulus fibrosus and to its gradual destruction.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	75-99	1-10 (P1 mode)	UST - 10 in total. MLT - 15 total.

### **METHOD OF TREATMENT**

Position of the patient - lying on his stomach.

The position of the radiator: a contact.

Methods of exposure: labile, the recommended area.

Frequency of treatments: every other day.

Number of treatments: 14-15.

Re-treatment: three weeks later the same course in a day.

Possible combination with other treatments:

- Massage (MLUST before the procedure);
- FC.

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata

UST- PVA zone (paravertebral area at the level of C7-L5 vertebrae);

- Area 25 (paravertebrally, D7- L2, segmental innervation zone of the liver).

MLT R - Zone 28 (lumbosacral joint);

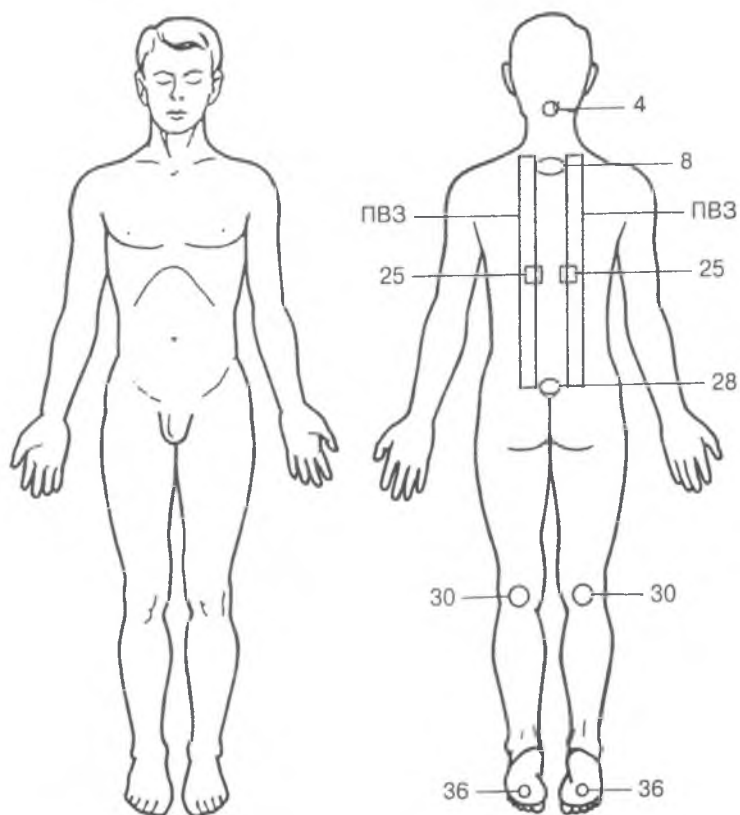
- Area 30 (popliteal fossa on the right / left);

- Area 36 (the plantar surface of the foot to the right / left).

MLT IR - Zone 4 (foramen magnum - the brain stem);

- - Zone 8 (the projection of the C7 vertebral segments - D2).

Influence zones		
US	MLT IR	MLT Rd
PVA; 25	4; 8	28; 30; 36



## M54.4 4 LUMBAGO WITH SCIATICA

**Sciatica** (lumbar and sacral radiculitis) - a syndrome that manifests as pain spreading along the sciatic nerve.

### **Etiopathogenesis**

Mechanical causes: apophyseal osteoarthritis, degeneration of the discs; gzyhi disc, fractures, sacroiliac dysfunction; limited movement of hips.

Infektsiynnye reasons: epidural abscess or osteomyelitis.

Tumor: Bone tumors (primary or metastatic).

Intradural tumors of the spinal cord.

Metabolic: osteoporosis, osteomalacia, chondrocalcinosis.

The mechanism of lumbago is always the same, regardless of the reasons. At displacement or deformation of the vertebrae and intervertebral discs are excited many painful nerve endings located in the fibrous ring and ligaments surrounding the vertebrae. As a result, there is severe pain and spasm (strong tension and inability to relax), the muscles surrounding the spine.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	75-99	75-77	USB - 3-5 in the zone; MLT - up to 10 in total.

### **METHOD OF TREATMENT**

Position of the patient - lying on his stomach.

The position of the radiator: a contact.

Methods of exposure: labile, the recommended area.

Frequency of treatments: daily or every other day.

Number of treatments: 7-10.

Retreatment: a month later.

Possible combination with other treatments:

- Massage (MLUST before the procedure);
- Electrostimulation of paravertebral muscles in alternation with MLUST;
- Physical therapy.

UST impact directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.). As the drug may pretreatment with 5-10 ml of 0.5% solution of novocaine.

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata

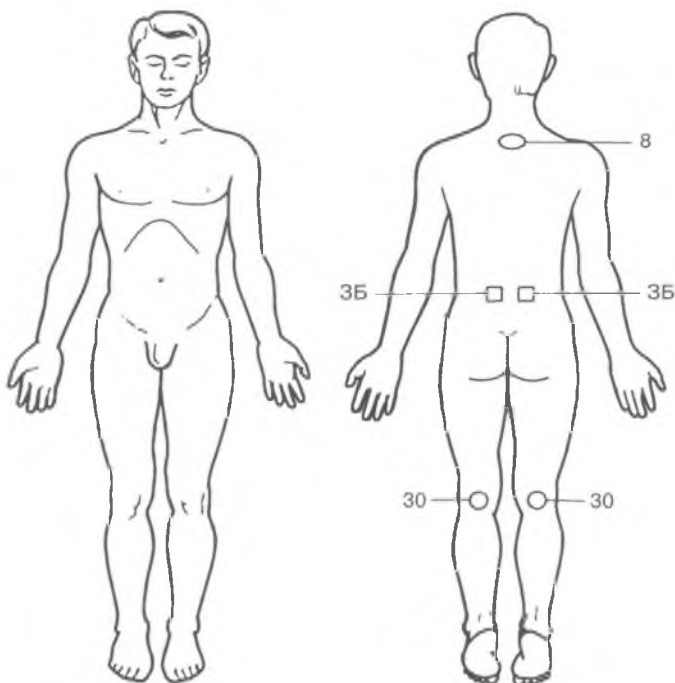
UST - ST zone (area of pain).

MLT R - Zone 30 (popliteal fossa on the left);

MLT IR - Zone 30 (popliteal fossa on the right);

- Zone 8 (the projection of the C7 vertebral segments - D2).

Influence zones		
US	MLT IR	MLT Rd
Pain area	30 on right; 8	30 on left



## R52 CHRONIC PAIN SYNDROME

(Pain, not elsewhere classified)

Feeling pain cause a variety of agents, but they share a common feature - a real or potential danger to damage the body. Therefore pain signal mobilizes body to protect against pathogen restriction and protective function of the affected organ pain.

### **Etiopathogenesis**

Causes of pain: physical (trauma, high or low temperature, high dose of UV, the electric current), chemical (contact with skin or mucous membranes of strong acids, alkalis, oxidizing agents, the accumulation of calcium salts fabric or potassium) and biological (high concentration of kinins, histamine, serotonin) factors.

Therapy is indicated for the prevalence of degenerative changes are accompanied by pain.

The procedure stimulates the antinociceptive system (formation of endogenous opiates, melatonin), changes the functional state of the cortex, stem, segmental and peripheral structures of the nervous system and reduces pathological changes directly to the damaged area.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	75-99	75-77 alternated with 10-100 (mode F2)	UST - 3-5 in the zone, 15 total MLT - up to 25 in total.

### **METHOD OF TREATMENT**

Position of the patient - lying on his stomach.

The position of the radiator: a contact.

Methods of exposure: labile, the recommended area.

Frequency of treatments: 1-2 days.

Number of treatments: 14-15

Re-treatment: 2-3 months.

Possible combination with other treatments:

- Drug therapy;
- Psychological correction;
- The central or electroanalgesia electrosleep.

Exposure to ultrasound is performed directly on the body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata

UST - Zone 17 (the projection of the liver);

- Area 21 (the projection of the celiac plexus);
- Area 25 (paravertebrally, D7- L2, segmental innervation zone of the liver).

MLT R - Zone 30 (popliteal fossa on the right / left);

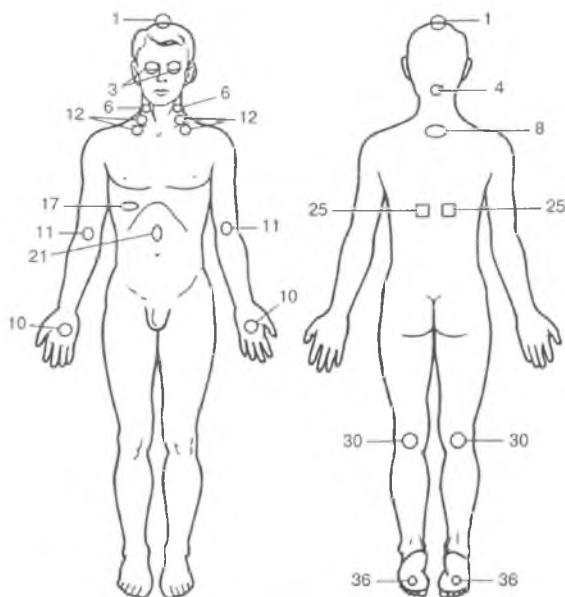
- Zone 6 (projection of the carotid artery on the right / left);
- Area 11 (ulnar fovea right / left);
- Area 12 (over-and subclavian vein to the right / left);
- Zone 3 (the eye).

MLT IR zone 1 (projection-reflektornaya epiphysis area);

- Zone 8 (the projection of the C7 vertebral segments - D2);
- Zone 4 (the projection of the brain stem).

During a session conducted nadvennoe (nadarterialnoe) irradiating the red blood magneto inductor zones 6, 11, 12 or 30, and act on two zones (zone 6 for instance - to the left and to the zone 30 - right) 5 - 7 min each. A day on the affected area 3 on both sides with 5 - 7 minutes ko-toruyu alternate with zones 1, 4 (MIT apparatus IR). Also, during each session produce ultrasonication for 5 - 7 minutes in one of the zones (17, 21, 25). The remaining area is used as an extra. This frequency modulation of all the factors must be changed one day apply frequency 75 - 77 Hz, and the next - scanning frequency 10 - 100 Hz. This principle is common, regardless of the localization of pain. However, for influencing pathologically altered hearth (zone pain such gyustgerpetichesky hearth) used MP + IR radiation for 5 - 7 minutes with the above parameters.

Influence zones		
US	MLT IR	MLT Rd
17; 21; 25	1; 4; 8	3; 6; 11; 12; 10; 36



**MYOFASCIAL PAIN**  
**M60.0 MYO FASCIITIS;**  
**M62.8 MIOFIBROZIT;**  
**M79.0 FIBROSIS; FIBROMYALGIA;**  
**M72.5 FASCIITIS.**

**Myofascial pain** - it negeneralizovannaya my<sup>-</sup>shechnaya nonspecific pain caused by dysfunction and myofascial tissue in the muscle voz<sup>-</sup>niknoveniem tricks irritability (trigger points - TT).

«Miogeloz» «fibrositis», «Myofasciitis» «myositis» «fibromyositis» «myalgia» - nonspecific painful muscle tissue seal, the source of muscle pain.

**Etiopathogenesis**

Causes: skeletal abnormalities(differentlengthlegs, flat feet), repetitivestereotyped movements, leading to fatigue individual muscles; prolonged immobilization of muscles; prolonged compression of the muscles; hypothermia; psycho-emotional stress; pathology of the internal organs. The mechanism of pain include sensory, motor and autonomic components.

Traumatization of the muscle, leading to the formation of MB, associated primarily with the muscular overload. With continued prolonged muscle contraction suffers intramuscular capillary blood flow, reduced oxygen levels and glucose metabolism is impaired in cells, leading to their damage.

**TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUSE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	12-15	37,5 alternate with 75-77	UST - 3-5 in the zone, 15 total MLT - up to 25 in total.

**METHOD OF TREATMENT**

Position of the patient - lying.

The position of the radiator: a contact.

Methods of exposure: labile, the recommended area.

Frequency of treatments: 1-2 days.

Number of treatments: 14-15.

Re-treatment: 2-3 months.

Possible combination with other treatments:

- Drug therapy;
- Physical therapy;
- Massage;

- Kinesitherapy.

Exposure to ultrasound is performed directly on the body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata

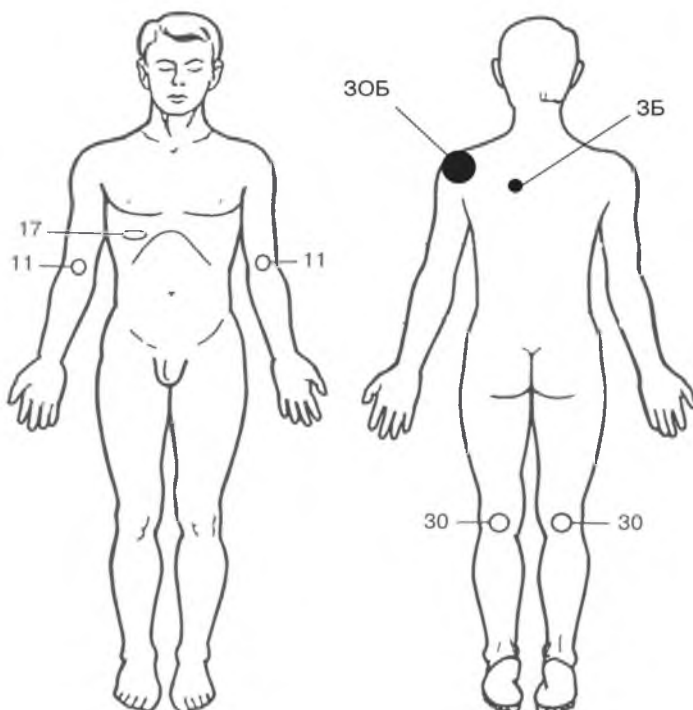
UST- PA (pain area, CT); - Zone (the projection of the liver).

MLT R - Zone 30 (popliteal fossa on the right / left);

- Area 11 (ulnar fovea right / left).

MLT IR - RPZ (referred pain zone).

Influence zones		
US	MLT IR	MLT Rd
PA; 17	RPZ	11; 30





# M00-M99 DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE

## M 00 - M 03 INFECTIOUS ARTHROPATHIES

The group of diseases that are characterized by the same type of lesions of the musculoskeletal system.

### **Etiopathogenesis**

Reactive arthritis is most often associated with chlamydia (Chlamydia trachomatis) urogenital infection.

Pathogenetic mechanisms of reactive arthritis is unknown, although it is clear involvement of immune response to bacteria of the urogenital tract. It is believed that the development of immunocomplex synovitis due to excessive immune response to microbial antigens microorganism outside the joint cavity, with the formation of immune complexes which are deposited in the synovium.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-4	75-99	1.2 alternate with 77	MLT - 10 zone, UST - 5-7 in total;

### **METHOD OF TREATMENT**

Position of the patient - lying / sitting.

The position of the radiator: a contact.

Methods of exposure: labile, the recommended area.

Frequency of treatments: daily or every other day.

Number of treatments: 8-10.

Re-treatment: 2-3 months.

Possible combination with other treatments:

- Drug therapy;
- Physical therapy;
- Massage.

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.) around the affected joint.

### **ATTENTION!**

*When exposed to the knee scoring is carried out on all sides, except the patella.*

*When exposed to hip dubbing is performed on both sides - the front and rear.*

*When multiple lesions of joints influence on them is carried out alternately, and the total duration of the procedure is increased up to 8-10 minutes.*

As contact protection when exposed to the small joints of the hands and feet can act as hydro-lens.

