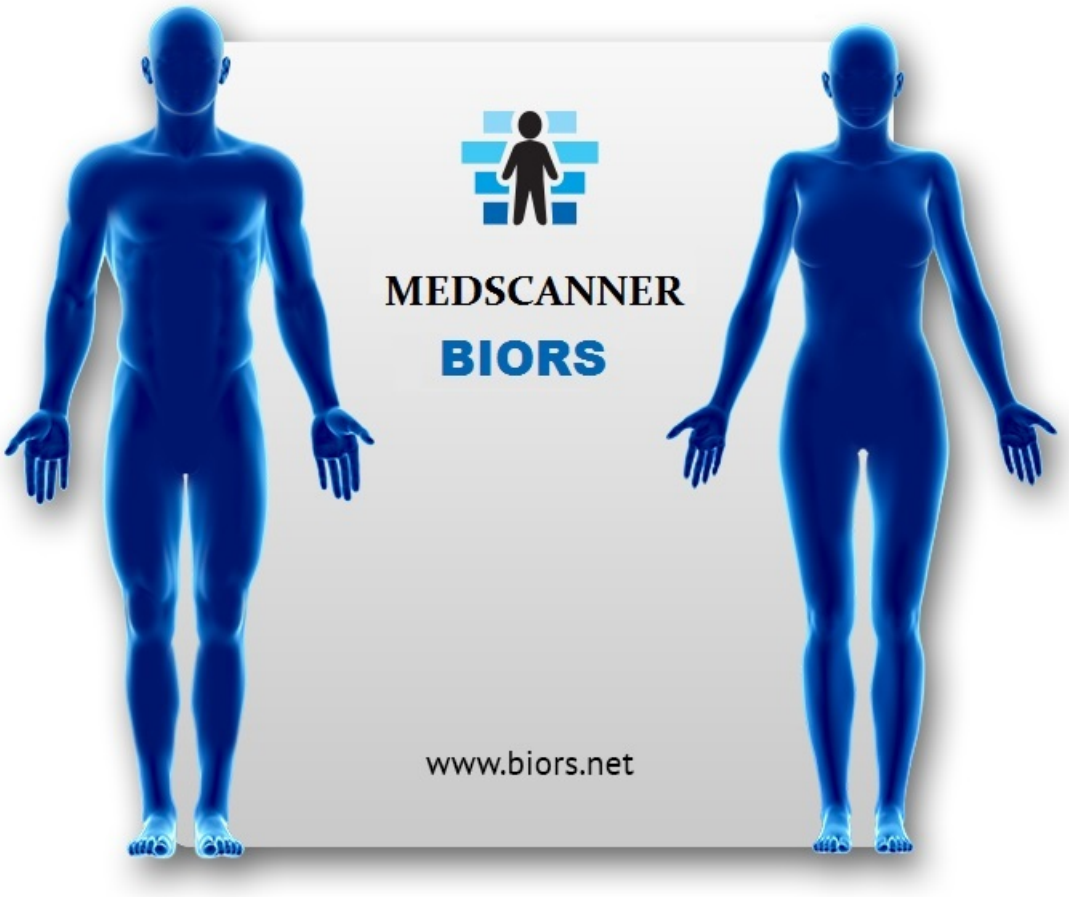
Hardware-software complex Medscanner BIORS TU 9440-002-0116473274-2015

in embodiments

Medscanner BIORS; Medscanner BIORS-01, Medscanner BIORS-02, Medscanner BIORS-03, Medscanner BIORS-04, Medscanner BIORS-05

USER MANUAL



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LIST OF ABBREVIATIONS

BP — (arterial) blood pressure

BAP — biologically active skin point

BAZ — biologically active skin zone

HM — homeopathic medicine

CU — conditional units (= Voll empirical scale division value)

EPV — Voll electropuncture

EAV — Voll electroacupuncture

ID — “indicator drop” during EAV

ANS — autonomic nervous system

CNS — central nervous system

CVS — cardiovascular system

VRT — vegetative resonance test (vega test)

R-chart — Nakatani’s scales for interpretation of electrical conductivity values

PS — pain sensitivity

BRT — bioresonance therapy

HRV — heart rate variability

ECG — electrocardiography (electrocardiograph)

TS — technical specifications

PC — personal computer

BACKGROUND INFORMATION
(FOR ALL EMBODIMENTS)

The hardware-software complex *Medscanner BIORS* (henceforth referred as *Medscanner*) is certificated in accordance with necessary standards and legislation.

Medscanner is used in healthcare facilities, medical treatment and preventive care institutions (outpatient clinics, medical units, health resorts, recreation centers, etc.) as well as in sports medicine clinics (centers).

Medscanner is designed for:

- testing of biologically active points (BAT) and biologically active zones (BAZ) by the use of different methods;

- medicine testing of homeopathic remedies and other medicines;

- pulseoximetry with measurement of the level of capillary blood oxygen and calculation of heart rate variability (pulseoximeter);

- evaluation of the vascular tone, haemodynamics and functional changes of distal vessels (photoplethysmograph);

- measurement of biological tissue complex resistance (bioimpedance analyzer);

- screening computer evaluation of the human body functional status based on a measurement by 22 leads (electrosomatograph);

- cardiac function evaluation (electrocardiograph);

- for electric, magnetic and bioresonance therapy by BAP and BAZ of diseases of various etiology as well as for normalization of the disordered body functions.

Medscanner is produced with blocks separately mounted on a board ("Pulseoximeter", "Bioimpedance analyzer", "Electrosomatograph", "Electrocardiograph 12-channel" or "Electrocardiograph single-channel"). The required modification of a *Medscanner* embodiment to be delivered is realized at the demand of a consumer by reducing the number of blocks, with reduction of functions and cost of a device.

The embodiments of a medical device "Hardware-software complex *Medscanner BIORS"* are as follows:

- *Medscanner BIORS* (*complete setup*);
- *Medscanner BIORS-01* (*basic configuration*);
- *Medscanner BIORS-02* (*with pulseoximeter*);
- *Medscanner BIORS-03* (*with electrosomatograph);*
- *Medscanner BIORS-04* (*with bioimpedance analyzer);*
- *Medscanner BIORS-05* (*Wellness*).

Note. *This Medscanner BIORS embodiment is the embodiment with the most full realization of all functions implemented in the design of a Medscanner device. All other embodiments are down-sized versions with reduced functions performed by Medscanner (by reducing the number of blocks carrying out these functions on the board inside the device housing).*

Embodiments of *Medscanner*

Table 1

Embodiment of *Medscanner*	Host of functions (operating modes implemented in the embodiment of *Medscanner*)	National product classification code
Medscanner BIORS (complete setup)	Registry (patient card); Voll diagnostics; Nakatani (Ryodoraku) diagnostics; Park Jae Woo (Su Jok) diagnostics; Schimmel diagnostics (Vega test); Medicine testing; Auriculodiagnostics; Aurametry; Electropuncture; Frequency therapy; Electrical physical therapy; Bioresonance therapy; *Magnetotherapy; Pulseoximeter (photoplethysmograph); Electrosomatograph; Bioimpedance analyzer; **Electrocardiograph (12-channel and single-channel).	94 4001
Medscanner BIORS-01 (basic configuration)	Registry (patient card); Voll diagnostics; Nakatani (Ryodoraku) diagnostics; Park Jae Woo (Su Jok) diagnostics; Schimmel diagnostics (Vega test); Medicine testing; Auriculodiagnostics; Aurametry; Electropuncture; Frequency therapy; Electrical physical therapy; Bioresonance therapy; *Magnetotherapy.	94 4001