Exposure is carried out simultaneously with the IFL UST-contactly. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 2 (the affected joint);

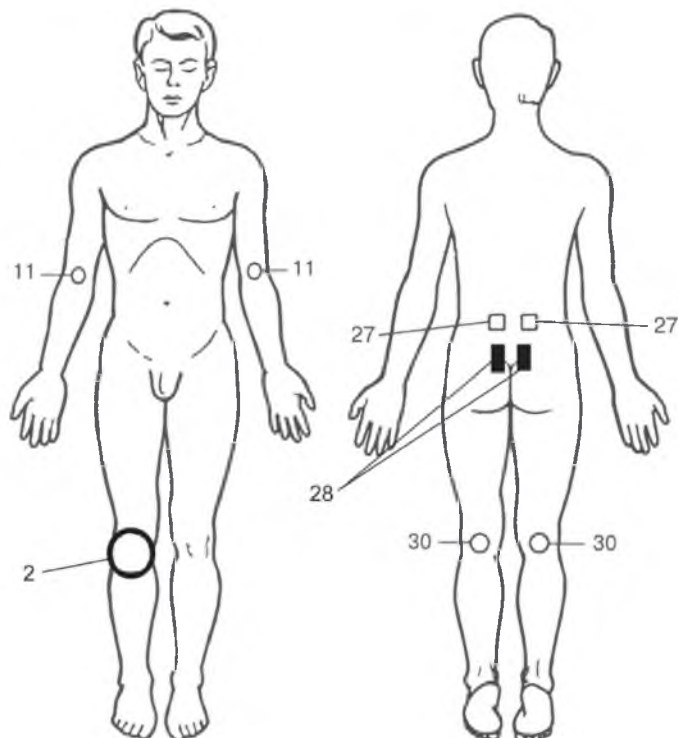
- Area 28 (paravertebrally, segmental innervation of the affected joint area).

MLT R - Zone 30 (popliteal fossa on the right / left);

- Area 11 (ulnar fovea right / left).

MLT IR - Zone 27 (paravertebrally, D11- L1 segmental innervation of the kidney area).

Influence zones		
US	MLT IR	MLT Rd
2; 28	27	11; 30



## M05-M14 INFLAMMATORY POLYARTHRITIS

### (RHEUMATOID ARTHRITIS).

**Rheumatoid arthritis (RA)** - the most common chronic inflammatory joint disease characterized by the formation of tumor-like hyperplasia of the synovial membrane (pannus), which is peculiar to invasive growth with the destruction of articular cartilage and underlying bone.

#### **Etiopathogenesis**

What ever the only etiological factor responsible for the development of RA, not set. It is believed that the disease occurs in genetically susceptible individuals under the influence of various external or internal disturbances - viral or bacterial infection, trauma, including surgery, psycho-emotional stress, medical intervention, age hormonal changes, etc. To date, accumulated.. ample evidence of genetic susceptibility to RA.

The main pathologic process in RA - the destruction of articular cartilage and subchondral bone ectopic hyperplastic synovial tissue.

#### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, µm	MLT POWER rel., %	MODULATION, Hz	TIME, min
1-2 session – 2, c 3 session - 3	75-99	37,5 alternate with 75	US - 5-7 on the joint; MLT - 10 at zone, up to 25 totally.

#### **METHOD OF TREATMENT**

Position of the patient - lying / sitting.

The position of the radiator: a contact.

Methods of exposure: labile, the recommended area.

Frequency of treatments: daily or every other day.

Number of treatments: 8-10.

Re-treatment: 2-3 months.

Possible combination with other treatments:

- Drug therapy;
- Inductothermy;
- Physical therapy;
- Massage.

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

«DIKASIN-1» Effective phonophoresis drug.

**ATTENTION!**

**When exposed to the knee scoring is carried out on all sides, except the patella.**

**When exposed to hip dubbing is performed on both sides - the front and rear.**

**When exposed to multiple joints of the impact on them is carried out alternately, and the total duration of the procedure is increased up to 8-10 minutes.**

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata

UST- zone 2 (the affected joint);

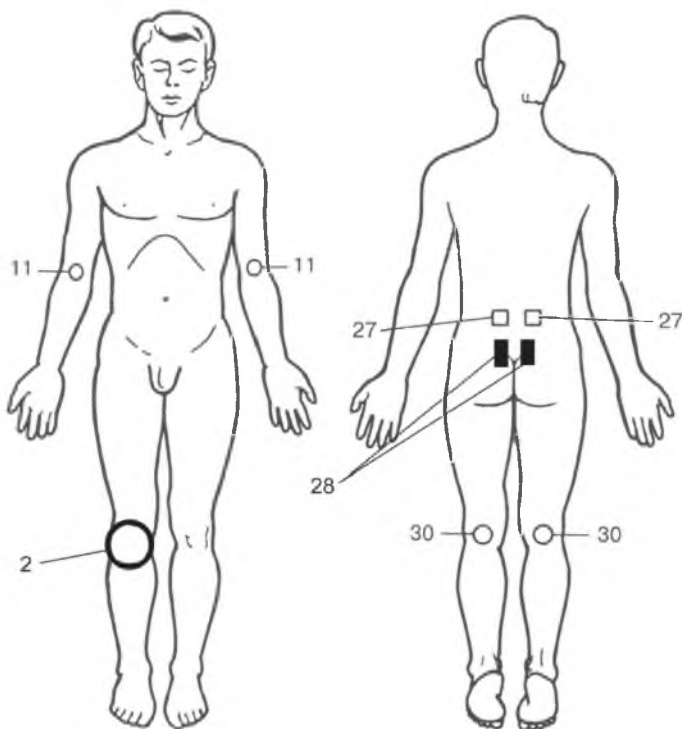
- Area 28 (paravertebrally, segmental innervation of the affected joint area).

MLT R - Zone 30 (popliteal fossa on the right / left);

- Area 11 (ulnar fovea right/left).

MLT IR - Zone 27 (paravertebrally, D11- L1 segmental innervation of the kidney area).

Influence zones		
US	MLT IR	MLT Rd
2; 28	27	11; 30



## M15-M 19 DEFORMING ARTHROSIS

Chronic inflammatory disease of degenerative joints with primary degeneration of the articular cartilage and the subsequent reactive-degenerative processes in the epiphysis articulated bones.

### **Etiopathogenesis**

Pathogenesis of deforming arthrosis is quite complicated. Destructive-dystrophic changes that characterize this pathology, - a multifactorial process, often develops gradually and has subtle clinical manifestations. Bright symptoms usually indicates the fact, joints seriously affected.

The trigger can be any agent which is usually damaging effect on hyaline cartilage. Often, an injury, or chronic joint Microfracture violation of congruency and its contact surfaces, which are the manifestation of dysplasia, systemic lesions of connective tissue, etc. The impetus for the emergence of osteoarthritis are also unfavorable life and working conditions of the patient, dysfunction of the sympathetic nervous system, pathology neurohumoral level, genetic, immune, endocrine, enzymatic and vascular factors.

In general, a violation of regional circulation, capillary stasis, and develops as a result of this, hypoxia plays an important role in the pathogenesis of deforming arthrosis as contribute to changes in aerobic and anaerobic oxidation reactions.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
2 - paravertebrally, 5 - the affected joint	75-99	18 alternate with 77	US - 6-10; MLT - 10 at zone, up to 25 totally

### **METHOD OF TREATMENT**

Position of the patient - lying / sitting.

The position of the radiator: a contact.

Methods of exposure: labile, the recommended area.

Frequency of treatments: daily or every other day.

Number of treatments: 7-10.

Re-treatment: 2-3 months.

Possible combination with other treatments:

- Drug therapy;
- Thermotherapy;
- Balneotherapy (bath).

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Effective phonophoresis hydrocortisone ointment to the area of the joint.

**ATTENTION!**

**When exposed to the knee scoring is carried out on all sides, except the patella.**

**When exposed to hip dubbing is performed on two sides - the front and externally.**

Exposure is carried out simultaneously with the IFL USTkontaktno. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata

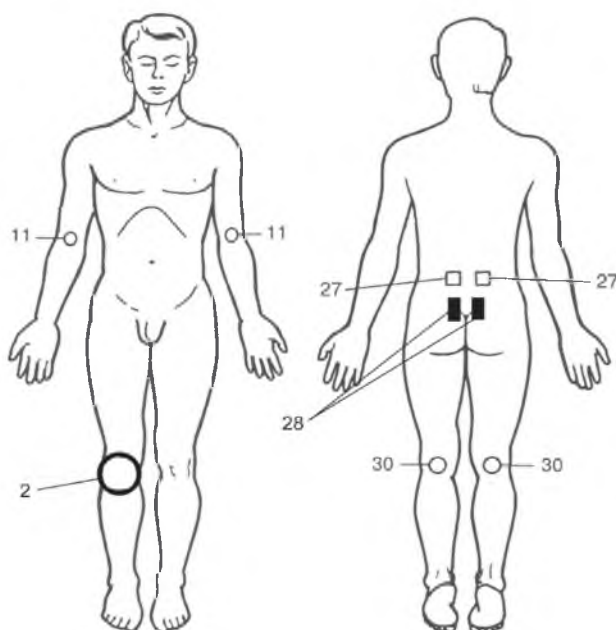
UST- zone 2 (the affected joint); - Area 28 (paravertebrally, segmental innervation of the affected joint area).

MLT R - Zone 30 (popliteal fossa on the right / left);

- Area 11 (ulnar fovea right / left).

MLT IR - Zone 27 (paravertebrally, D11- L1 segmental innervation of the kidney area).

Influence zones		
US	MLT IR	MLT Rd
2; 28	27	11; 30



## M10-M14 ARTHRITIS GOUTY

It develops against gout.

### Pathogenesis

The etiology of gout:

1. Reasons for causing a decrease excretion of uric acid (90%) genetically caused hypothyroidism kidney enzyme systems, dehydration, chronic renal failure, etc.

2. Reasons causing overproduction of uric acid (10%): - decrease in activity caused by genetically hypoxanthine-guanine phosphoribosyltransferase, increased activity of 5-phosphoribosyl-1-synthetase, myeloproliferative diseases (polycythemia, leukemia), psoriasis, with a predominance of excess food monotonous meat meal, consumption of alcoholic beverages (especially beer, dry wine).

Pathogenesis of gout: uric acid metabolism defects enzymes and other etiological factors overproduction of uric acid, and / or decrease its excretion, hyperuricemia tissue deposition of urate, activation uratovymi crystals in the glenoid cavity, accumulation uratovyh crystals in renal interstitium and tubules..

### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-3 - paravertebrally, 4-5 - the affected joint	75-99	1,2; 18 alternate with 77	UST - 5 on the field, a total of not more than 15. MLT - 10 zone, up to 20 in total.

### METHOD OF TREATMENT

Position of the patient - lying / sitting.

The position of the radiator: a contact.

Methods of exposure: labile, the recommended area.

Frequency of treatments: daily or every other day.

Number of treatments: 7-10.

Re-treatment: 2-3 months.

Possible combination with other treatments:

- Drug therapy;
- Diet therapy;
- Massage;
- Physical therapy;
- Phytotherapy.

Exposure to ultrasound is performed directly on the body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

Effective phonophoresis hydrocortisone ointment to the area of the joint.

**ATTENTION!**

**When exposed to the knee scoring is carried out on all sides, except the patella.**

**When exposed to hip dubbing is performed on two sides - the front and externally.**

On the small joints of the hands and feet of the impact is carried out through a water lens.

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata

UST - Zone 2 (the affected joint);

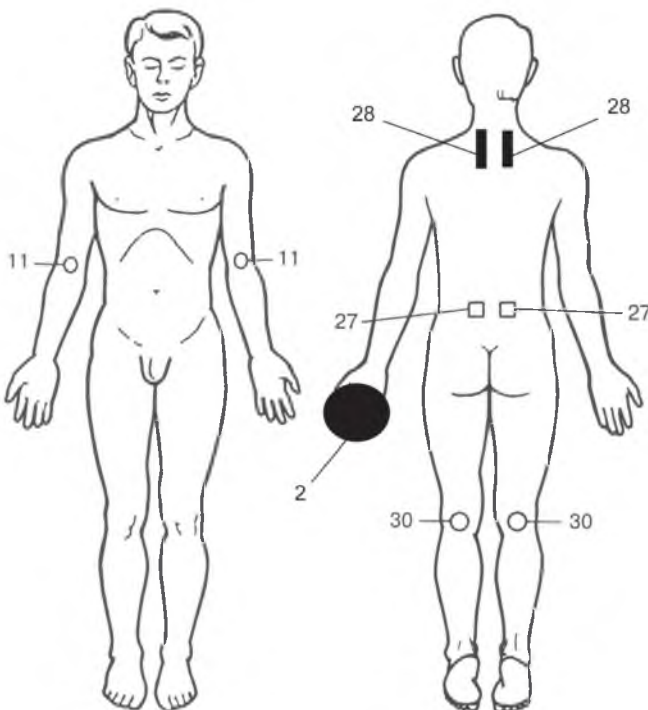
- Area 28 (paravertebrally, segmental innervation of the affected joint area).

MLT R - Zone 30 (popliteal fossa on the right / left);

- Area 11 (ulnar fovea right / left).

MLT IR - Zone 27 (paravertebrally, D11- L1 segmental innervation of the kidney area).

Influence zones		
US	MLT IR	MLT Rd
2; 28	27	11; 30





## K07 DISEASES OF THE TEMPOROMANDIBULAR JOINT

Diseases of the temporomandibular joint (TMJ) are frequent and varied. The most common are arthritis, arthritis and sprains. In addition, there are the pathological condition of the joint, is a symptom of a variety of neuromuscular disorders of the maxillofacial region. In the complex treatment of these diseases includes orthopedic.

### Etiopathogenesis

Osteoarthritis can cause TMJ causes of general and local character. The general should include the exchange, neurodystrophic, endocrine disorders, infectious diseases; local concern: long current inflammatory process in the joint; excessive load on the articular surface of the head of the lower jaw, which may be associated with neuromuscular disorders of the maxillofacial region, such as bruxism; with the absence of teeth, especially the side, the deformation of the surface okklyuzionnoi dentition and abnormal abrasion. These factors can be combined with each other. Degenerative processes in the joint may develop as a result of the impact of general and local factors - a violation of both cellular and extracellular mechanisms for trophism.

The general mechanism of development of osteoarthritis of the TMJ is that gradually the cartilage covering the articular surface of the condyle head undergoes degeneration, sometimes disappearing; degenerative processes can lead to perforation of the disc.

### TREATMENT SCHEME:

he front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	75-99	1,2; 18 alternate with 77	USB - 3-5 in total; MLT - 10 in total

### METHOD OF TREATMENT

Position of the patient - lying / sitting.

The position of the radiator: a contact.

Methods of exposure: labile, the recommended area.

Frequency of treatments: daily or every other day.

Number of treatments: 6-15.

Re-treatment: 2-3 months.

Possible combination with other treatments:

- Drug therapy;
- Diet therapy;
- Massage;
- Physical therapy;

- Phytotherapy.

Impact UST conducted directly on a body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

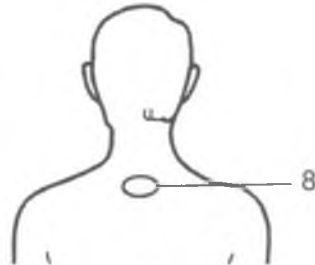
Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 2 (temporomandibular joint).

MLT R - Zone 15 (the projection of the thymus gland).

MLT IR - Zone 8 (C7-D2 projection of the vertebral segments).

Influence zones		
US	MLT IR	MLT Rd
2	8	15



## K07.6 CALCANEAL SPUR

**Plantar fasciitis** (plantar fasciitis) - is an aseptic inflammation of the soft tissue at the site of attachment of the plantar fascia to the heel bone. When the deposition of calcium salts in the area formed osteophyte (bony growths) - heel spurs.

### **Etiopathogenesis**

Contributing factors for plantar fasciitis include: excessive pronation (tucking inwards) of the foot when walking; too high or flat arch of the foot; walking, jogging or prolonged standing on a hard surface; overweight; wearing uncomfortable shoes or intercourse; stress the Achilles tendon or leg muscles.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
5	75-77	18 alternate with 77	US - 3-5 in total; MLT - 10 in total.

### **METHOD OF TREATMENT**

Position of the patient - lying / sitting.

The position of the radiator: a contact.

Methods of exposure: labile or stable, the recommended area.

Frequency of treatments: daily or every other day.

Number of treatments: 15-20.

Re-treatment: 2-3 months.

Possible combination with other treatments:

- Diet therapy;
- Massage;
- Physical therapy.

Exposure to ultrasound is performed directly on the body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

Effective analginum phonophoresis with hydrocortisone.

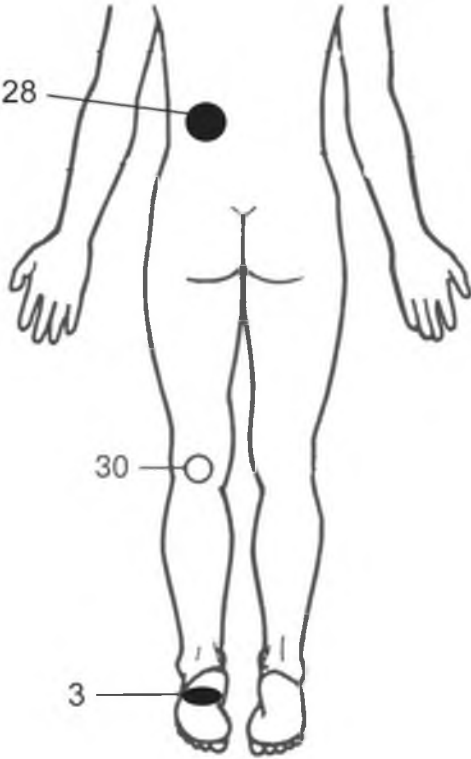
Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 3 (the projection of heel spurs from the soles).

MLT R - Zone 30 (popliteal fossa from heel spurs).

MLT IR - Zone 28 (paravertebrally, kidney projection from heel spurs).  
With bilateral lesions treatments alternated every other day.

Influence zones		
US	MLT IR	MLT Rd
3	28	30



## M 65.2 CALCIFYING TENDOVAGINITIS

**Calcifying tendovaginitis** is the disease of muscles at which the inflammatory process is localized on an internal surface of a fibrous sinew of a vagina.

### **Etiopathogenesis**

Tendovaginitis can arise as an independent disease or as the provoked inflammatory process of inside sinews of a vagina on the background of the main illness. In the first case, as a rule, consider aseptic (crepitant tendovaginitis). In the second case - infectious (specific and nonspecific). Aseptic tendovaginitis in most cases results from receiving micro injuries in connection with implementation of professional activity or excessively intensive sports activities. It is caused by performance of the same movements with involvement of limited group of muscles therefore there is the wrong distribution of loading.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-2,5	75-99	9,4; 9,7; 7,7	UST - 5-8 in total; MLT - 10 in total.

### **METHOD OF TREATMENT**

Position of the patient - lying / sitting.

The position of the radiator: a contact.

Methods of exposure: labile, the recommended area.

Frequency of treatments: daily or every other day.

Number of treatments: 8-12.

Re-treatment: 2-3 months.

Possible combination with other treatments:

- Diet therapy;
- Massage;
- Physical therapy.

Exposure to ultrasound is performed directly on the body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

Effective phonophoresis of hydrocortisone.

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - zone 3 (in the course of the tendon);

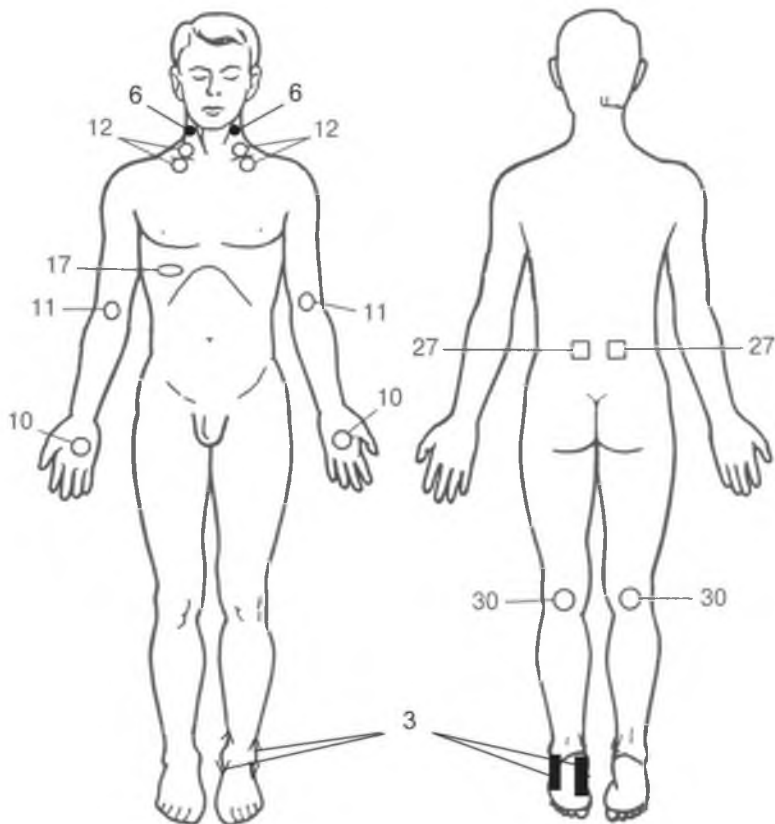
- Area 17 (the projection of the liver).

MLT R - nadvennoe irradiation of blood above the lesion locations:

- Area 30 (popliteal fossa on the right / left);
- Zone 6 (projection of the carotid artery on the right / left);
- Area 11 (ulnar fovea right / left);
- Area 12 (over-and-subclavian veinto the right/left).

MLT IR - Zone 27 (paravertebrally projection segmental innervation of the liver D7-L2).

Influence zones		
US	MLT IR	MLT Rd
3; 17	27	30; 6; 11; 12



## M45. BEKHTEREV'S DISEASE (ANKYLOSING SPONDYLITIS)

Chronic inflammatory disease of the spine that affects mainly the sacroiliac, intervertebral joints, edge-vertebral joints and the joints of the vertebrae processes.

### Etiopathogenesis

In the role of the main etiological factor in favor histocompatibility complex, HLA-B27. In men, ankylosing spondylitis occurs in about 5-9 times more than the fair sex. But the etiology and pathogenesis - a different concept, if you will, the different stages of disease development. If the causative factor inextricably linked to the major histocompatibility complex, the pathophysiology of the disease is closely intertwined with impaired immune response at some point, the immune system starts to produce antibodies against bacteria and not other foreign cells, but against their own elements of the connective tissue. Antibodies bind to specific antigens in joints (connective tissues and other sites) that causes inflammation. This inflammation has been called autoimmune, as the immune system attacks its own cells.

In the role of the factors that trigger the processes described above can serve chronic infections gastrointestinal and genitourinary system, spinal injuries, chronic stress and other adverse factors.

### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	75-99	1,2; 10; 28; 77	UST - 5-10 in total in the inactive phase, not more than 5 in the active MLT - 20 total.

### METHOD OF TREATMENT

Position of the patient - lying on his stomach.

The position of the radiator: a contact.

Methods of exposure: labile, the recommended area.

Frequency of treatments: daily or every other day.

Number of treatments: 10-12.

Re-treatment: 2-3 months.

Possible combination with other treatments:

- Balneotherapy;
- Mud;

- Massage;
- Physical therapy.

Exposure to ultrasound is performed directly on the body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.). Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 23 (paravertebrally, D7-L1).

- Area 17 (the projection of the liver).

MLT R - Zone 30 (popliteal fossa on the right / left);

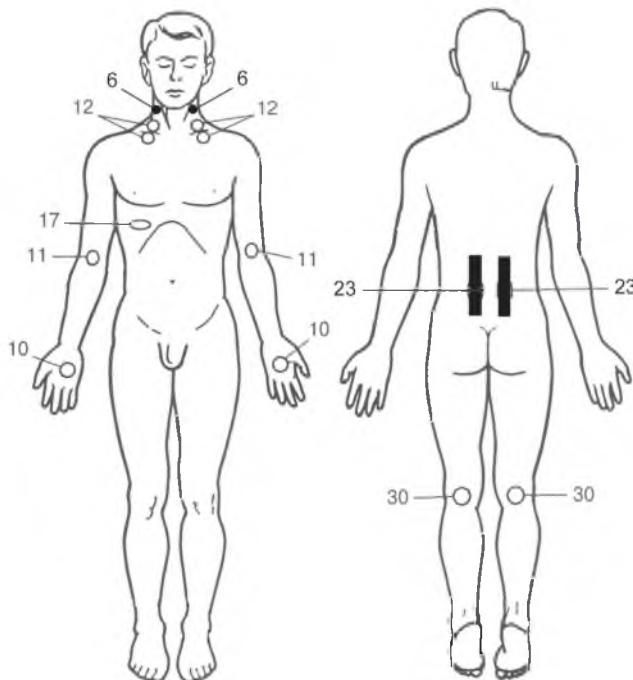
- Zone 6 (projection of the carotid artery on the right / left);

- Area 11 (ulnar fovea right / left);

- Area 12 (over-and subclavian vein to the right / left).

MLT IR (after ultrasonic sound) - Zone 23 (paravertebrally projection segmental innervation of the liver D7-L2).

Influence zones		
US	MLT IR	MLT Rd
23; 17	23	30; 6; 11; 12





## M24 DUPUYTREN'S CONTRACTURE

Contracture(disease) of Dupuytren(DC)- fibroproliferative diseasecharacterized by lesions of the palmar fascia, leading to progressive flexion contractures of the fingers.

### Etiopathogenesis

The pathogenesis of the disease until the end and has not been studied. The disease is the result of constant trauma the palmar surface of the hand, but this theory has not been confirmed. Some authors suggest a genetic predisposition to the disease. A theory autosomal dominant mode of inheritance with variable.

There are several theories of the pathogenesis of the disease. Sanderson et al. (1992) found the effect of general dislipidemii on the proliferation of fibroblasts and overproduction of collagen in the palm aponeurosis [10]. Murrell (1992) in local ischemia brush (different origins) found that ATP in oxygen is converted successively into hypoxanthine, xanthine and uric acid, xanthine dehydrogenase epithelial exposed, thereby forming highly reactive free OH radicals. The toxic effect of radicals, in turn, causes a violent proliferative response of fibroblasts with collagen overproduction.

A contributing factor is the mikotravmy brush.

### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	75-99	18; 28	UST - 5-8 to the area; MLT - 20 in total.

### METHOD OF TREATMENT

The patient - sitting / lying.

The position of the radiator: a contact.

Methods of exposure: a stable or labile recommended zone.

Frequency of treatments: daily.

Number of treatments: 10-12.

Re-treatment: 3-4 months.

Possible combination with other treatments:

- Mud;
- Massage;
- Physical therapy.

Exposure to ultrasound is performed directly on the body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

«DIKASIN-1» Effective phonophoresis drug.

Impact of the MLT is carried out simultaneously with a contact UST. Inductors

are mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 3 (palmar surface of the hand in the amended palmar fascia);

- Area 17 (the projection of the liver); - Area 24 (paravertebrally projection segmental innervation of the skin D4-7 hands).

MLT R - Zone 30 (popliteal fossa on the right / left);

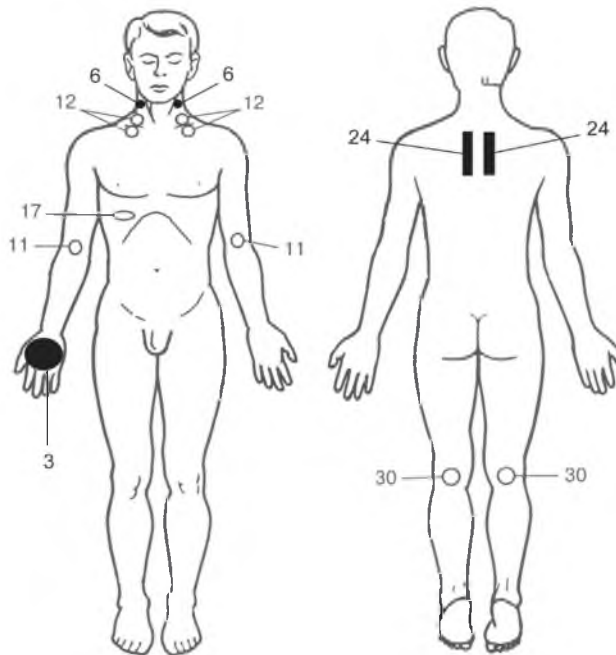
- Zone 6 (projection of the carotid artery on the right / left);

- Area 11 (ulnar fovea right / left);

- Area 12 (over-and subclavian vein to the right / left);

MLT IR (after ultrasonic sound) - Zone 23 (paravertebrally projection segmental innervation of the skin hands D4-7).

Influence zones		
US	MLT IR	MLT Rd
3; 24; 17	24	11; 6; 12



## M81 OSTEOPOROSIS

**Osteoporosis** is a consequence of violation of balance of reorganization processes of bone tissue and is characterized by its discharge (reduction of weight by unit of volume, i.e. density of a bone tissue) that involves decrease in mechanical durability of a bone.

### **Etiopathogenesis**

The major etiologic (causative) factors for osteoporosis include:

- lack of physical activity, diet and the associated weight,
- alcohol, smoking, lack of intake of dietary vitamins.

Elasticity and bone deteriorates stability for extended for several months, immobility limb. At the same time improving these indicators proved due to physical exertion. Lack of physical activity, reducing the load on the muscles leads to the fact that the entire musculoskeletal system, including the spine, muscle is deprived of the necessary support, reduction of bone occurs.

An additional factor that increases the likelihood of development of the pathological process, serves as a sharp decline in food and bulimia, leading to a decrease in revenues in the body of calcium and phosphorus.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure.

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
от 2 до 5 по нарастающей	50-75	37; 69	UST - 5 per zone, 15 total MLT- 20 total.

### **METHOD OF TREATMENT**

Position of the patient - lying.

The position of the radiator: a contact.

Frequency of treatments: daily.

Number of treatments: 14-15.

Re-treatment: 1-2 days the first 5 treatments, then a second course of three months, 2 times a week.

Possible combination with other treatments:

- Diet therapy;
- Massage;
- Physical therapy.

Methods of exposure: a stable or labile recommended zone.

Exposure to ultrasound is performed directly on the body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 17 (the projection of the liver); - Area 21 (the projection of the celiac plexus).

**ATTENTION!**

Zone 17 or zone 21 is used by the session.

MLT R - Zone 30 (popliteal fossa on the right / left);

- Area 11 (ulnar fovea right/left).

MLT IR - Zone 25 (paravertebrally D7-L2, the projection of the segmental innervation of the liver);

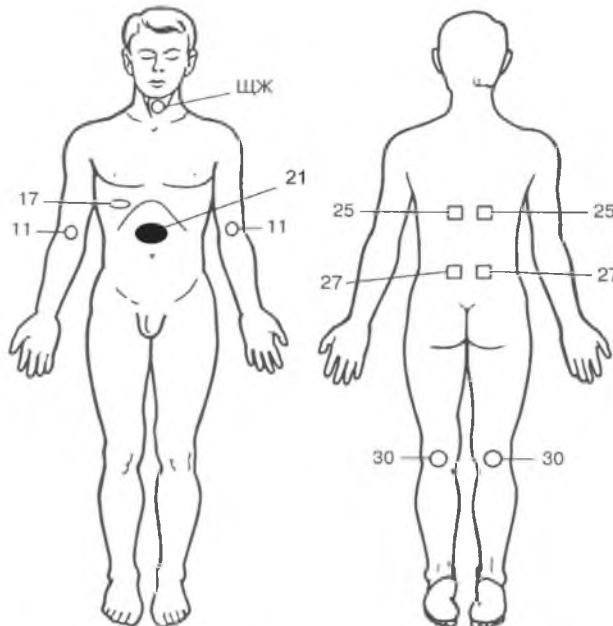
- Area 27 (paravertebrally D11-L1, the projection of the segmental innervation of the kidneys);

-T - Thyroid area (the projection of the thyroid).