Medscanner BIORS-02 (with pulseoximeter)	Registry (patient card); Voll diagnostics; Nakatani (Ryodoraku) diagnostics; Park Jae Woo (Su Jok) diagnostics; Schimmel diagnostics (Vega test); Medicine testing; Auriculodiagnostics; Aurametry; Electropuncture; Frequency therapy; Electrical physical therapy; Bioresonance therapy; *Magnetotherapy; Pulseoximeter (photoplethysmograph).	94 4001
Medscanner BIORS-03 (with electrosomatograph)	Registry (patient card); Voll diagnostics; Nakatani (Ryodoraku) diagnostics; Park Jae Woo (Su Jok) diagnostics; Schimmel diagnostics (Vega test); Medicine testing; Auriculodiagnostics; Aurametry; Electropuncture; Frequency therapy; Electrical physical therapy; Bioresonance therapy; *Magnetotherapy; Electrosomatograph.	94 4001

Medscanner BIORS-04 (with bioimpedance analyzer)	Registry (patient card); Voll diagnostics; Nakatani (Ryodoraku) diagnostics; Park Jae Woo (Su Jok) diagnostics; Schimmel diagnostics (Vega test); Medicine testing; Auriculodiagnostics; Aurametry; Electropuncture; Frequency therapy; Electrical physical therapy; Bioresonance therapy; *Magnetotherapy; Bioimpedance analyzer.	94 4001
Medscanner BIORS-05 (*Wellness*)	Registry (patient card); Pulseoximeter (photoplethysmograph); Electrosomatograph; Bioimpedance analyzer; **Electrocardiograph (12-channel and single-channel).	94 4001

***Note 1.** A magnetic inductor to perform magnetotherapy is purchased separately.*

****Note 2.** ECG block does not provide for automatic measurements of ECG parameters.*

Temperature limits of use of *Medscanner*: from 10 to 35°C and relative humidity of 75% at temperature of 30°C without condensation of moisture. Maximum surface temperature of applied parts of electrodes and sensors must not exceed 41ºC.

Medscanner is manufactured in metal housing. Overall dimensions of the *Medscanner* (*Medscanner* electronic unit) except for accessories do not exceed 275 × 254 × 50 mm. The dimension imprecision is ± 1 mm.

Medscanner corresponds to articles of Class II according to the level of electric shock hazard protection, with BF-type, defibrillation-proof applied part of electrocardiograph and BF-type applied parts of other blocks.

Medscanner is supposed to operate from the PC external direct current supply with voltage of 5 V through USB cable. To increase output power of *Medscanner*, it is allowed connection to external AC power supply with steady output voltage of 9 V (220 Volt adapter/2,1 × 5,5 mm plug).

The peak demand does not exceed 4.5 volt-ampere.

The weight of *Medscanner* (together with electrodes and wires, except for the weight of a computer) is not more than 5.0 kg. Weight imprecision is + 10 g.

Operation mode setup time is not more than 3 min excluding the time for turning on the computer and software start.

The continuous running time of *Medscanner* is at least 8 hours.

Reliability and maintainability

The indicators of reliability of *Medscanner* meet all standards.

An average lifetime of *Medscanner* is at least 5 years. Criterion of limit state should be an impossibility or technical and economic inexpediency of repair if the estimated repair cost exceeds 60% of the cost of a new *Medscanner*.

Note. After the intended lifetime of *Medscanner* is expired, it may be extended depending on the results of technical diagnostics and determining the remaining life according to established procedure.

Mean time between failures is not less than 2000 hours.

Reliability probability for *Medscanner* is not less than 0.85.

Computer system requirements

For the *Medscanner* program to work is required a desktop or lap-top personal computer of the IBM PC class with a keyboard, a mouse pointing device and a video monitor. *Medscanner* is controlled by computer that is running *Microsoft Windows* operating system, with installed "Medcanner" software implementing data transfer and processing, maintenance of stated operating modes and control actions within the prescribed limits.

The software is **not intended** for use with *Android*, *Linux*, *MacOs* and other operating systems that do not relate to *Windows* family.

Windows system must be configured for correct operation with Russian language (region — Russia; language — Russian; date and time formats are hh:mm:ss and dd:mm:yy; Russian fonts are installed; a default codepage for non-Unicode program is 1251).

The computer is not included into the delivery set of *Medscanner* and must be purchased by a customer according to the following characteristics:

— operating system: *Windows VISTA/7/8/10*;

— processor: not lower than Pentium 4;

— video adapter: any model supporting version *DirectX 9.0* or higher;

— random access memory: at least 1 GB;

— hard disc free space: at least 100 Mbyte;

— at least 3 USB ports for connection of *Medscanner* and supporting equipment.

For electrical safety, it is necessary to use at least 1.5 m length USB cable.

Technical characteristics

Table 2

Characteristic	Value for the embodiment					
	Medscanner BIORS	*Medscanner BIORS-01*	*Medscanner BIORS-02*	*Medscanner BIORS-03*	*Medscanner BIORS-04*	*Medscanner BIORS-05*
1. Voltage (at Rh = 100 kOhm) in Voll diagnostics mode, Schimmel diagnostics mode (Vega test), in aurametry and medicine testing, V	0.64	0.64	0.64	0.64	0.64	–
2. Voltage (at Rh = 100 kOhm) in electrosomatography diagnostics mode, V	0.64	–	–	0.64	–	0.64
3. The short-circuit current in Voll diagnostics mode, Schimmel diagnostics mode (Vega test), in aurametry and medicine testing, □A, not more than	12.8	12.8	12.8	12.8	12.8	–
4. The short-circuit current in electrosomatography diagnostics mode, □A, not more than	12.8	–	–	12.8	–	12.8
5. Voltage (at Rh = 100 kOhm) in Nakatani diagnostics mode, V	7.5	7.5	7.5	7.5	7.5	–
6. The short-circuit current in Nakatani diagnostics mode, □A, not more than	200	200	200	200	200	–
7. The short-circuit current in auriculodiagnostics mode, □A, not more than	50	50	50	50	50	–
8. The short-circuit current in Su Jok diagnostics mode, □A, not more than	10	10	10	10	10	–

9. Electric current pulse waveform	square / triangular / sine / exponential / sawtooth / nerve impulse	square / triangular / sine / exponential / sawtooth / nerve impulse	square / triangular / sine / exponential / sawtooth / nerve impulse	square / triangular / sine / exponential / sawtooth / nerve impulse	square / triangular / sine / exponential / sawtooth / nerve impulse	–
10. Current pulse polarity in therapy mode	+/–/bipolar	+/–/bipolar	+/–/bipolar	+/–/bipolar	+/–/bipolar	–
11. Maximum voltage in therapy mode, V, not more than	+24/–24	+24/–24	+24/–24	+24/–24	+24/–24	–
12. Current in electropuncture and frequency therapy mode, mA, not more than	1.5	1.5	1.5	1.5	1.5	–
13. Current in electrophysiotherapy mode, mA, not more than	20	20	20	20	20	–
14. Pulse duration range in electropuncture mode, ms	1–1000	1–1000	1–1000	1–1000	1–1000	–
15. Pulse frequency range in electropuncture mode, Hz	0–250	0–250	0–250	0–250	0–250	–
16. Maximum set frequency in frequency therapy mode, Hz, not more than	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	–
17. The range of galvanic noise changes in electropuncture mode, %	0–50	0–50	0–50	0–50	0–50	–
18. Frequency adjustment accuracy in therapy mode, Hz, not less than	0.1	0.1	0.1	0.1	0.1	–
19. Maximum voltage in bioresonance submode, mV, not more than	3	3	3	3	3	–
20. The range of amplification change in bioresonance submode, units	1–32	1–32	1–32	1–32	1–32	–