**ATTENTION!**

***On projection of thyroid gland in the absence of influence of any seals and other morphological changes, all procedures carried out up to 5, the exposure time of 1 minute.***

Influence zones		
US	MLT IR	MLT Rd
3; 24; 17	24	11; 6; 12



## G00-G99 DISEASES OF THE NERVOUS SYSTEM

### G51 NEURITIS OF THE FACIAL NERVE

#### Etiopathogenesis

The most common cause of facial nerve lesions is an infection. Provoking factor can be cooled (riding in a car with the window open, sleeping near the open window, etc.). All that matters injury, disorders of blood circulation in hypertension, atherosclerosis of brain vessels and others. It is noted electoral defeat of the facial nerve in the disorder of blood circulation in the vertebral artery. Sometimes the facial nerve damage occurs as a complication of otitis media, mumps, inflammatory, neoplastic and other processes at the base of the brain. Pontino form of polio clinic manifested neuritis of the facial nerve. In the dental practice can be acute facial paralysis with anesthesia of the lower alveolar nerve.

#### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-4	25-50-75-99	3,9; 7,5; 9,4; 77	US - 1-7, increasing with each session; MLT - 15 in total.

#### METHOD OF TREATMENT

Position of the patient - lying.

The position of the radiator: a contact.

Frequency of treatments: daily.

Number of treatments: 10.

Retreatment: a month if necessary.

Possible combination with other treatments:

- Massage;
- Physical therapy.

Methods of exposure: a stable or labile recommended zone.

Impact UST conducted directly on a body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 8 (D2 projection C7 vertebral segments).

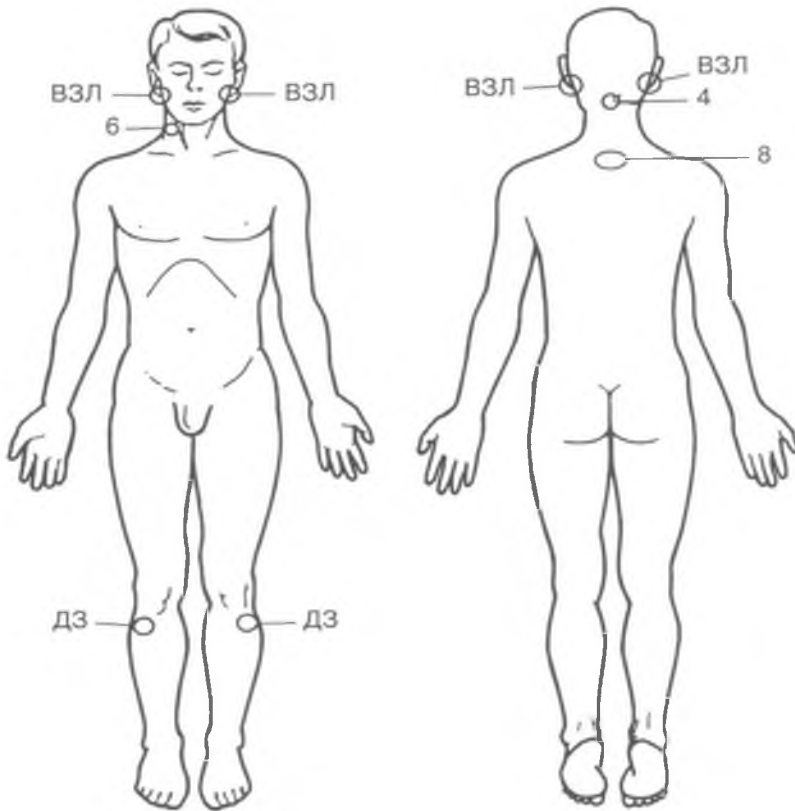
MLT R - DMZ zone (the additional area corresponding to the epicenter of the right/left point E36);

- Zone 6 (projection of the carotid artery on the affected side).

MLT IR - Zone 4 (the projection of the brain stem, corresponding to the foramen magnum);

- PAL zone (possible area locus region stylomastoid holes on the side of the lesion).

Influence zones		
US	MLT IR	MLT Rd
8	4; PAL	6; ДЗ



## G50 DAMAGE OF THE TRIGEMINAL NERVE

**Trigeminal neuralgia** (trigeminal neuralgia, Fozergilya disease - a chronic disease characterized by attacks of intense shooting, burning pain in the zones of innervation of the trigeminal nerve.

### **Etiopathogenesis**

The pathogenesis is not completely clear. It is now believed that the disease is most likely to occur as a result of compression of the trigeminal nerve (at the point of exit from the bridge) winding, pathologically altered blood vessels or, more rarely, a tumor. Rarely, patients with multiple sclerosis in plaque produced sensitive trigeminal nucleus, resulting in neuralgia. There may be pain as a consequence of injuries that resulted in abnormal jaw.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	50-75	3,9; 73; 75	US - 5-7; MLT - 10 totally.

### **METHOD OF TREATMENT**

The patient - sitting.

The position of the radiator: a contact.

Frequency of treatments: daily.

Number of treatments: 10.

Retreatment: a month if necessary.

Possible combination with other treatments:

- Drug therapy;
- Spa treatment.

Methods of exposure: a stable or labile recommended zone.

Impact UST conducted directly on a body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

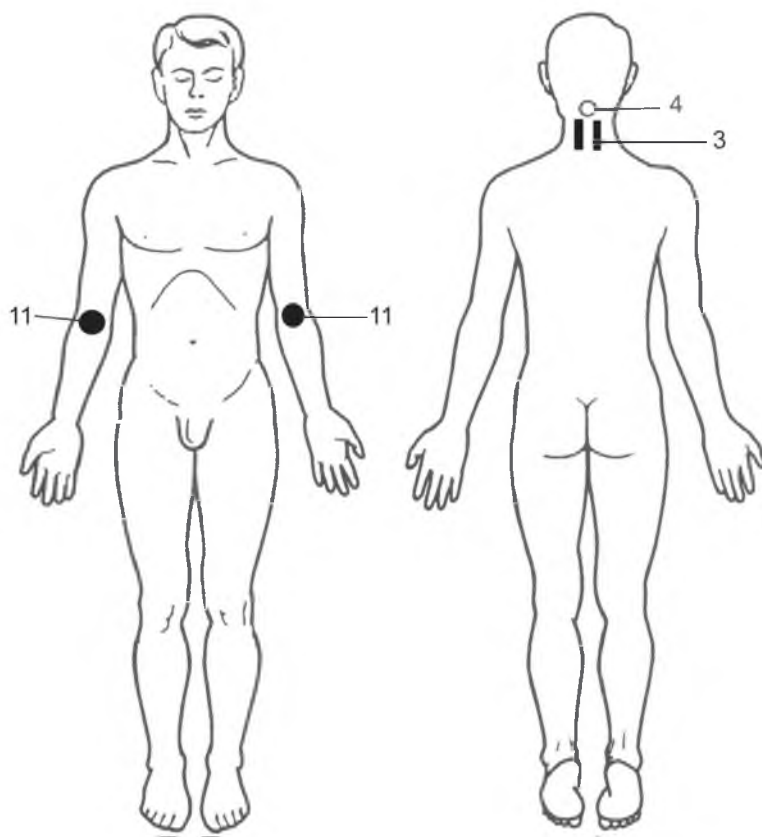
Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 3 (paravertebral neck).

MLT R - Zone 11 (the projection of the neurovascular bundle in the cubital fossa).

MLT IR (after exposure to ultrasound) - Zone 4 (the projection of the brain stem, corresponding to the foramen magnum).

Influence zones		
US	MLT IR	MLT Rd
3	4	11





## Ultrasound puncture

### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

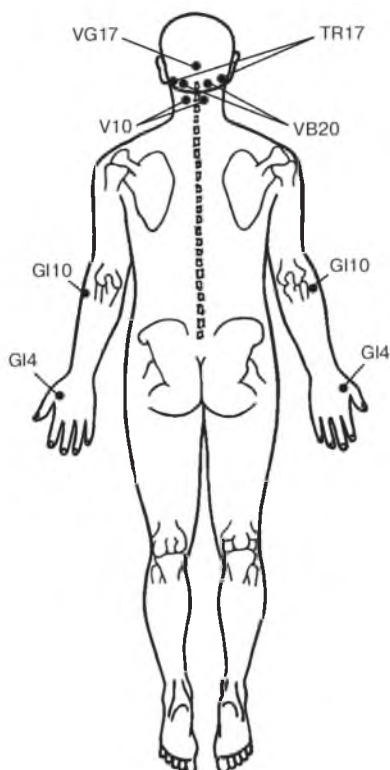
AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-3	0	9,4	US - 1,5 on BAP

Recommended recipe:

- 1) VG17 + VB20 (2) + GI4 (2);
- 2) V10 (2) + VB12 (2) + E36 (2);
- 3) VG17 + TR17 (2) + GI10 (2).

The maximum effect is achieved followed by zonal laser therapy.

Influence zones		
US	MLT IR	MLT Rd
Acupuncture points	-	-



## M79.2 INTERCOSTAL NEURALGIA

**Intercostal neuralgia** (ancient Greek νεῦρον — «nerve» and ἄλγος — «algia» (pain), or torakalgiya - a compression or irritation of the intercostal nerves.

### **Etiopathogenesis**

Intercostal neuralgia is a cause of acute pain in the chest area. Often the symptoms are similar to symptoms of acute myocardial infarction, pneumonia, pleurisy and other diseases.

Reasons intercostal neuralgia

1. An osteochondrosis of the thoracic spine, kyphosis, lordosis, and so on.
2. Injuries to the thorax
3. Hypothermia
4. Unsuccessful torso rotation or a long stay in an awkward position (sedentary work, etc.), A long and unaccustomed physical strain on the spine.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-3	50-75	3,9; 99	UST - 3 for one field, 5-10 in total; MLT - 15 in total.

### **METHOD OF TREATMENT**

The patient - sitting.

The position of the radiator: a contact.

Frequency of treatments: daily or every other day.

Number of treatments: 10.

Retreatment: a month if necessary.

Possible combination with other treatments:

- Drug therapy;
- Spa treatment.

Methods of exposure: a stable or labile recommended zone.

Thorax divided into 6 fields (right and left front, right and left rear, two side).

Impact UST conducted directly on a body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zones 1, 2, 3 (the surface of the chest: the front left / right, rear left / right, the lateral surface of the right / left).

**ATTENTION!**

***Influence of ultrasound on the day on two fields, excluding the region of the heart and the sternum.***

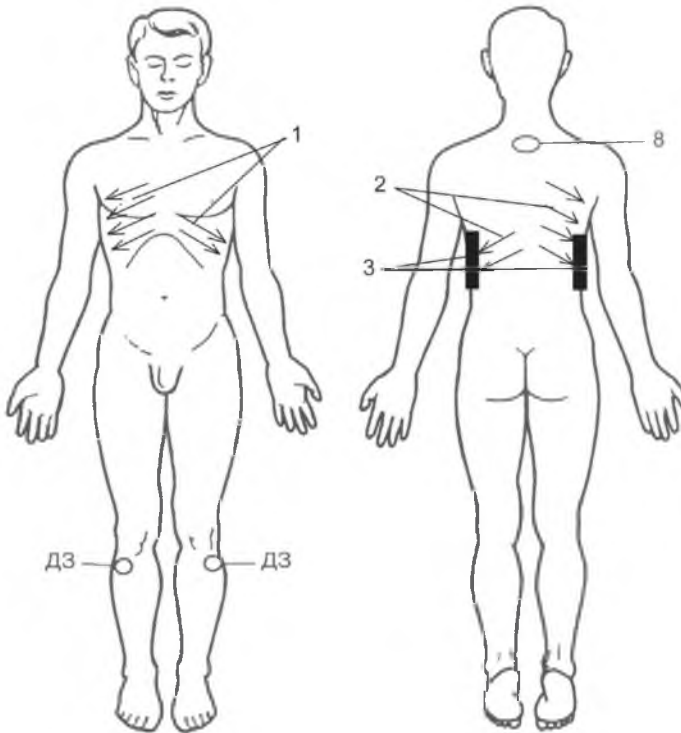
Area of Effect - intercostal spaces.

Chance of phonophoresis of hydrocortisone.

MLT R - DMZ zone (the additional area corresponding to the epicenter of the right/left point E36);

MLT IR - Zone 8 (C8-D2 projection of the vertebral segments).

Influence zones		
US	MLT IR	MLT Rd
1; 2; 3	8	ДЗ



## Ultrasound puncture

### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-3		3,9	UST - 1 on AP, (4-6 points on session).

Special point:

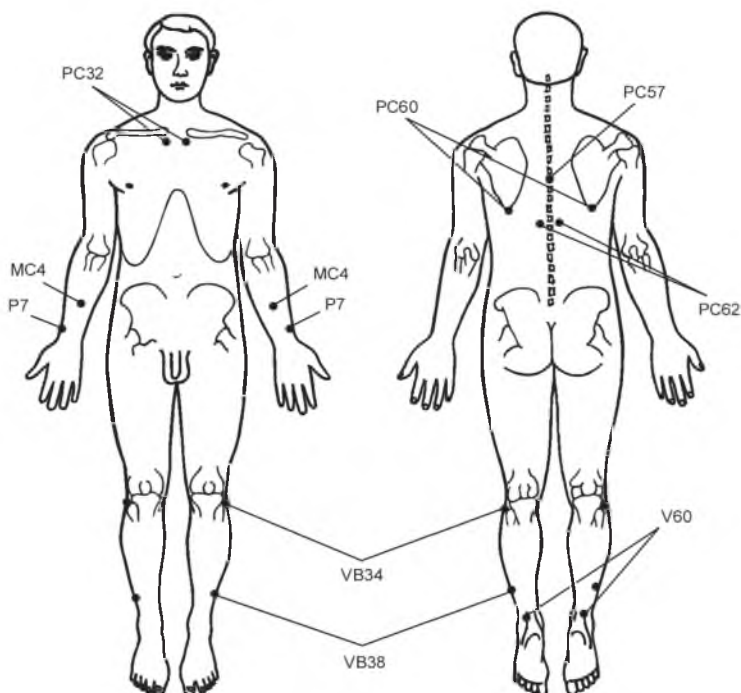
- Pain in the area of the pectoralis major muscle - P7 (1 min);
- Pain in the fourth intercostal space - MC4 (1 min);
- Pain in the side of the chest - VB34 (2 min) + VB38 (2 min);
- Pain in the thoracic region of the back V60 (2 minutes).

Additional points:

PS3; RS57; RS60; RS62.

The maximum effect is achieved by pre-zonal laser therapy.

Influence zones		
US	MLT IR	MLT Rd
Acupuncture points	-	-



## M79.2 NEURALGIA OF CERVICAL DEPARTMENT OF THE BACKBONE

**Neuralgia** (from the Greek neuron - Vein, nerve, and algos - pain) -ostraya, aching, burning or dull pain in the course of the peripheral nerves arising episodic and periodic.

Attacks of pain may be accompanied by pallor or redness of the skin, sweating, muscle twitching. When no movement disorders neuralgia and sensitivity loss, and nerve damage are no structural changes.

### **Etiopathogenesis**

The cause of the disease neuralgia can be very nerve, nerve plexus or the processes developing in the surrounding organs and tissues as a result of injury, infection (influenza, malaria, etc.), Quenching, etc. Neuralgia develops mainly in the nerves, where the nerve passes through the narrow channels of the bone and can be easily crushed or infringed its surrounding tissues. Development of the infringement and the emergence of neuralgia may contribute to a variety of factors: hypothermia, inflammation, tumors, trauma, stress, intoxication, circulatory disorders, hernia of intervertebral disks, and so on.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	50-75	3,9; 99	UST - 1-2 on the field, 6-8 in total; MLT - 15 in total.

### **METHOD OF TREATMENT**

**Position of the patient** - lying / sitting.

**The position of the radiator:** a contact.

**Frequency of treatments:** daily or every other day.

**Number of treatments:** 8-10.

**Repeated treatment:** two months if necessary.

**Possible combination with other treatments:**

- Drug therapy;
- Physical therapy;
- Spa treatment.

**Methods of exposure:** a stable or labile recommended zone.

Impact UST conducted directly on a body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

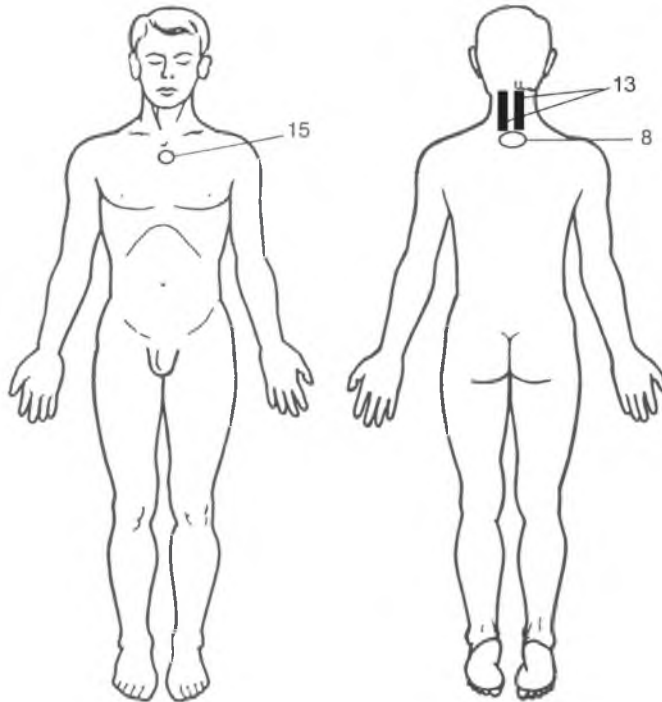
Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - zone 13 (paravertebrally C5-D2).

MLT R - Zone 15 (the projection of the thymus gland).

MLT IR (after ultrasound exposure) - Zone 8 (projection C5-D2).

Influence zones		
US	MLT IR	MLT Rd
13	8	15



## M79.2 NEURALGIA OF THE LUMBAR SPINE

### Pathogenesis

Causes of neuralgia of the sciatic nerve (sciatica).

1. An osteochondrosis, intervertebral hernia, etc., When there is infringement of the roots with the development of sciatic neuralgia.

2. Injuries to the lumbar spine, hip fractures, pelvic tumor in the area of the passage of the sciatic nerve, infectious and inflammatory diseases of the pelvic organs, hypothermia, weight lifting, bad twist the torso.

3. Development of sciatica contributes to a sedentary lifestyle, sedentary work and pregnancy.

### TREATMENT SCHEME:

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-5 5 at the end of the course	50-70	3,9; 99	UST - 3 on the field, per procedure voicing 2-3 field; MLT - 5 zone, 15 in total.

### METHOD OF TREATMENT

Position of the patient - lying.

The position of the radiator: a contact.

Frequency of treatments: daily or every other day. Number of treatments: 8-10.

Repeated treatment: two months if necessary.

Possible combination with other treatments:

- Drug therapy;
- Physical therapy;
- Spa treatment.

Methods of exposure: a stable or labile recommended zone.

Impact UST conducted directly on a body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.).

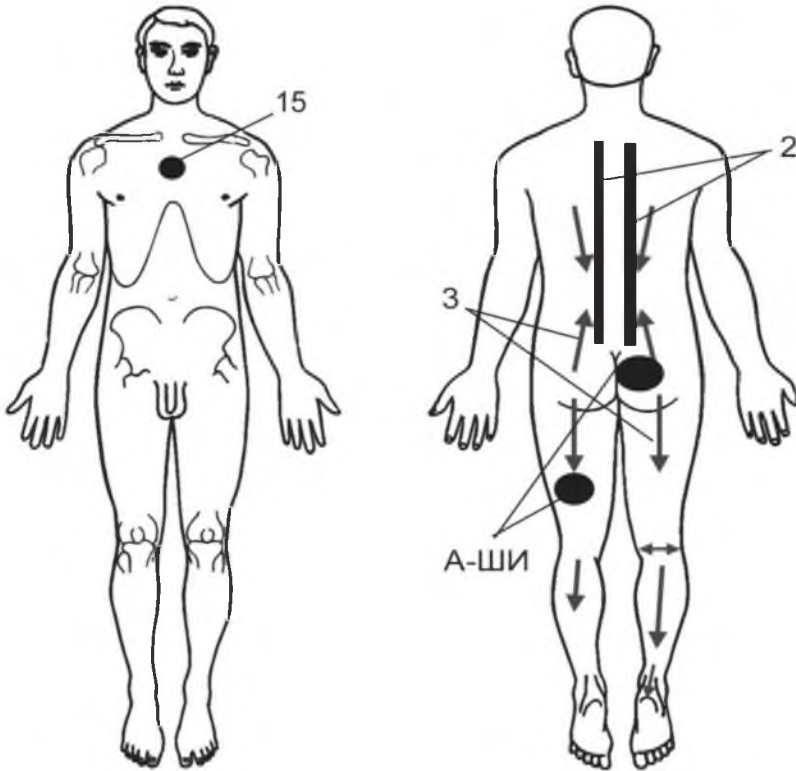
Impact MLT UST is performed after a contact at point A-SHI (pain points).

UST - Zone 2, 3 (paravertebrally D2-L5 and in the course of the sciatic nerve (thigh, calf, foot).

MLT R - Zone 15 (the projection of the thymus gland).

MLT IR (after ultrasound exposure) - Zone A-SHI (pain points)

Influence zones		
US	MLT IR	MLT Rd
2; 3	A-SHI	15





## T75.2 VIBRATION DISEASE

Occupational disease, characterized by a variety of clinical symptoms characteristic of the flow; caused by the influence of local (local) and whole-body vibration.

### **Etiopathogenesis**

The main etiological factor is the industrial vibration. Often it is accompanied by other occupational hazards (noise, cooling, static tension of muscles of the shoulder girdle, the forced oblique body position, etc.). The disease is manifested disorders of the nervous, cardiovascular system, the musculoskeletal system. Local and general vibrations, being a strong irritant effect on the receptor apparatus of the skin and nerve trunks, increases the secretion of norepinephrine at the terminal of the sympathetic nervous system. The excess norepinephrine can not fully captured and accumulated in the terminal, so it is a significant portion enters the bloodstream, resulting in an increase in vascular tone, leads to increased blood pressure and angio-spasm. The action of vibration occur destructive phenomena in the corpuscles of Vater-Pacini, nerve fibers, neurons of the spinal cord, reticular formation of the brain stem, spinal and sympathetic ganglia border trunks. There is reduction of afferent innervation, especially the perception of vibration sensitivity. With the development of pathological changes in somatoneurological and vegetative apparatus degenerative changes occur in the skin, muscles, skeletal system.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
2	75-99	1,2; 6,3; 93	UST - 5-7 in the zone; MLT - 5 zone, 15 in total

### **METHOD OF TREATMENT**

Position of the patient - lying.

The position of the radiator: a contact.

Frequency of treatments: every other day.

Number of treatments: 10-12.

Re-treatment: after 6 months.

Possible combination with other treatments:

- Drug therapy;
- Spa treatment.

Methods of exposure: a stable or labile recommended zone.

Impact UST conducted directly on a body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

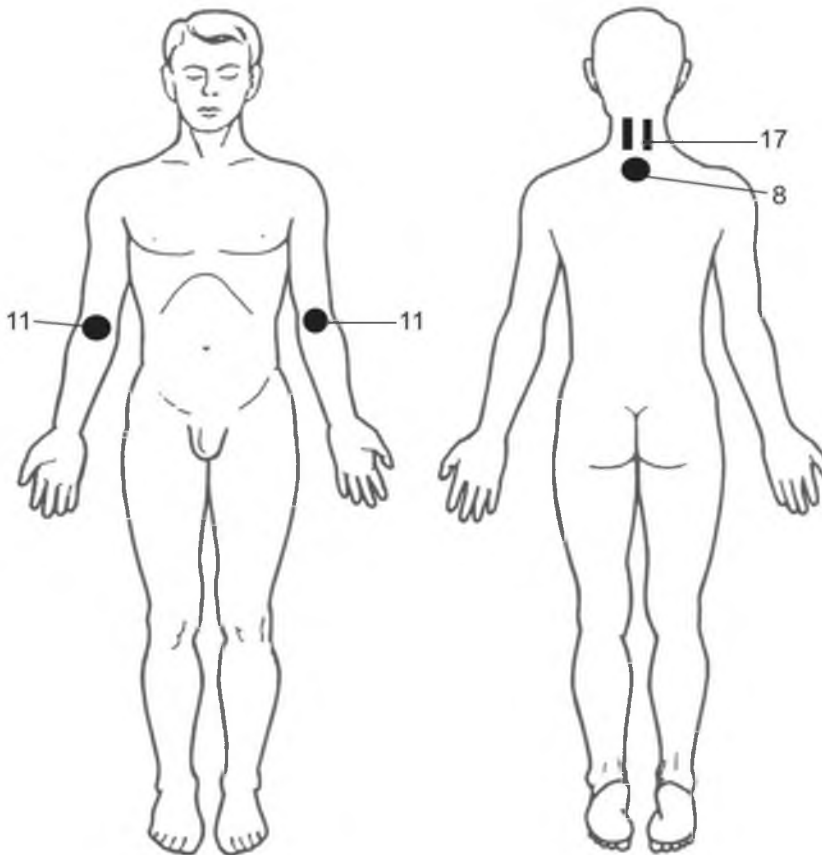
Impact of MLT is carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 17 (paravertebral cervical spine area).

MLTR - Zone 11 (cubital fossa on the right / left).

MLT IR (after UST) - Zone 8 (D2 projection C7 segments).

Influence zones		
US	MLT IR	MLT Rd
17	8	11



## M60 MYOSITIS

Myositis is inflammatory damages of muscles, skeletal muscles, but not the lesion of smooth muscles of internals. In this group are integrated the most different in an etiology, course and degree of prevalence pathological processes. Myositis can lesion both one of muscles, and big muscular massifs.

### **Etiopathogenesis**

Among the variety of reasons for muscle inflammation should be noted: trauma, various infections, worm infestation, physical activity, adverse external factors - the cold, vibration, intoxication, hereditary factor.

The most common myositis develop due to various infections. As a rule, these are different viruses, E. coli, Staphylococcus and Streptococcus. In this regard, myositis may be complicated by a variety of infectious diseases - flu, sore throat, inflammation of the tonsils (tonsillitis), pneumonia, inflammation of the meninges (meningitis). In the propagation of purulent infection on the body with the blood flow in the muscles generated purulent lesions or abscesses. Especially clearly observed in sepsis. The introduction of purulent infection in muscle tissue may be due to trauma with damage to the skin, and even conventional intramuscular injection made in violation of the rules of antiseptics.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
2-3	50-99	1,2; 6,8; 10; 73	US - a total of 5-10; MLT - 5 zone, up to 15 in total.

### **METHOD OF TREATMENT**

Position of the patient - lying.

The position of the radiator: a contact.

Frequency of treatments: daily or every other day.

Number of treatments: 10-12.

Re-treatment: after 6 months.

Possible combination with other treatments:

- Spa treatment.

Methods of exposure: a stable or labile recommended zone.

Impact UST conducted directly on a body or through a contact medium (ultrasound gel, cocoa butter or other plants, drug, etc.). Impact of MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - affected muscles and paravertebrally to the relevant segments.

IKMLT (after UST) - affected muscles and paravertebrally to the relevant segments.

**ATTENTION!**

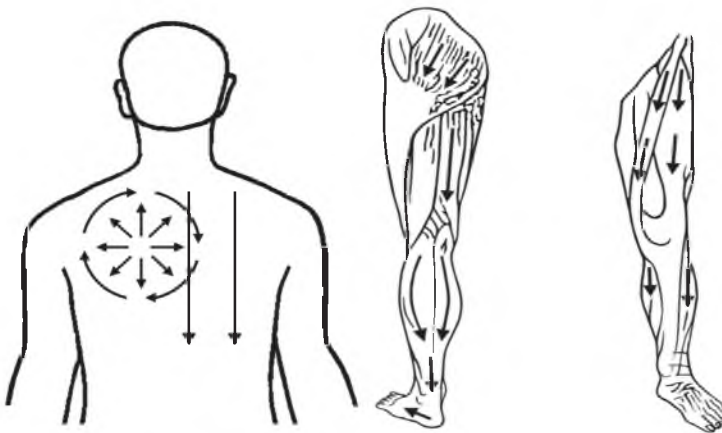
***If the focus of muscle pain is not projected on the appropriate level of the spine (arms below the elbows and legs below the knees), exposure is carried out only on the pain center.***

MLT R - Zone 11 (cubital fossa on the right / left);

- Area 30 (popliteal fossa on the right / left).

The figure shows, respectively footprint for UST and MLT with myositis infraspinal muscles and lower limb muscles.

Influence zones		
US	MLT IR	MLT Rd
Fig.	Fig.	11; 30



***ULTRASONIC PUNCTURE IN MYOSITIS:***

During the ultrasound puncture in myositis affects 1.5-2 minutes at point A-SHI affected segments. Daily, 6-8 procedures, the amplitude of the ultrasonic -2 microns, a feeling of deep heat without burning sensation in the patient.

# F00-F99 MENTAL AND BEHAVIORAL DISORDERS

## F51.0 INSOMNIA

**Insomnia** - a dissatisfaction with sleep. Insomnia is the most common complaint of sleep disorders, and the patients have a sense of the quality or lack of restorative sleep function.

### **Etiopathogenesis**

Main causes: stress, neurosis, mental illness, neurological disorders, physical illness, psychotropic drugs, alcohol, toxic factors, endocrine and metabolic diseases.

The pathogenesis of insomnia is not well studied. Insomnia is usually the result of the interaction of biological, physical, psychological and environmental factors. The areas of the brain involved in the regulation of wakefulness include tuberomammillary and posterior hypothalamic nucleus containing histamine neurons from which are stimulatory signals in the brain stem areas associated with wakefulness. Of these zones pulses diffusely projected onto the cerebral cortex and ensure the maintenance of wakefulness.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
4-5	75-99	2,4	US - 5 in total; MLT - 20 in total.

### **METHOD OF TREATMENT**

Position of the patient - lying.

The position of the radiator: a contact.

Frequency of treatments: daily or every other day.

The number of procedures: the number of sessions is determined by the effectiveness of therapy.

Conversations with early awakening should be carried out in the morning and going to sleep in low - in the evening (for 1.5-2 hours before bedtime).

Possible combination with other treatments:

- Herbal medicine;
- Massage;
- Autogenous training;

- Psychological correction.

Methods of exposure: a stable or labile recommended zone.

Within one session exposure performed simultaneously on three zones of these factors.

Impact UST conducted directly on a body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 17 (the projection of the liver).