21. HPF and LPF set range in bioresonance submode, Hz	100–20,000	100–20,000	100–20,000	100–20,000	100–20,000	–
22. Wavelength of emission (in optical and infrared ranges) of pulseoximeter sensor, nm	660, 940	–	660, 940	–	–	660, 940
23. Measurement range of heart rate, bpm	30–245	–	30–245	–	–	30–245
24. Measuring range of the blood oxygen saturation (SPO_2), %	70–100	–	–	–	–	70–100
25. Flux power of pulseoximeter sensor, mW, not more than	0.8	–	–	–	–	0.8
26. Probe frequency range of bioimpedance analyzer, kHz	10–100	–	–	–	10–100	10–100
27. Amplitude of probe voltage of bioimpedance analyzer, V, not more than	+5/–5	–	–	–	+5/–5	+5/–5
28. Measuring range of active resistance of bioimpedance analyzer, Ohms	70–800	–	–	–	70–800	70–800
29. Measuring range of reactive resistance of bioimpedance analyzer, Ohms	30–90	–	–	–	30–90	30–90
30. 3 ECG leads	I, II, III (RA, LA, LL)	–	–	–	–	I, II, III (RA, LA, LL)
31. 10 ECG leads	RA, LA, RL, LL, V1, V2, V3, V4, V5, V6	–	–	–	–	RA, LA, RL, LL, V1, V2, V3, V4, V5, V6
32. ECG input voltage range, mV	0.03–10.00	–	–	–	–	0.03-10.00
34. ECG sensitivity, mm/mV	10	–	–	–	–	10
35. ECG sweep speed, mm/s	25	–	–	–	–	25

36. ECG input impedance, for all inputs except R, Mohm, not less than	5	–	–	–	–	5
37. ECG common-mode rejection ratio, dB, not less than	100	–	–	–	–	100
38. Direct current in ECG measurement circuit, μA, not more than	0.1	–	–	–	–	0.1

Safety requirements

1. The environment should not be explosive or toxic, must not contain aggressive gases and vapours. The amount of dust in the air must not exceed 0.75 mg/dm³.
2. It is prohibited to perform any examination and therapy if a person has implanted electronic devices (electronic cardiostimulators, artificial pacemakers, etc.).
3. It is never acceptable to leave a patient alone during electrical therapy sessions.
4. It is prohibited to place sensors and/or electrodes in areas of skin damage.
5. It is prohibited to use *Medscanner* in facilities with high humidity level (baths, sauna).
6. Ingress of moisture into *Medscanner* during disinfection or sanitation is not permitted.
7. *Medscanner* and its components should not be subjected to single impact with acceleration above 150 m/s²and duration of impact above 12 ms.
8. It is prohibited to pull the power supply cable, USB cable or electrode cables when disconnecting.
9. Simultaneous connection of electrodes on a patient's body to the *Medscanner* and electrosurgical machine is prohibited.
10. Do not work with the *Medscanner* when it is closer than 1 m from working EHF or mkV therapy devices.
11. Do not connect *Medscanner* to power supply without first ensuring that an electrical outlet plug, wires or housing are not damaged.
12. It is prohibited to operate *Medscanner* when the cover of the electronic unit is removed.
13. It is prohibited to operate *Medscanner* having visible mechanical damages.
14. It is prohibited to place *Medscanner* near open flame.
15. *Medscanner* should not be exposed to direct sunlight for a long time.
16. It is necessary to avoid disruption of natural heat removal from the electronic unit case or covering it by thermal insulation materials (pillows, blankets etc.).
17. It is not permitted to use wires, electrodes and other components produced by outside manufacturers.

Operating rules

- After shipment in sub-zero weather conditions *Medscanner* must be kept in transport packaging before turn-on at normal climatic conditions for at least 12 hours.
- An external inspection of a device should be done before operation in order to ensure the absence of mechanical damages of *Medscanner* and/or its components.
- *Medscanner* installation, functional check, maintenance and operation may be conducted by persons having the necessary skills, trained in safety procedures, studied technical and operational documents.
- Immediately after completion of measurements or at least 15 minutes before conducting new diagnostic and therapeutic procedures it is necessary to disinfect applied parts of the device using hydrogen peroxide 3% with addition of detergent, a kind of *Fairy* 0,5%, or chloramine solution 1%.
- Keep components of the device (electrodes, sensors, patient cables) in individual bags. The lifetime of electrodes, sensors and cables is directly related to the number of usage times, storage and servicing conditions. A component must be replaced at the first signs of wear.
- In case of dirty *Medscanner* electronic unit or when scheduled disinfection in the department of medical establishment is carried out, it is necessary to disinfect surfaces of all parts and the housing of *Medscanner* electronic unit using hydrogen peroxide 3% with addition of detergent, a kind of *Fairy* 0,5%, or chloramine solution 1%.
- To avoid ingress of moisture into *Medscanner* electronic unit (**the housing of *Medscanner* electronic unit is not watertight!**) a gauze pad soaked with disinfecting solution should be wrung-out.

- If the *Medscanner* is malfunctioning, turn it off immediately and contact the manufacturer or the distributor for consultation.
- Repair of *Medscanner* or its individual parts (components) is performed by the manufacturer.

Packaging

Medscanner and all component parts are placed in consumer package: plastic or leatherette lodgement case with rigid frame, snap locks or zip fasteners. In case of postal delivery, a device and components are placed in transport packaging: plywood or wooden boxes or boxes made from corrugated fibreboard. Every component part of the *Medscanner* is packed in a polyethylene bag. Cardboard boxes must be fitted with polyethylene adhesive tape or similar tape.

Transportation and storage

1. *Medscanner* should be transported by closed modes of transport (except for unheated unpressurized aircraft cabins) in accordance with shipping rules, which are valid in such mode of transport. Hard acceleration in any directions shall not exceed 10 g.

It is necessary to prevent any movements of *Medscanner* devices inside vehicles during shipment.

ATTENTION. In case *Medscanner* was exposed to freezing temperatures during shipment, it is necessary to keep it in transport packaging at normal climatic conditions for at least 12 hours.

2. *Medscanner* should be stored in packaging, in closed rooms excluding the possibility of influence of sunlight, moisture, thermal shocks. Ambient air temperature for storage should be between + 5°C and + 40°C; required relative humidity of air should not exceed 80% at temperature of 25°C.
3. Storage of *Medscanner* near chemical, ammonia and other reactive gases warehouses (storage locations) is not permitted.

Environmental protection requirements and disposal

Disposal of *Medscanner* devices after their specified service life is made according to the 2.1.7.2790 Sanitary Rules and Regulations and manufacturer's recommendations stated in accompanying documentation and markings of components.

Hazard Class of medical wastes depending on morphological structure of medical device according with 2.1.7.2790 Sanitary Rules and Regulations:

— hardware-software unit, Passport, User Manual as well as non-applied parts relate to epidemiologically non-hazardous waste close on its structure to hard domestic waste (Class A);

— applied parts relate to epidemiologically hazardous waste (Class B);

— all components of *Medscanner* (the whole delivery set) if used in treatment and diagnostic departments of infectious hospitals (dispensaries) are transferred to the group of extremely epidemiologically dangerous wastes (Class B).

Delivery set

Table 3

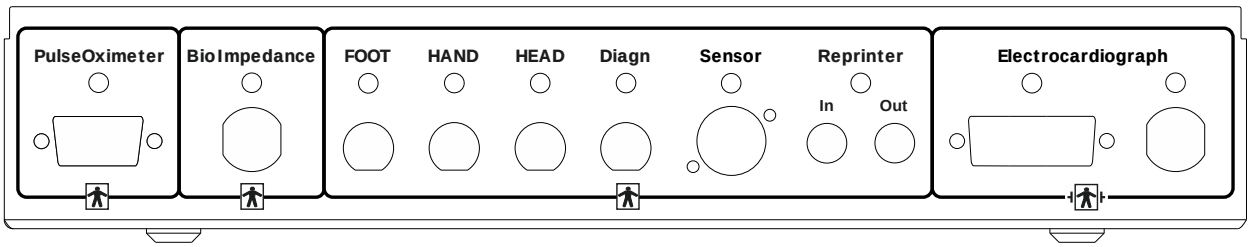
Name	Number, pcs., for the embodiment					
	Medscanner BIORS	*Medscanner BIORS-01*	*Medscanner BIORS-02*	*Medscanner BIORS-03*	*Medscanner BIORS-04*	*Medscanner BIORS-05*
1. *Medscanner* electronic unit	1	1	1	1	1	1
2. Footpad electrodes	2	2	2	2	2	2
3. Cylindrical electrode	2	2	2	2	2	2
4. Electrode probe	1	1	1	1	1	—
5. Electrode probe with a touch sensitive button	1	1	1	1	1	—
6. Attachment for the probe, 4 mm	1	1	1	1	1	—
7. Attachment for the probe, 2.5 mm	1	1	1	1	1	—
8. Hollow attachment for the probe, 10 mm	1	1	1	1	1	—
9. Attachment for the probe, 3 mm	1	1	1	1	1	—
10. Attachment for the probe, 1.5 mm	1	1	1	1	1	—
11. Head electrode (double, on a belt)	1	1	1	1	1	1
12. Container for testing and biotransference	2	2	2	2	2	—
13. Plug-snap connector for 4 mm plug	2	2	2	2	2	—
14. Reusable electrodes for electrotherapy and physical therapy, 50 × 60 mm	2	2	2	2	2	—
15. Band for fixation of electrodes on the patient's body	1	1	1	1	1	—
16. Patient cable for diagnostics and therapy	4	4	4	4	4	3
17. Cable for connection of container for testing and biotransference	2	2	2	2	2	—
18. Cable for connection of *Medscanner* to PC, 2.0 B male to USB A male 1.8 m	1	1	1	1	1	1

19. Compact Disc or USB flash drive with program installation files and operating documents.	1	1	1	1	1	1
20. Power unit, 9 V, 1 A, 2.1 × 5.5 mm plug	1	—	—	—	—	—
21. Cable for bioimpedancemetry (double)	1	—	—	—	1	1
22. Disposable electrodes for bioimpedancemetry (*Fiab*, Italy), PG 470/4	16	—	—	—	16	16
23. Silicone fingertip sensor for the pulseoximeter (SpO2), adult	1	—	1	—	—	1
24. 3-lead ECG cable	1	—	—	—	—	—
25. Reusable limb electrode (clip electrode), adult	4	—	—	—	4	4
26. 10-lead ECG cable, color code, European version. Schiller compatible. Defibrillator proof.	1	—	—	—	—	1
27. Chest suction ECG electrodes Ø 24 mm	6	—	—	—	—	6
28. Magnetic inductor	1	—	—	—	—	—
29. Roller electrode	1	—	—	—	—	—
30. Passport	1	1	1	1	1	1
31. Case (consumer packaging)	1	1	1	1	1	1

Marking

The marking of *Medscanner* corresponds to the GOST standards.

There are symbols of plugs and indicators **on the front panel of the *Medscanner***:



- pulseoximeter;

- bioimpedance analyzer;
- diagnostics by 4 channels: “Feet”. “Hands”, “Head”, “Diagn”;
- probe sensor;
- imprinter (input is red, output is black);
- electrocardiograph (12-channel and single channel).

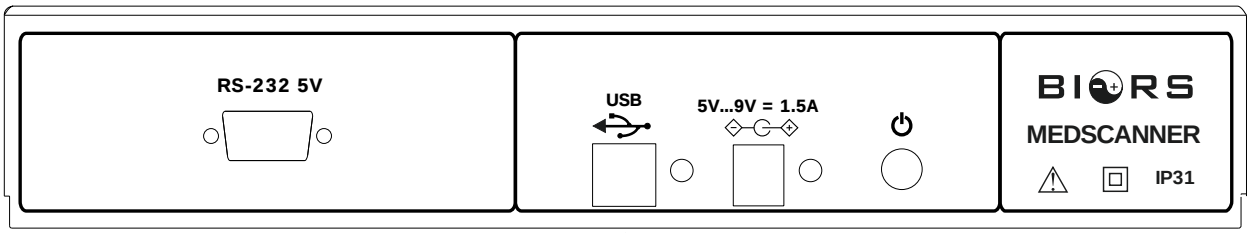
If a certain block is not included in a particular embodiment, its socket connectors are <u>absent or not active</u>.

Blocks are marked with symbols indicating the level of electric shock hazard protection:

26 symbol from Table D.1 GOST R IEC 60601-1 (BF-type, defibrillation-proof applied part) for electrocardiograph

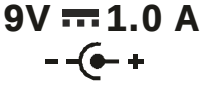
20 symbol from Table D.1 GOST R IEC 60601-1 (BF-type applied part) for other blocks

There are symbols of ports, switch and following information **<u>at the back of the *Medscanner*</u>**:



RS-232 5V interconnection of peripheral equipment;

USB cable connection to computer;



input polarity, voltage value and amount of electricity supplied to *Medscanner* from additional external power supply;

switch position: “**O**” is “off” and “**I**” is “on”, in accordance with IEC 60417-5007 and IEC 60417-5008;

BIORS the brand BIORS;

MEDSCANNER short name of the medical device;

14 symbol from Table D.1 GOST R IEC 60601-1 (Warning! See User Manual);

symbol of Class II device according to GOST R IEC 60601-1;

IP31 IP protection level according to GOST 14254.

In accordance with engineering documentation, the plates with following information is fixed **on the lower surface of *Medscanner* housing and on the lateral surface of a case**:

- embodiment of the *Medscanner*;
- designation of present technical conditions;
- *Medscanner* number according to manufacturer's numbering system;
- date of manufacture;
- power demand, nominal current consumption;
- brand label, name of the manufacturer, place of manufacture/address.

Markings on the consumer packaging are applied by blueprinting or typographically.