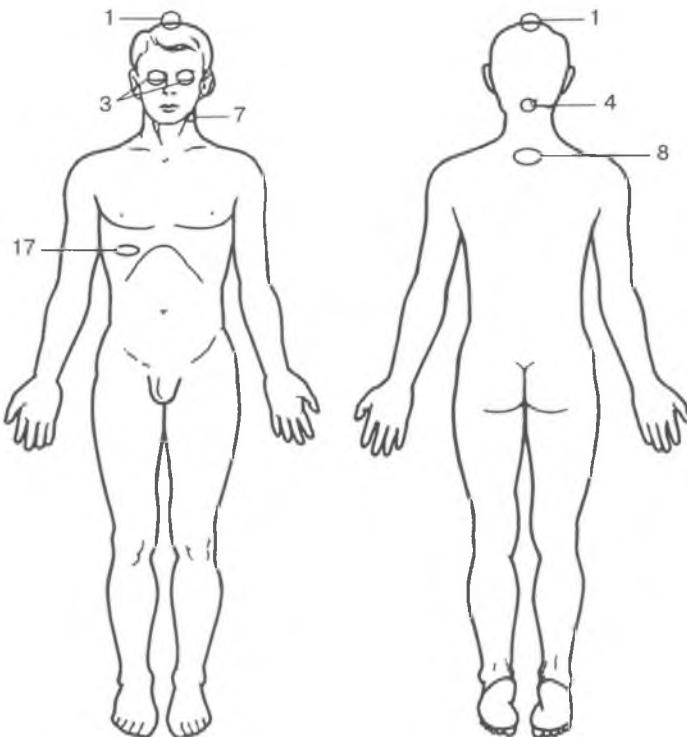
MLT R - Zone 3 (the eye).

MLT IR - Zone 8 (C8-D2 projection of the vertebral segments);

- Zone 4 (the projection of the brain stem);

- Zone 1 (embryological projection epiphysis).

Influence zones		
US	MLT IR	MLT Rd
17	1; 4; 8	3



## F32 DEPRESSION

**Depression** - a mental disorder characterized by «depressive triad»: depressed mood and loss of ability to experience pleasure, impaired thinking, motor retardation.

### **Etiopathogenesis**

It is shown that the affective, motor and cognitive disorders with unipolar depression are similar with similar syndromes in lesions of the basal ganglia. Therefore, the hypothesis was suggested that the anatomical substrate of unipolar depression - loss of neural circuits involving the basal ganglia and the prefrontal area.

Physiotherapy treatment is prescribed as a preventive measure (3-5 sessions a day) on the eve of the expected state of deterioration.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	75-99	1-10 (P1-mode)	UST - 5 zone, MLT - 10 zone, 30 in total.

### **METHOD OF TREATMENT**

Position of the patient - lying.

The position of the radiator: a contact.

Frequency of treatments: daily or every other day.

Number of treatments: 3-5 sessions on the eve of the expected deterioration.

Possible combination with other treatments:

- Drug therapy;
- Physical therapy;
- Balneotherapy;
- Psychological correction.

Methods of exposure: a stable or labile recommended zone.

Within one session exposure performed simultaneously on three zones of these factors.

Impact UST conducted directly on a body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

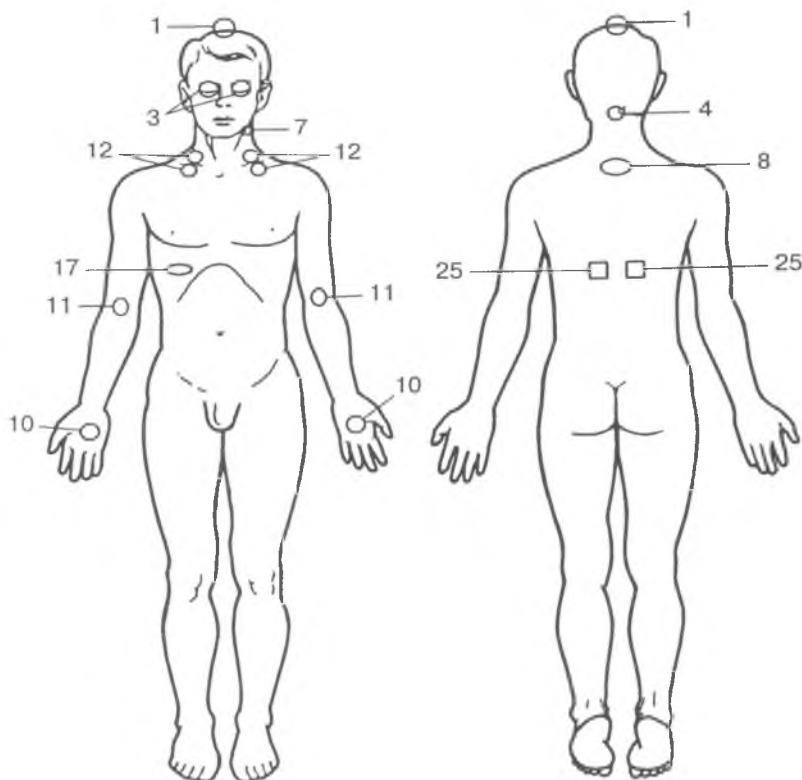
Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

UST - Zone 17 (the projection of the liver);  
 - Area 25 (D9-10 projection of the vertebral segments).

MLT R - Zone 3 (the eye);  
 - Zone 1 (embryological projection epiphysis);  
 - Area 7 (projection VSHSG);  
 - 10a area (palmar surface of the right hand);  
 - Area 11 (cubital fossa on the right / left).

MLT IR - Zone 8 (C8-D2 projection of the vertebral segments);  
 - Zone 4 (the projection of the brain stem);  
 - Zone 10b (palmar surface of the hand from left);  
 - Area 12 (over-and subclavian fossa).

Influence zones		
US	MLT IR	MLT Rd
17; 25	4; 8; 10b; 12	1; 3; 7; 10a; 11





## **F40-F48 NEUROTIC, STRESS-RELATED AND SOMATOFORM DISORDERS**

The main feature is repeated presentation of physical symptoms together with persistent demands of medical examinations, in spite of repeated negative findings and their assurances of doctors that the symptoms have no somatic nature. If the patient has any physical illness, they do not explain the nature and extent of symptoms, or suffering, or patient complaints.

### **Etiopathogenesis**

Causes: stressful stimuli, traumatic brain injuries, infections, intoxication, diseases of internal organs and endocrine glands, as well as the long-term lack of sleep, fatigue, malnutrition and prolonged emotional stress. Neurosis is the result of a collision of conflicting incentives that create a situation of uncertainty reflex response; clinic, so there is a conflict between the impulses. Somatoform disorders explains the activation of neuro-visceral connections that include somatization neurosis.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	75-99	2-5	UST - 5 zone; MLT - 5 zone, 20 in total.

### **METHOD OF TREATMENT**

Position of the patient - lying.

The position of the radiator: a contact.

Frequency of treatments:

The number of procedures:

Possible combination with other treatments:

- Balneotherapy;

- Psychological correction.

Methods of exposure: a stable or labile recommended zone.

Impact UST conducted directly on a body or through a contact medium (UST ultrasonic gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

### **METHODS:**

On-vein irradiation of blood in the carotid arteries (zone 11), the frequency of 2-5 Hz, 5 minutes on each side, one every 2-3 days, 5-7 protsedur.Pri this daily: zona15

(frequency 75 Hz, 1 time min); Zone 8 (1 min); Zone 4 (8 sec); Zone 5 (20 sec); zone 17 (2.5-3 minutes). Course - 21 days.

UST - Zone 17 (the projection of the liver).

MLT R - Zone 15 (the projection of the thymus gland);

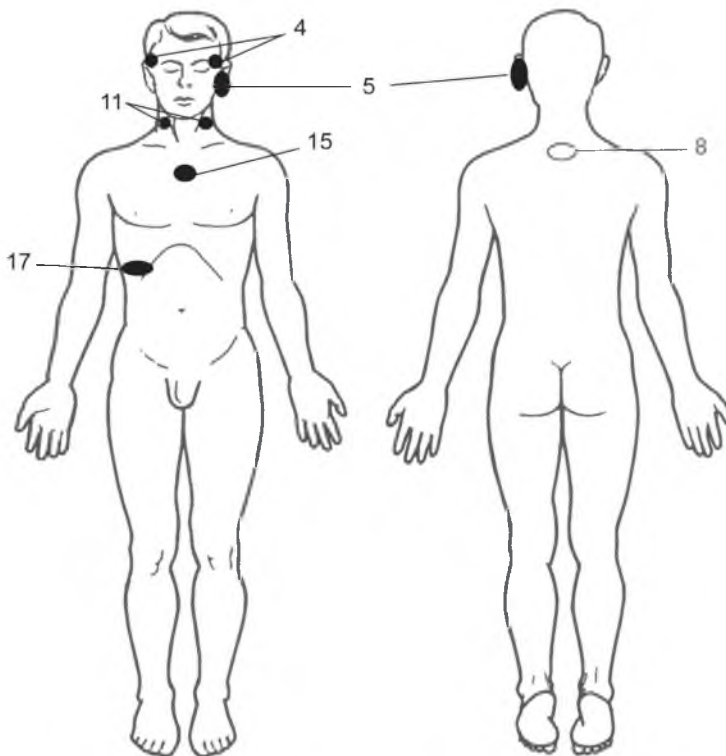
- Area 11 (the projection of the carotid artery on the right / left).

MLT IR - Zone 8 (C8-D2 projection of the vertebral segments);

- Zone 4 (temporal area to the right / left);

- Zone 5 (left pinna).

Influence zones		
US	MLT IR	MLT Rd
17	4; 8; 5	15; 11



## E65-E68 OBESITY AND OTHER TYPES OF HYPERNUTRITION

**Obesity** — the chronic recurrent disease which is characterized by the excess content of fatty tissue in an organism (men have not less than 20%, women have 25% of body weight, an index of body weight more than 25-30).

### **Etiopathogenesis**

According to modern concepts one of the main pathogenetic mechanisms leading to development of a disease is the energy imbalance consisting in discrepancy between the number of the calories arriving with food, and energy expenses of an organism. Most often it occurs owing to eating disorders: excess receipt of energy with food in comparison with energy expenditure. Undoubtedly is the value of activity of a lipoprotein lipase of adipocytes in mechanisms of development of obesity. At overeating the brown fatty tissue hypertrophies, turning excess of the energy arriving with food into heat and by that interfering with its adjournment in fatty depots. Small physical activity or lack of adequate physical activity, creating excess of energy in an organism, also promotes increase in body weight. The role of hereditary and constitutional predisposition is undoubted.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	75-99	9.4 alternated with 1-10 (P1 mode)	UST - 5 per zone, MLT - 10 to zone 30 cumulatively.

### **METHOD OF TREATMENT**

Position of the patient - lying.

The position of the radiator: a contact.

Methods of exposure: labile, the recommended area.

Frequency of treatments: daily, alternate between morning and evening hours.

Number of treatments: 10.

Possible combination with other treatments:

- Physical therapy;

- Diet therapy;

- Balneotherapy;

- Psychological correction.

Methods of exposure: a stable or labile recommended zone.

Impact UST conducted directly on a body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted

on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

In one session, use the 3-4 zone with the following parameters.

UST - Zone 21 (the projection of the celiac plexus);

- Area 26 (paravertebrally projection D5- D8 zone segmental innervation of the pancreas).

MLT R - Zone 3 (the eye);

- Area 37 (the lower third of the internal surface of the tibia);

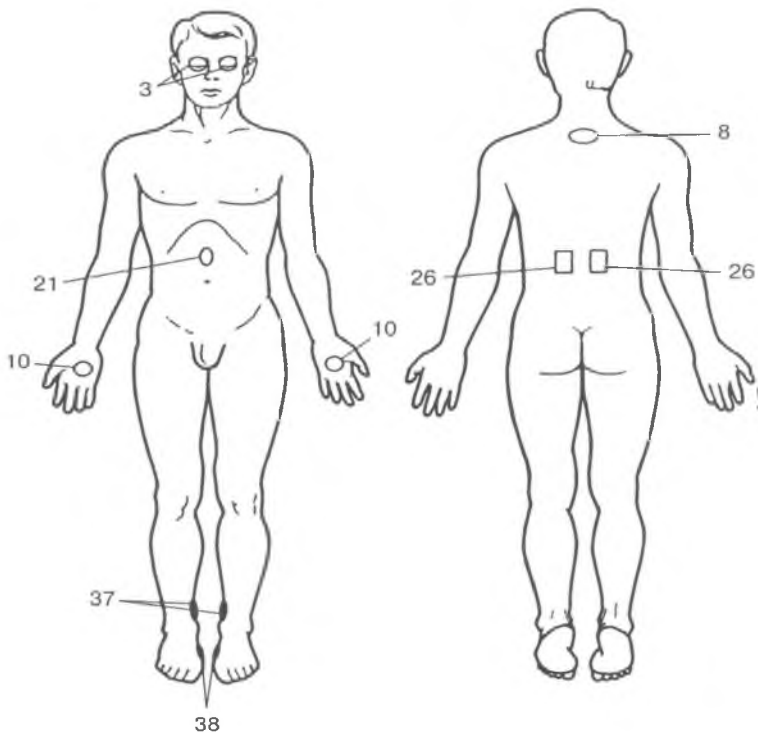
- Area 38 (the inner surface of the feet);

- Zone 10a (palmar surface of the hand on the right).

MLT IR - Zone 8 (C8-D2 projection of the vertebral segments);

- Zone 10b (palmar surface of the hand on the left).

Influence zones		
US	MLT IR	MLT Rd
21; 26	8; 10b	3; 37; 38; 10a



## F01.1 MULTI-INFARCT DEMENTIA

**Dementia** - a persistent decline in cognitive abilities of the person, as well as the gradual loss of knowledge learned earlier.

### **Etiopathogenesis**

The causes of dementia and related disorders are very different. But it is possible to allocate the basic - neuronal death under the influence of deposits formed in the brain. As a result, any suppression of the activity of neurons, or the disruption of the vessels, their feeding.

The causes of senile dementia can be different, moreover, are often found mixed forms of the disease. In addition, the likelihood of developing the disease affect unfavorable factors, the main ones are: age, gender - according to statistics, among the patients more often are women, a genetic predisposition.

Also the lack of intellectual activity, stresses, intoxications, alcoholism can exert impact on probability of development of dementia.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	75-99	9.4 alternated with 1-10 (P1 mode)	UST -up to 7 zone MLT -10 per zone, 30 in total.

### **METHOD OF TREATMENT**

Position of the patient - lying.

The position of the radiator: a contact.

Frequency of treatments: daily, morning.

Number of treatments: 14-15.

Possible combination with other treatments:

- Drug therapy;
- Diet therapy;
- Kinesitherapy.

Methods of exposure: a stable or labile recommended zone.

Impact UST conducted directly on a body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

In one session, use the 3-4 zone with the following parameters.

UST - Zone 17 (the projection of the liver).