Markings on the plate (label) and *Medscanner* housing are applied by etching, engraving, typographically or other suitable method. The labels may also bear additional information including advertisements. Variable information on the plate (label) can be filled by hand, clearly and legibly.

INDICATIONS AND CONTRAINDICATIONS

Indications
(for all embodiments):

Acute and chronic pain syndromes.

Functional disorders of body organs and systems.

Mild or moderate bronchial asthma (as a part of the complex therapy).

Prevention of recurrence of chronic diseases, functional disorders, individual symptoms and syndromes of illnesses.

Rehabilitation after various diseases, traumas, surgery operations.

Acute and chronic diseases; pain and other pathologic syndromes; traumas in athletes when active drug treatment is not recommended since some medicines have doping effect.

The need to boost the general body resistance, immunocorrection during the recovery period after infectious and various long-lasting illnesses.

The need to enhance the action of environments when using balneotherapy and health-resort treatment.

Meteopathic and balneological reactions emerging during health-resort therapy.

The need to increase of body adaptive capacity and prevention of pathologic stress reactions under intensive exposure of various adverse and potentially pathogenic factors (stress due to intensive physical activity and psychoemotional load, hypodynamia (physical inactivity) monotonia, and other unfavourable working conditions).

Indications for use of different methods of electropuncture diagnostics (Voll, Nakatani, Schimmel, Park Jae Woo methods, auriculodiagnostics, aurametry, electrosomatography, medicine testing):

1) screening integral functional assessment of acupuncture meridians, body organs and systems for physical health monitoring, defining an electropuncture profile of main and concomitant conditions; making an individual plan of reflexotherapy; treatment efficiency evaluation and in-depth examination with use of direct diagnostic techniques, if necessary;

2) adjustment of homeopathic medicines (HM) selection, their potencies, dosage, individual compatibility (when HM are prescribed together) and treatment efficacy evaluation;

3) assessment of meridian systems state, that are used in traditional Chinese medicine, in order to compile an individual acupunctural recipe for reflex therapy as well as for the treatment efficacy evaluation.

Contraindications

Absolute contraindications (for all embodiments):

- age under one year old or over 75 years old;

- different kinds of tumors, regardless of location and etiology;

- pregnancy;

- respiratory and cardiovascular diseases, decompensation stage;

- active tuberculosis;

- acute infectious diseases;

- acute psychosis;

- cachexia;

- the presence of a heart pacemaker or other implanted device as well as metal implants in a patient;

- skin damage and/or skin disease in areas of electrode placement;

- fever, purulent diseases of skin and internal organs, acute inflammatory processes and any acute illnesses of uncertain aetiology;

- hypertensive disease, cardiac arrhythmia, abnormalities of heart, acute myocardial infarction, coronary heart disease;

- acute critical conditions such as renal colic, anginal attack;

- period after surgical intervention within three weeks after surgery;

circulatory disturbance, haemophilia, thrombosis, acute bleeding and hemorrhagic tendency, thrombophlebitis;

- state of alcoholic or narcotic intoxication, psychic excitement;

- epilepsy;

- multiple sclerosis;

- some localizations of atherosclerosis;

- urolithiasis and cholelithiasis;

- Parkinson disease;

- severe form of bronchial asthma, bronchial asthma attack;

- individual intolerance of electric current or medicine used for electrophoresis; allergic reactions;

- bone fractures with multiple fragments until their consolidation (fracture union).

Relative contraindications (for all embodiments):

- conditions immediately after physical overwork or psychological shock;

- menses;

- condition after organ transplantation;

- absence of limb (due to impossibility of electrode placement);

- a patient's own inadequate assessment of his/her mental state (mental illnesses);

- communication difficulties with a patient.

There are no contraindications for such diagnostic techniques as pulseoximetry and HRV. However, there are some contraindications regarding interpretation of the results of HRV calculation obtained during examination. Such absolute contraindication is the presence of artificial heart pacemaker in a patient (in case it is the main pacemaker there is no point in having HRV test). Relative contraindications are: large number of recording artifacts; an

electrosurgical unit can affect the operation of the pulseoximeter; the pulseoximeter must not be used during magnetic resonance imaging and computed tomography conducting.

Warnings and precautions when the device is running in the pulseoximeter mode:

• It is prohibited to sterilize the device in autoclave, use ethylene oxide or immerse the sensor within the fluid because it can lead to inaccurate measured data.

• To get accurate SpO_2 values, the pulseoximeter is supposed to be able to measure pulse rate properly. Before SpO_2 measurement it is necessary to ensure that nothing prevents from proper pulse rate measurement.

• It is prohibited to use a pulseoximeter in an explosive environment.

• The place where the pulseoximeter sensor is located should be inspected regularly in order to check position of the sensor, evaluate blood circulation and patient's skin sensitivity under the sensor.

• Read and understand the operating manual before use of the device.

• Periodic changing a finger for the sensor depends on long period of use of the applied sensor and patient's condition. It is necessary to change the location of the sensor, evaluate skin condition and blood circulation, as well as make an adjustment every 4 hours.

• The temperature of the applied part of pulseoximeter must not exceed 41ºC.

• The pulseoximeter must not be used during magnetic resonance imaging (MRI) or computed tomography (CT) conducting as well as during diagnostic and therapeutic procedures with the use of *Medscanner*.

• electromagnetic interference (from mobile phones, paging devices, radio set, etc.), an electrosurgical unit, defibrillator can affect the performance of the pulseoximeter.

• The sensor of the pulseoximeter should not be placed on the same side as a blood pressure cuff, an artery or venous catheter.

• It is prohibited to fix a sensor on the limb using adhesive tape.

• Bright room light can adversely impact SpO_2 measurement. • The sensor should be shaded from the direct sunlight if it is necessary (for example, using a surgical towel).

• High levels of dysfunctional hemoglobin (for example, carboxyhemoglobin or methemoglobin) can affect the measurement results.

• Low perfusion or venous pulse influence the measurement accuracy.

• Blood must not contain any intravascular dyes, such as methylene blue or indocyanine green.

• Too high mobility of a patient is not permitted.

• Examination is not permitted when a person has hypotension, significant vasoconstriction, severe anemia or hypothermia.

• A patient should not have a cardiac arrest or be in shock.

• Nail polish or artificial nails may result in inaccurate readings during evaluation of SpO_2.

Conducting of bioimpedancemetry is not recommended in the following cases:

- the presence of a heart pacemaker or other implanted device as well as metal implants in a patient (including metal piercing jewelry);

- severe skin damage and/or skin disease in areas of electrode placement;

- pregnancy;

- idiosyncrasy of electric current;

- absence of limb (due to impossibility of electrode placement).

There are no contraindications for conducting standard electrocardiography. However, the procedure itself can be difficult to carry out in patients with complex chest traumas, severe obesity or in cases there are too much hair on the chest (due to poor electrode-to-skin contact). Besides, if a patient has a heart pacemaker, it can lead to significant ECG data corruption.

There are contraindications for conducting exercise ECG:

acute period of myocardial infarction; acute infectious diseases; worsening of arterial hypertension, coronary artery disease or chronic heart failure; complex arrhythmias, possible aortic dissection, decompensation (worsening course) in diseases of other organs and body systems (digestive, respiratory, urinary track systems).

Complications of electropuncture and BRT can be related to aggravation of main or concomitant conditions (similar to the complications related to homeopathic treatment). In severe exacerbation the treatment should be temporarily withheld and pharmacological therapy must be assigned.

Possible adverse events

During a session some complications may occur. In that case, the procedure must be discontinued immediately. The complications are as follows:

- dizziness;
- chill or hyperhidrosis;
- increase of pain syndrome;
- nausea;
- electric current burn injury;
- allergic reactions to electric current (skin rash or local skin pigmentation in areas of electrode placement, burning sensation under the skin and in different organs);
- drowsiness or sleep and wake disturbance;
- diarrhea (frequent stool);
- repeated urination;
- thirst;
- joint pain, headache;
- aggravation of a preexisting conditions;
- URTI symptoms (headache, fatigue, rhinitis, fever).

INSTALLATION OF THE COMPLEX
(FOR ALL EMBODIMENTS)

Software parameters and characteristics

Medscanner is a programmed medical electronic system. It controlled by computer with installed *Medscanner* software (1.03 version dated 30 September 2015 or higher) that provides processing of data and data transfer.

Program interface language: English (En-US).

Technical documentation language: English (En-US).

Required platform: *Intel i586*-compatible computer, free USB port, 2 MB RAM, 100 MB of free hard disk space.

Required operating system: *Microsoft Windows VISTA* or higher.

After installation the program occupies about 40 MB of a hard disk (the exact value depends on client database content).

The program is distributed free of charge without copy protection.

The software is intended to control a medical device *Medscanner* BIORS (the same software is used for every embodiment of a device).

Protection against unauthorized program access is provided by standard capabilities of the operating system (*User account*, *Security policy*; see description of the operating system *Microsoft Windows*).

Timing specifications: program fetch time is about 10 s, client database search time is about 10 ms, medicine and prescription database search time is about 30 ms.

Possible non-routine events during program operation

Event: Lost device connection (for example, USB cable break).

Severity of consequences: insignificant.

Actions performed: device automatically shuts down the procedure performed and turns off using electrodes. Response time is about 1200 ms. A message “Lost device connection” is displayed in the program window.

Operator actions: eliminate the cause of lost connection (check USB cable).

Event: Disorderly close-down (software crash, process abort, operating system crush — blue screen, etc.).

Severity of consequences: insignificant.

Actions performed: device automatically shuts down the procedure performed and turns off using electrodes. Response time is about 1200 ms.

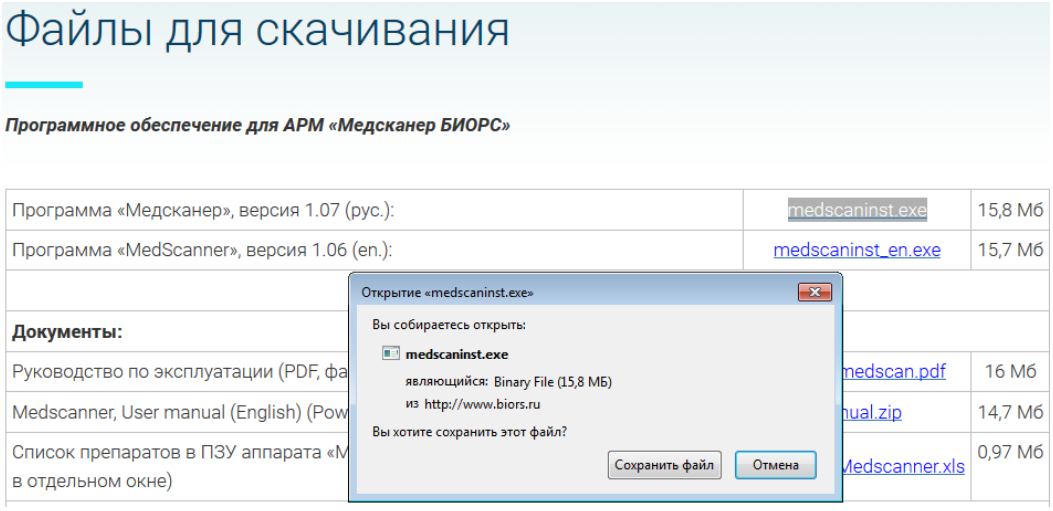
Operator actions: eliminate the cause, recover the system state.

Program installation

Attention! For correct installation of drivers under *Windows 7* a separate patch installation is required. The **Security Update for Windows 7 for x64-based Systems (KB3033929)** can be downloaded via link

https://www.microsoft.com/en-us/download/details.aspx?id=46148

Note. You can always download a free Medscanner program version from our website http://www.biors.ru/arm-medscanner-biors/medscanner-downloads/



Log in as an administrator. **Do not connect *Medscanner* to your computer!**

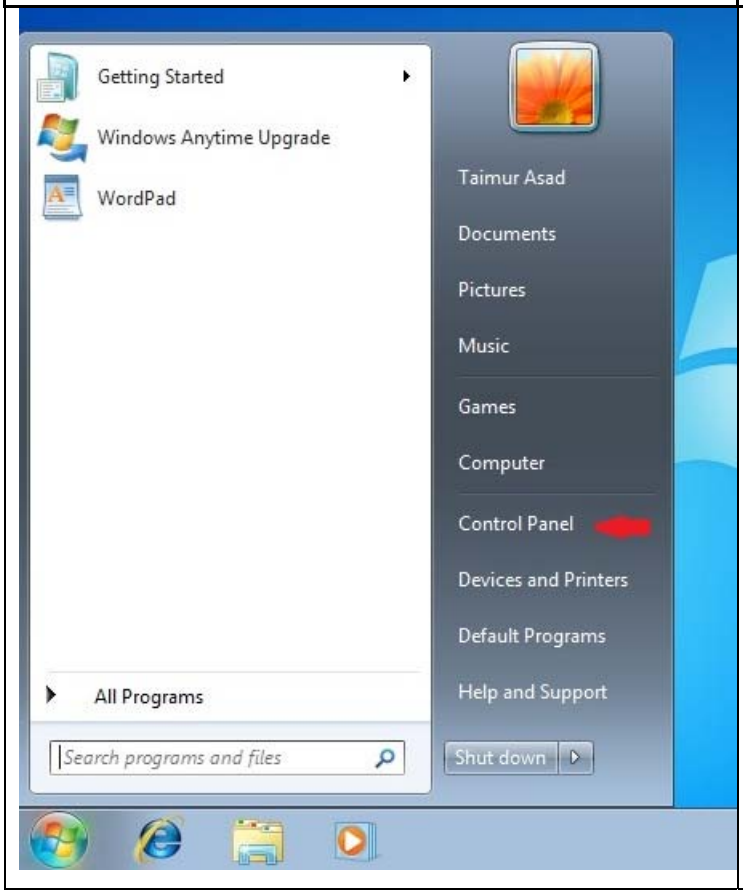
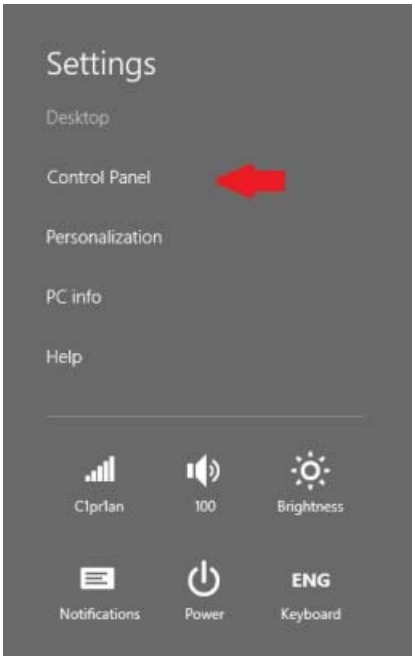
Turn off User Account Control in *Windows Vista/7/8.1/10*

In ***Windows 8.x*** go to **Desktop** (its icon is in the bottom left corner of the screen):

It is advisable to install first a free **Classic Shell** software (it is available on DVD). That program removes *Metro* interface and retrieves the standard *Windows* desktop and the standard **Start** button when a computer starts.