MLT R - Zone 3 (the eye);

- Zone 6 (projection of the carotid artery);

- Area 36 (the plantar surface of the foot);

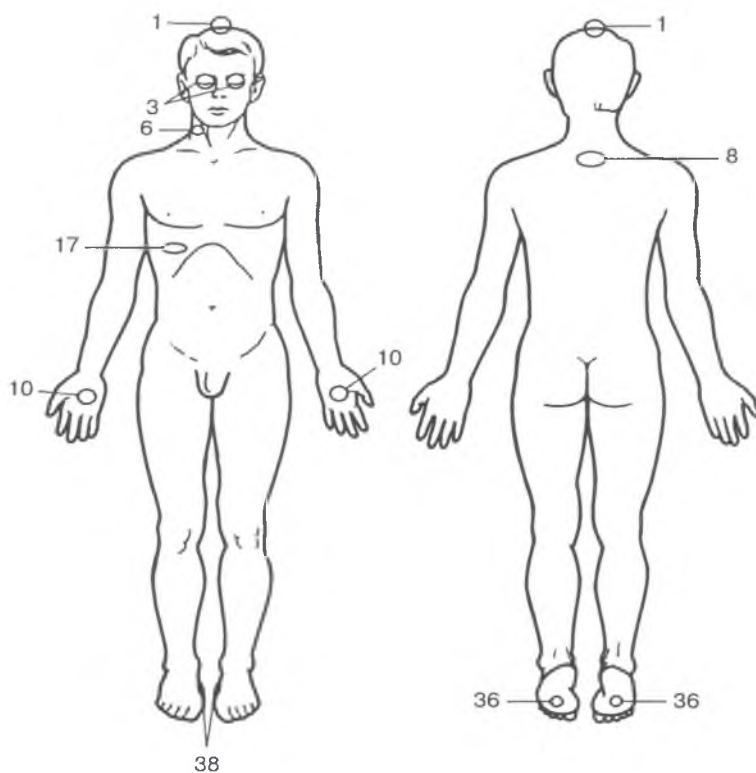
- Area 10 (palmar surface of hands);

- Area 38 (the inner surface of the stop).

MLT IR - Zone 1 (projection epiphysis);

- Zone 8 (C8-D2 projection of the vertebral segments).

Influence zones		
US	MLT IR	MLT Rd
17	8; 1	3; 6; 36; 38; 10



## I 15 VEGETATIVE DYSTONIA (VD) ON HYPERTENSIVE TYPE

**The vegetative-vascular Dysfunction (VD)** - designation, widespread in medical and diagnostic practice, various by origin and to manifestations, but the functional vegetative frustration in the basis caused by violation of neuro humoral regulation of vegetative functions.

### **Etiopathogenesis**

These disorders are most frequently observed in the neuroses, physical inactivity, with endocrine disharmony in puberty and menopause, as well as neurosis conditions associated with neuro-mental or physical fatigue, infections, intoxication, withdrawal symptoms in drug addicts and other nature.

In the pathogenesis of VSD usually involved the regulation of autonomic disorders at all levels - from the cerebral cortex to the peripheral parts of the autonomic nervous system (adrenergic and cholinergic receptors include executive bodies) and regulation of endocrine links

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	75-99	12 alternated with 1-10 (P1 mode)	UST - 5 per zone, MLT - 10 zone, 30 in total.

### **METHOD OF TREATMENT**

Position of the patient - lying.

The position of the radiator: a contact.

Frequency of treatments: every other day.

Number of treatments: 10.

Possible combination with other treatments:

- Drug therapy;
- Balneotherapy;
- Physical therapy;
- Psychological correction.

Methods of exposure: a stable or labile recommended zone.

Impact UST conducted directly on a body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

In one session, use the 3-4 zone with the following parameters.

UST - Zone 21 (the projection of the celiac plexus).

MLT R - 36a Zone (the plantar surface of the foot to the right);

- 10a area (palmar surface of hands on the right).

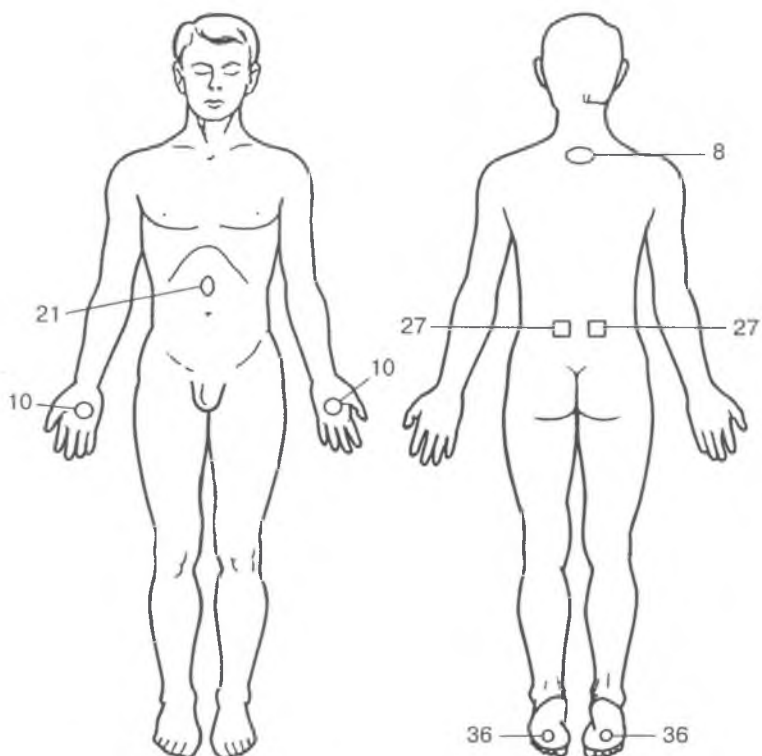
MLT IR - area 36b (the plantar surface of the foot to the left);

- Zone 10b (palmar surface of hands on the left);

- Zone 8 (C8-D2 projection of the vertebral segments);

- Area 27 (paravertebrally projection D12-L2 area of segmental innervation of the kidney).

Influence zones		
US	MLT IR	MLT Rd
21	8; 27; 10b; 36b	10a; 36a





## G21 PARKINSON'S DISEASE

**Parkinson's disease** is a neurologic syndrome which is characterized by a number of symptoms: a tremor, a muscular rigidity (the steady increase of a muscular tone, uniform resistance of muscles in all phases of the passive movement which is equally expressed in flexors and extensors), postural instability (inability to keep balance, difficulties of walking, falling) and a bradykinesia (a slow rate of movements, difficulty of initial movements, difficulty of turns).

### **Etiopathogenesis**

Clinical manifestations of trembling paralysis and syndrome of parkinsonism result from the postponed acute and chronic infections of nervous system. Cerebral atherosclerosis, vascular diseases of a brain, a tumor, a trauma of nervous system can serve as etiologies. The main pathogenetic link is violation of an metabolism of catecholamines (dopamine, noradrenaline) in extrapyramidal system.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	75-99	9.4 alternated with 1-10 (P1 mode)	UST - 5 per zone, MLT - 10 zone, 30 in total.

### **METHOD OF TREATMENT**

Position of the patient - lying.

The position of the radiator: a contact.

Frequency of treatments: every other day, preferably in the morning.

Number of treatments: 14-21.

Possible combination with other treatments:

- Drug therapy;
- Kinesitherapy.

Methods of exposure: a stable or labile recommended zone.

Impact UST conducted directly on a body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

In one session, use the 3-4 zone with the following parameters.

UST - Zone 17 (the projection of the liver).

MLT R - Zone 3 (the eye);

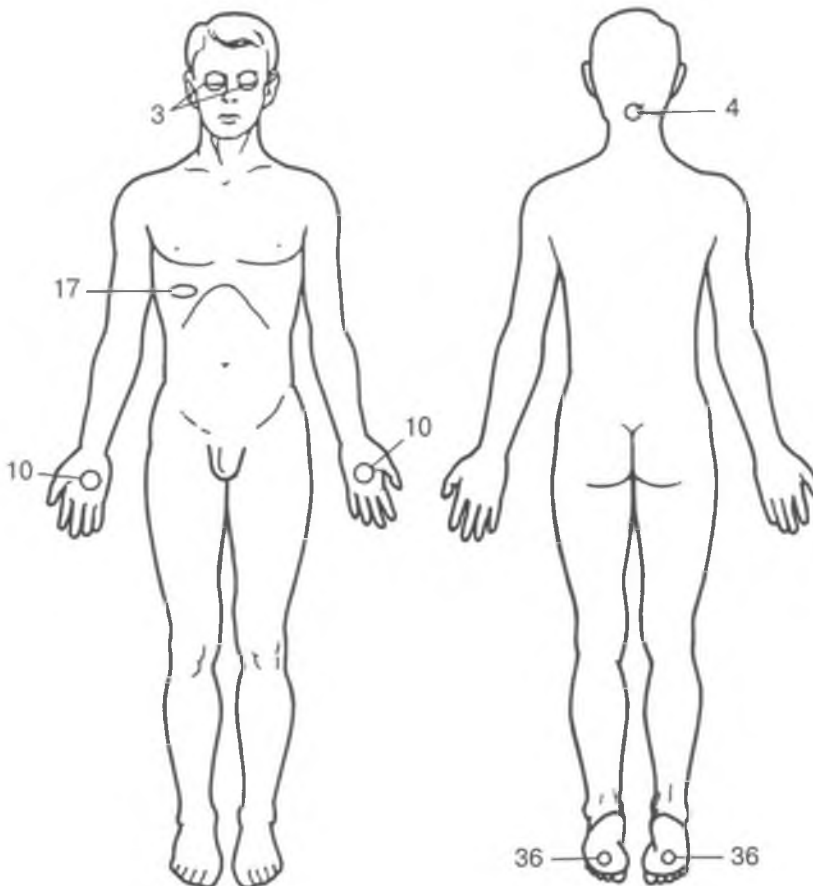
- Zone 36a (the plantar surface of the foot to the right);

- 10a area (palmar surface of hands on the right).
- MLT IR - area 36b (the plantar surface of the foot to the left);
- Zone 10b (palmar surface of hands on the left);
- Zone 4 (the projection of the brain stem).

**ATTENTION**

*The best results are obtained when the patient is not taking antiparkinsonian drugs.*

Influence zones		
US	MLT IR	MLT Rd
17	4; 10b; 36b	3; 10a; 36a



## **F90 DYSTONIC HYPERKINESIA (TORTICOLLIS, OROMANDIBULAR DYSKINESIA)**

Dystonic hyperkineses are pathological suddenly arising involuntary movements in various groups of muscles.

### **Etiopathogenesis**

Manifested in the organic and functional lesions of the nervous system: the cerebral cortex, subcortical motor centers or the brain stem. Usually caused by lesions of the basal ganglia and related structures forming extrapyramidal system (extrapyramidal hyperkineses), rarely disorders of the peripheral nervous system (peripheral hyperkineses). Can occur as a side effect of antipsychotic neuroleptic syndrome in the composition (medicinal hyperkineses), due to their toxic effects on the extrapyramidal system.

Often arise against infectious diseases (encephalitis, rheumatism), vascular encephalopathy; after undergoing a traumatic brain injury, intoxication and others.

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, $\mu\text{m}$	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	75-99	10-100 (P2-mode)	UST -do7 total; MLT - 10 zone, 30 in total.

### **METHOD OF TREATMENT**

Position of the patient - lying.

The position of the radiator: a contact.

Frequency of treatments: 2-3 times a week, preferably in the morning.

Number of treatments: 14-15.

Number of courses per year: 3.

Possible combination with other treatments:

- Drug therapy;
- Autogenous training;
- Postisometric relaxation.

Methods of exposure: a stable or labile recommended zone.

Impact UST conducted directly on a body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

Impact MLT is carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

In one session, use the 3-4 zone with the following parameters.

UST - Zone 17 (the projection of the liver); - Area 25 (paravertebrally projection D7-L2 segmental innervation zone of the liver and gall bladder).

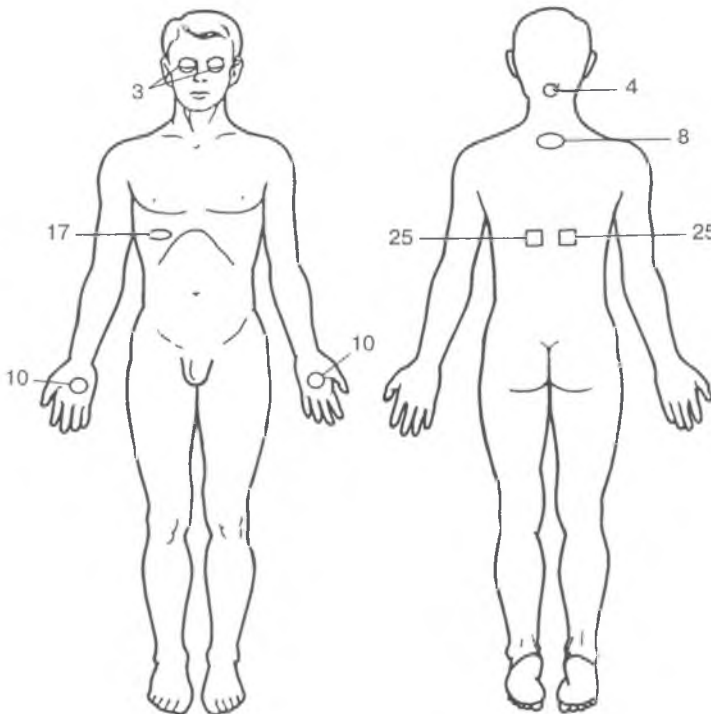
MLT R - Zone 3 (the eye);

- Area 10 (palmar surface of hands).

MLT IR - Zone 8 (projection C7 vertebrae segments - D2);

- Zone 4 (the projection of the brain stem).

Influence zones		
US	MLT IR	MLT Rd
17; 25	4; 8	3; 10



## ***APPLICATION OF MAGNET-LASER ULTRASOUND THERAPY FOR HEALTH IMPROVING AND PREVENTIVE PURPOSES***

### **TREATMENT SCHEME:**

The front panel of the device are the following parameters of the procedure:

AMPLITUDE US, μm	MLT POWER rel., %	MODULATION, Hz	TIME, min
3-5	50-75-99	9,4	UST - 5 per zone, MLT - 10 zone, 30 in total.

### **METHOD OF TREATMENT**

Position of the patient - lying.

The position of the radiator: a contact.

Frequency of treatments: 2 times a week.

Number of treatments: 5-7.

Number of courses per year: 2-3.

Possible combination with other treatments:

- Physical therapy;
- Hardening;
- Massage.

Methods of exposure: a stable or labile recommended zone.

Impact UST conducted directly on a body or through a contact medium (UST gel, cocoa butter or other plants, drug, etc.).

Impact MLT carried out simultaneously with a contact UST. Inductors mounted on the projection pathological focus in the area of paravertebral or reflex zones and the zone of the medulla oblongata.

In one session, use the 3-4 zone with the following parameters.

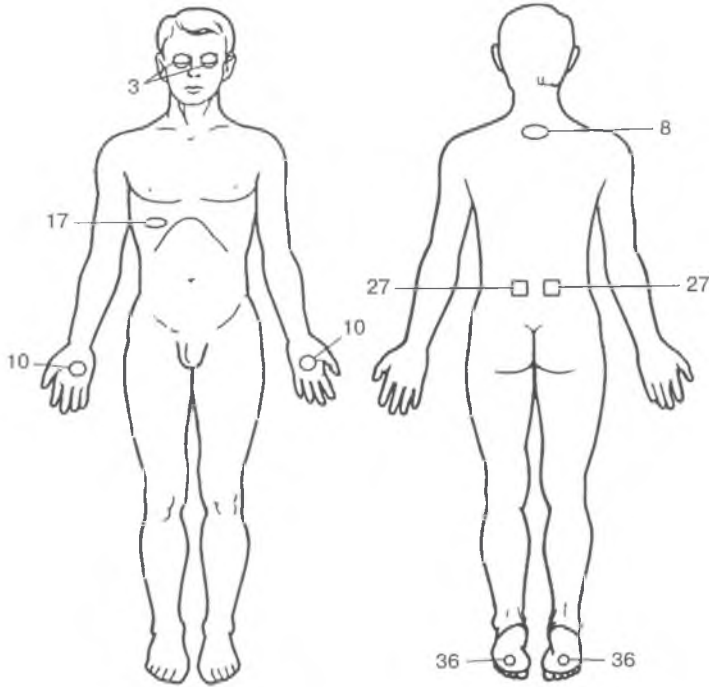
UST - Zone 17 (the projection of the liver).

MLT R - Zone 36 (the plantar surface of the foot);

- Area 10 (palmar surface of hands).

MLTIR - Zone 8 (projection C7 vertebrae segments - D2); - Area 27 (paravertebrally projection D11-L1 segmental innervation of the kidney area).