Set up user account control parameters. It is necessary in order to ensure that *Windows* system facilities do not adversely affect an addition of clients, medicine names, etc. to the *Medscanner* program.

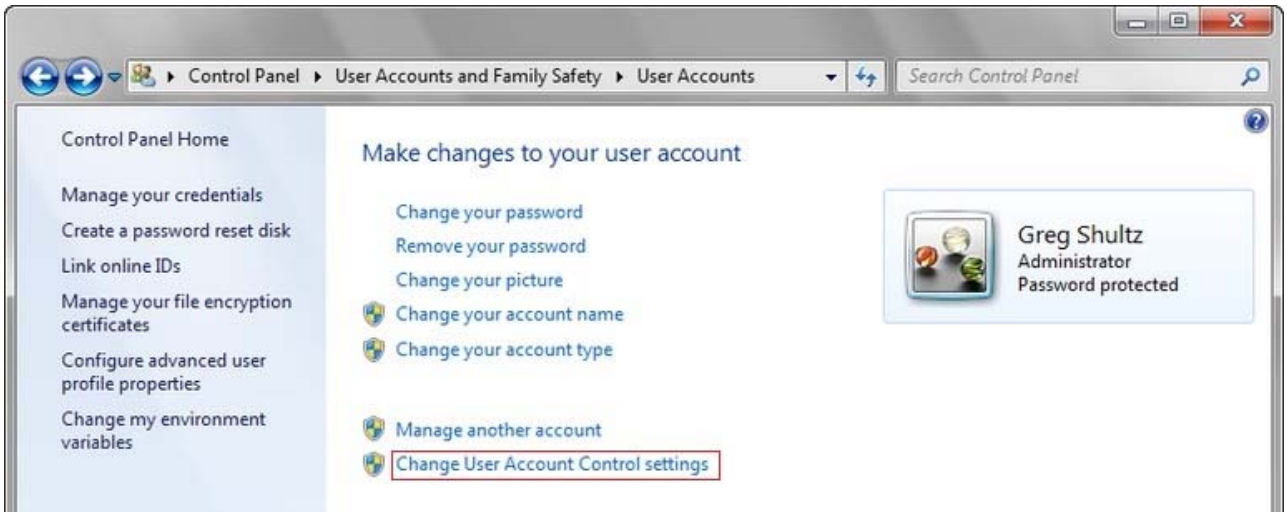
To do that, go to the **Control Panel** through the **Start** menu or, if absent, through the side menu (in *Windows 8*).

For *Windows Vista/7*	For *Windows 8* (sidebar)
	

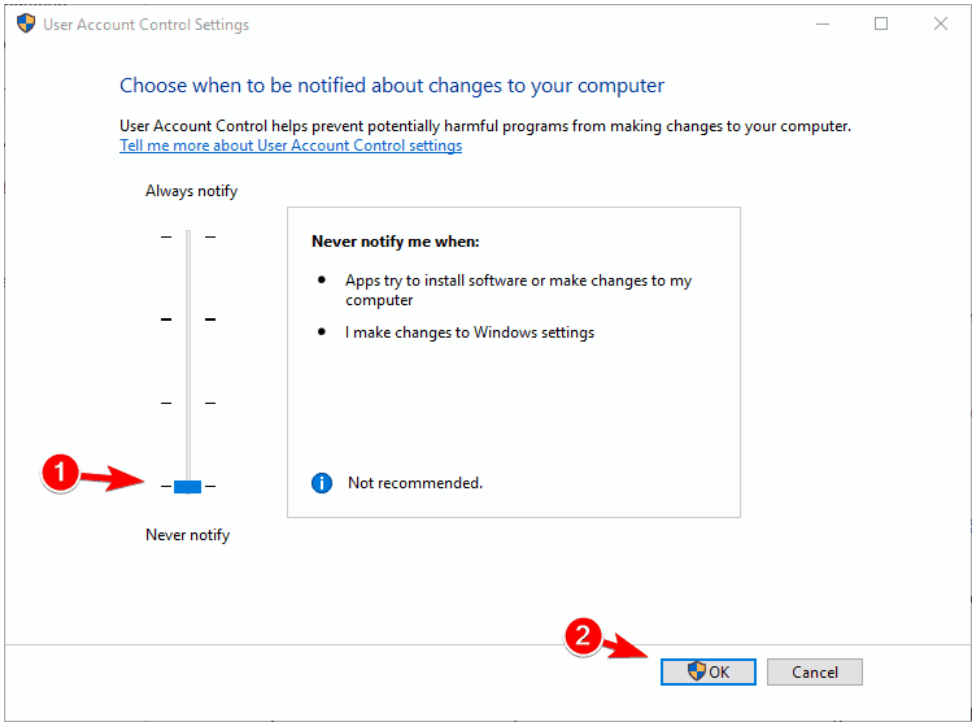
User Accounts and Family Safety:

User Accounts:

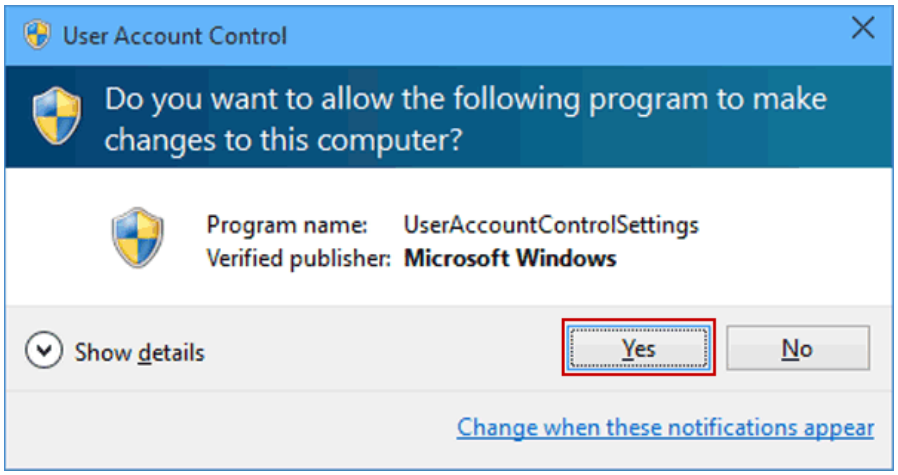
Make changes to your User Account (then select the bottom ***Change User Account Control Settings*** link):



In the window **Choose when to be notified about changes to your computer** drag the slider to the lowermost position ***Never notify*** and click the **OK** button.