Influence zones		
US	MLT IR	MLT Rd
17	27; 8	36; 10



# Annex 1

*Resonant frequencies used in a combined apparatus for physiotherapy «MIT-11»  
and recommendations for their application*

Frequency, Hz	Diseases, conditions, syndromes, symptoms
1,2	The universal or basic frequency (the frequency of «superdelta» - the frequency of the heart rhythm). The main indications: diseases of the cardiovascular system, especially accompanied by heart palpitations, inflammation and autoimmune diseases, focal infection. Cardiopsychoneurosis.
2,4	Frequency universal multiple of (1.2 Hz) and enters the delta range (0.5-3 Hz) biocurrents brain. Frequency in the delta brain waves have a sedative effect and promote the normalization of physiological (delta) sleep with insomnia. Stimulation of hormonal function in women (hypermenorrhea, menorrhagia, uterine fibroids). Dyskinesia of biliary tract, kidney disease, fatigue (tiredness), sinusitis, and headache associated with it, bruises, injuries from bruises, infectious and toxic liver disease, rheumatic diseases.
9,40±0,5	Frequency of spectrum of the alpha rhythm (8-13 Hz) biocurrents brain, frequency of tremor of capillaries and frequencies that are multiples (0.1 Hz), alpha-rhythm of circulation. The resonant frequency of the release of ions. Increased efficiency due to the normalization neurodynamics brain. Other diseases and symptoms: headache of various origins, essential hypertension, accompanied by angina, respiratory disease (obstructive bronchitis), insufficient function of the endocrine glands (diabetes, impotence), adnexitis, prostatitis, cystitis, tonsillitis, peptic ulcer and 12 duodenal colon and other.
18,75	Diseases of the musculoskeletal system, phantom pain, burns, ophthalmic practice in patients with lesions of the cornea, acute respiratory infections.
37,5	Frequency of physical blocking of calcium channels (Ca <sup>2+</sup> ), and diseases associated with this process (instead of antihypertensive drugs, calcium channel blockers, to reduce the spastic muscle tone - post stroke patients, cerebral palsy, poorly healing fractures, etc.). Diseases of the neuromuscular system, dlyasnizheniya weight, in violation of thermoregulation, tonsillitis.

75	Universal frequency of analgesic, has antidepressant, reduces fear, strengthens kidney function. It stimulates the «color» vision, it is also recommended for diseases of the respiratory system, increases the content of leukocytes in the blood, stimulates lymphocirculation.
1-10	Scanning frequency (LF «swing») help the body recover from physical and mental overvoltage (asthenic hypofunctional and condition of the body), diseases of the cardiovascular system and parenchymal organs.
10-100	Scanning frequency (midrange «swing») has a sedative effect and normalizes hyperactivity conditions associated with neurotic disorders.



**Annex 2.**  
**Apparatus recommended for MLUST procedures and combined use**  
**with other physiotherapy methods.**  
**«HARMONY» system**



The system «Harmony» is designed for dry horizontal traction of the spine (in the lumbosacral and cervical regions), using an adjustable electric couch and pneumopressing. The installation consists of:

- Couche (2100 \* 1070 \* 830mm) with electric drive, controlled by remote control;
- Thoracic bodice;
- Segmental air mattress.

1. Traction is carried out in a room at a temperature 20-22°C. Before the procedure is recommended to perform a back massage for 10 minutes, then, after which the patient wear the chest belt and is laid on the couch.

2. Chest belt with the help of straps and detachable ring is attached to the tab located at the head on the back of the couch.

3. Pneumatic segmental mattress is activated for 5-7 minutes before starting the procedure. During this time it is completely filled with air, and during the procedure deflates and inflates in segments (by segment).

4. Using the remote couch slope changes from a horizontal position into an oblique angle of 45 degrees.

5. Thus, the patient lies on an inclined plane, thoracic spine is fixed a belt attached to the back of the couch. Procedures are held without loads.

6. Traction is held under its own weight and pneumopressing. At the same time in dosing of procedure is taken into account the weight, sex and age of the patient.

7. Throughout the session extension is necessary to control the tension of the sling pectoral girdle on both sides, the patient's state of health, portability procedure (you can offer the patient to move his feet, according to the «Cycling», or move your feet to the right and to the left, at the same time informing the sensations).

According to this information to decide whether to increase/ decrease the load or premature termination of the procedure.

8. The termination of procedure is performed by turning off the release sling pectoral girdle.

9. Immediately after the stretching of procedure for stabilization of the spine, the patient needs to rest on a horizontal couch for at least 20 minutes.

A combined method of treating musculo-articular and traction machine pneumopressing patient results in improved peripheral circulation and normalization of muscle strength and tone, provides a maximum relaxation of the affected muscles and associated stretching effect providing decompressed neurovascular structures and high therapeutic effect.

Indications: lumbosacral radicular syndrome caused by a degenerative process in the intervertebral discs in the process of return of development and the stage of incomplete remission with static-dynamic disorders (restriction of range of motion in the lumbar spine, scoliosis, kyphoscoliosis, stress the long muscles of the back, flattening of lordosis and etc.), with a weakly to moderately severe pain.

Contraindications: acute stage of the disease, scar-adhesions epiduritis, violation of the spinal cord blood flow, phenomena of irritation of the spinal cord membranes (arachnoiditis). Sciatica with concomitant diseases of the abdominal cavity (cholecystitis, peptic ulcer and duodenal ulcer, pochechno- and cholelithiasis, omission of kidneys, gallbladder stones, scar processes in the abdominal cavity).

### **Combined physiotherapy apparatus MIT-11**



Physiotherapy apparatus combined MIT-11 for treating patients with low-frequency ultrasound (US) and a pulse magnetic field in combination with the optical flow and infrared red (or blue) spectrum (MLT).

Ultrasound is a unique physical factor that provides for micro cell and tissue level, which leads to an increase in the microcirculation of exposure and increase the rate of biochemical reactions. The magnetic field in combination with the optical flow (MLT) has a pronounced analgesic, anti-inflammatory and immunomodulatory effects.

In addition to the unique combination of these factors, the machine MIT-11 provides:

- the possibility of a three-level principle of the impact, i.e. simultaneous action on the central nervous system (projection medulla), the peripheral nervous system (spinal segment) and on the body itself or a projection;

- principle of resonant effects on body or functional system as a whole.

Advantages of the combined effects of ultrasound and MLT are expressed in:

- increase the effectiveness of treatment;
- no allergy or intolerance;
- activation of the body to fight the disease,

launching and promoting mechanisms sanogenesis;

- significant reduction in dosing of drugs, etc.

The most effective use of the device for the treatment of:

- painful syndromes and inflammatory processes;
- respiratory diseases;
- digestive disorders, biliary tract;
- diseases of the cardiovascular system;
- diseases of the musculoskeletal system;
- endocrinological diseases;
- gynecological and urological diseases;
- ENT diseases.

### **Apparatus for physiotherapy combined MIT-MT**



Apparatus for magnetic therapy combined, «MIT MT» is used for the treatment by low-intensity magnetic field and / or zonal magnetic quantum effects on the resonant frequencies of organs or systems.

The device is used for the treatment

of various diseases, which are based on a violation of the immune and endocrine systems of local blood circulation, swelling, pain syndromes, inflammatory processes and a number of psychosomatic diseases, mainly neuroses and reactive states, especially complicated with sleep disorder. The use of low-intensity magnetic field at the resonant frequencies of the work of human organs has magnetic resonance modulating effect on the immune and endocrine systems and has neuro-reflex and local action. Strengthens processes of protective inhibition in the cerebral cortex, it has a sedative and giposensibiliziruyuschee influence. It helps restore the nervous regulation of respiration, blood circulation and metabolism.

Therapeutic effects of magnetic therapy: vasoactive, anti-inflammatory (anti-edematous), trophic, hypo-coagulating, local analgesic, act-protective.

The device is recommended for application in medical, sanatorium, rehabilitation facilities and home on doctor's advice.

## Apparatus for preparation of singlet-oxygen foams MIT-C

Apparatus «MIT-C» (foams) designed for preparation of singlet-oxygen mixture, based on the activation of distilled water vapors by hard ultraviolet radiation. The resulting mixture can be used for preparation of singlet-oxygen cocktails or singlet-oxygen foam. The use of singlet-oxygen foam is suitable for the prevention and treatment of various diseases associated with the violation of redox processes in the body and impaired aerobic metabolism. The presence in the body of singlet-oxygen mixture increases the amount of free radicals and the activation of biochemical processes in the body.

An oxygen molecule in an excited (singlet) state is for short enough time. This is due to the fact that electron clouds are in an unstable state. Moving electrons on a stable orbit (the state) is accompanied by the emission of photons of electromagnetic energy ultraviolet wavelengths, which in turn provides:



- activation of biochemical and of biophysical processes (exchange-oxidation reactions) in the body;
- bactericidal effect of the secondary UV radiation;
- information influence (ultraviolet radiation is involved in the transfer of information within and intercellular);
- structuring of water and other fluids in the

process of preparation of singlet-oxygen cocktails or foams.

Singlet oxygen cocktails or foam is desirable to use within 10 minutes of their preparation.

The device is recommended for the treatment, prevention and rehabilitation of the following diseases:

- broncho-pulmonary system (asthma, bronchitis);
- cardiovascular system (rheumatism, hypertension, coronary artery disease, heart failure and circulatory failure, and others.);
- neurological disease (pathology of brain vessels, a diencephalic syndrome, vascular dystonia, neurosis, asthenic conditions);
- diabetes;
- systemic diseases connective tissue disease (rheumatism and others.);
- immune diseases.

## Apparatus for electrotherapy dual channel MIT-EF2

The device is intended for use in medical rehabilitation centers, health resorts, therapeutic and preventive and pre-school institutions.

Apparatus for electrotherapy «MIT-EF2» is used to perform electrophoresis or other variants of electro pulse or constant electric current.

Medicinal electrophoresis - a method of combined simultaneous effect on the patient by electric current and certain drugs delivered through in the tissue with the help of current. For electrophoresis are used medications that in an electric field do not lose their pharmacological properties, breaking into ions or absorbing ions themselves. Due to the fact that the medication is in the ionized form, and the reactivity of the organism under the influence of an electric current is increased, even such small amounts of medication have the desired impact. In addition, deposition medication in ionized form of the active form of the skin can significantly prolong its effect.

The use of pulsed operation impact on the therapeutic frequencies provides further:



- removing spastic skin reactions to external stimuli in the form of an electric current medication;
- perform simultaneously with electrophoresis the electric-frequency therapy by currents of Voll;
- enhance the action of medications due to specific, resonant action of an electric current.

Application of the device is most effective in the treatment of:

- lesions of the peripheral nervous system (intercostal neuralgia, sciatica);
- traumatic injuries;
- functional disorders of the central nervous system;
- diseases of the cardiovascular system;
- diseases of the digestive system;
- diseases of musculoskeletal system;
- rheumatic joints and tendons;
- and other skin diseases.

## Apparatus for myostimulation AEST-01

Apparatus for electrical stimulation of muscles «AEST-01» is intended for the treatment of diseases, the pathogenesis of which is the formation of stagnant foci of excitation or inhibition in the cerebral cortex.

The device is intended for recovery or prevention of functions of the neuromuscular system, the impact is carried out by pulse currents. Under the influence of a pulsed electric current the forced contraction of the muscles is obtained.

Indications:

- myopathic paresis and paralysis;
- primary muscular atrophy, which is the result of damage to peripheral motor neuron;
- secondary muscle atrophy as a result of prolonged immobilization after fracture; plastic surgery;



- sexual neuroses;
- marked soft tissue swelling;
- fatigue, atonic and spastic colitis, pancreatitis, adhesive disease;
- atony of smooth muscles of internal organs (stomach, intestines);
- alimentary-constitutional obesity;
- metabolic disease;
- injury, trauma and the effects of aesthetic surgery;
- cellulite;
- figure correction.

Contraindications:

- current intolerance;
- bleeding tendency;
- acute purulent processes.

The device is recommended for use in the treatment and rehabilitation of medical institutions, insurance centers and sports medicine, cosmetology centers.

## Apparatus for electromyostimulation AEST-01 (8-channel version)



Apparatus for electromyostimulation (eight-channel) «AEST-01» is intended for recovery or prevention of functions of the neuromuscular system, where applicable factor is the pulse currents.

Under the influence of a pulsed electric the current the forced contraction of the muscles occur, which leads to fat burning and actively

removes it from the body, which reduces the volume of the body and improve the overall muscle tone.

Indications:

- marked soft tissue swelling;
- cellulite;
- alimentary and constitutive obesity;
- dermatological and plastic surgery;
- metabolic diseases;
- damage, trauma and the effects of aesthetic surgery;
- decreased muscle tone;
- fatigue, atonic and spastic colitis, pancreatitis, adhesive disease, myopathic paresis and paralysis;
- body shaping and facial contours;
- atony of smooth muscles of internal organs (stomach, intestines).

Main results achieved:

- improvement of trophic processes;
- recovery of muscle tone;
- strengthening the lymphatic drainage;
- modeling the silhouette.

## The vortex foot bath «KUPAVA»



The basis of the action of whirlpool bath is a combination of different strength of thermal, mechanical, optical and magnetic stimuli. When using the mineral water they are joined by chemical irritation due to the complex range of different mineral salts, gases and microelements.

Additionally is performed «Jet massage.» In this case the air is mixed with the water that circulate under the influence of the electric pump, and thus achieved a special vortex effect, known as the «Venturi tube». The jets of water and air coming from the nozzles located at the sides of the bath, intensively influencing on thy extremities.

Common effects after using vortex foot bath:

- reduction of physical fatigue, exhaustion, increase working capacity and efficiency;
- improvement of the central and autonomic nervous system;
- improve metabolism;

The main indications: neuroses; insomnia, chronic fatigue syndrome; obesity; osteoarthritis of the joints; post-traumatic disorders of the musculoskeletal system (conditions after fractures, sprains and other injuries.); vascular dystonia; pelvic inflammatory disease is acute; impotence, diseases of the cardiovascular system. Women vortex foot massage is a preventive measure against violations of the menstrual cycle.

**Contraindications:** TB and neoplastic bone lesions, acute trauma, fractures, burns.









**monograph**

Translated by Butskaya L.  
Technical design by Horlatenko Yevheniya  
Signed for printing 17.06.2016.  
Format 70x100 1/16. Printing digital. Edition 500 pcs.

Published by:  
LIMITED LIABILITY COMPANY  
«PRINTING COMPANY» TOP DRUK «  
Tel : +38 (044) 393-07-53

Publishing House: Radomska Szkoła Wyższa w Radomiu, Radom University in Radom Str. Zubrzyckiego 2 26-600 Radom Tel: +48 48 383 66 05 [med@rsw.edu.pl](mailto:med@rsw.edu.pl)  
Printing House: Radomska Szkoła Wyższa w Radomiu, Radom University in Radom Str. Zubrzyckiego 2 26-600 Radom Tel: +48 48 383 66 05 [med@rsw.edu.pl](mailto:med@rsw.edu.pl)

308 s. Liczba znaków: 478 000 (ze streszczeniami i okładką). Liczba grafik: 136 x 1 000 znaków (ryczalt) = 136 000 znaków.  
Razem: Liczba znaków: 614 000 (ze streszczeniami, okładką i grafikami) = 15,35 arkuszy wydawniczych.  
308 p. Number of characters: 248 000 (with abstracts). Number of Images: 136 x 1000 characters (lump sum) = 136 000 characters.  
Total: Number of characters: 614 000 (with abstracts, summaries and graphics) = 15,35 sheet publications.

**ISBN 9781365244537**

**DOI <http://dx.doi.org/10.5281/zenodo.57246>**

**ISBN 9781365244537**



**ISBN 9781365244537**