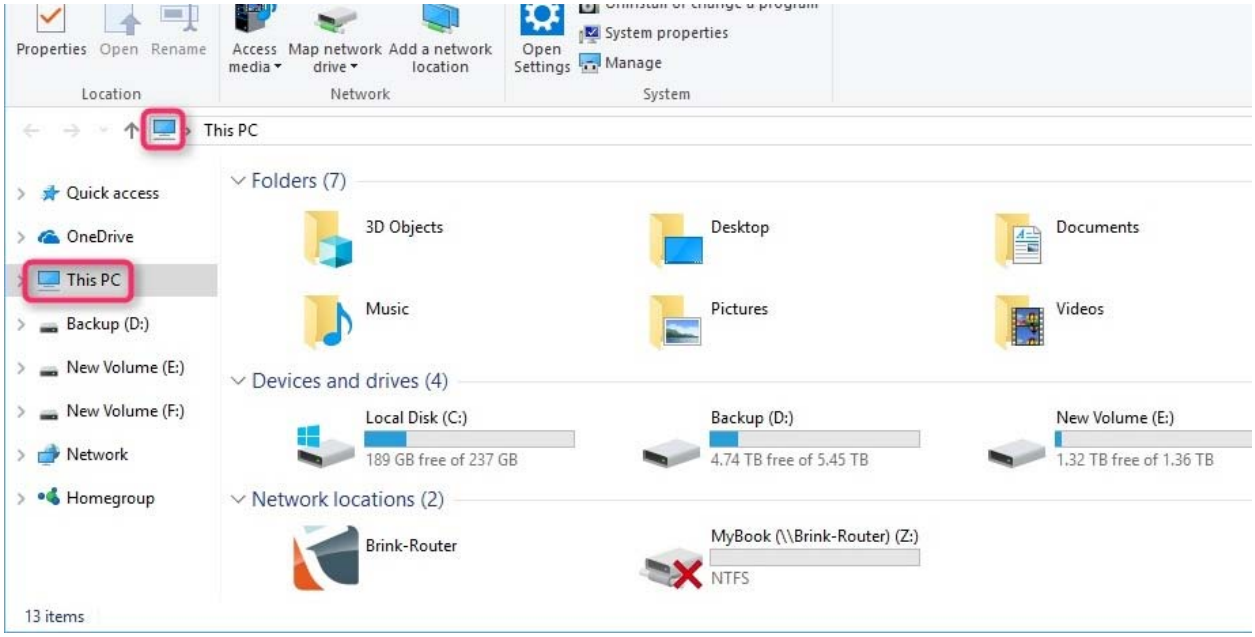


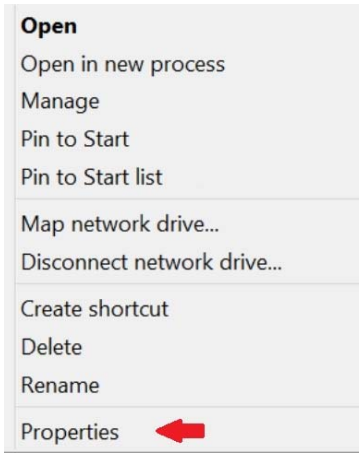
Then confirm selected action by clicking **Yes** one more time in the relevant window:



Turn off User Account Control in *Windows 10*

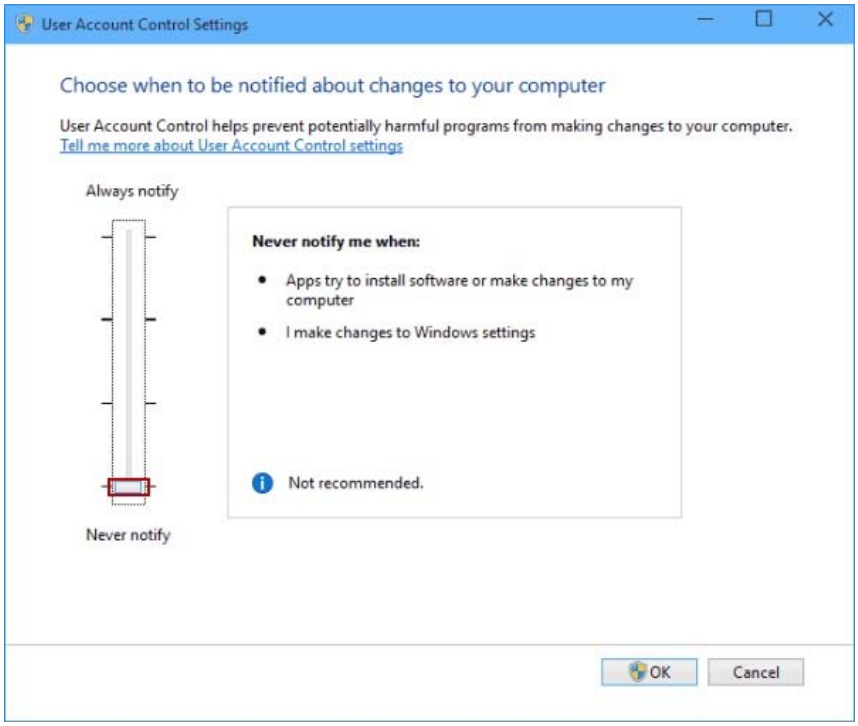
Open *Windows Explorer* or click the **This PC** icon. In the opened window select **This PC** item on the left and click it with the right mouse button. In the appeared menu select the lowest **Properties** item.





In the opened window select the lowest menu **Security and Maintenance**.

In the next window select on the left the menu **Make changes to your User Account** item. In the opened **User Account Control Settings** window drag the slider to the lowermost position ***Never notify*** and click the **OK** button.



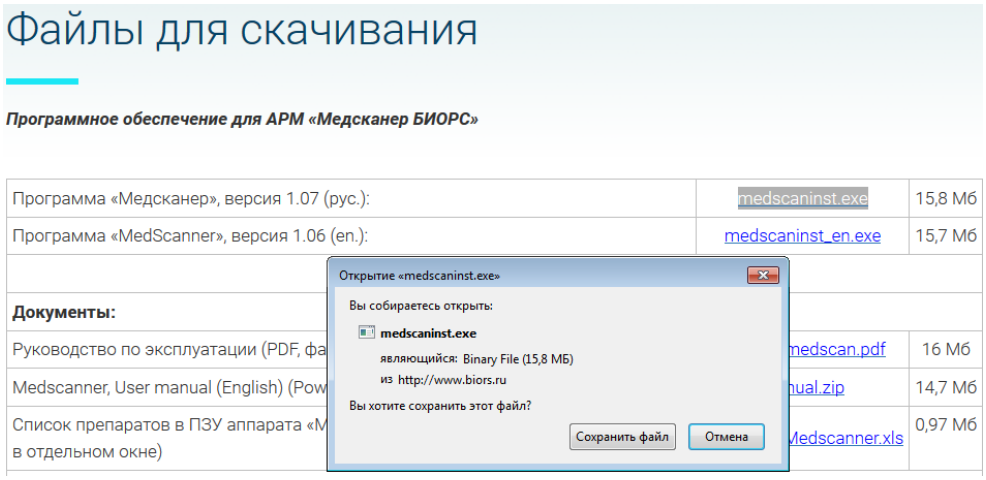
Installation of the *Medscanner* program

Insert the installation disk into CD-ROM drive:

The autorun menu is opened. Click **Run Autorun.exe**. It is advisable to tick the box ***Always do this for software and games***:

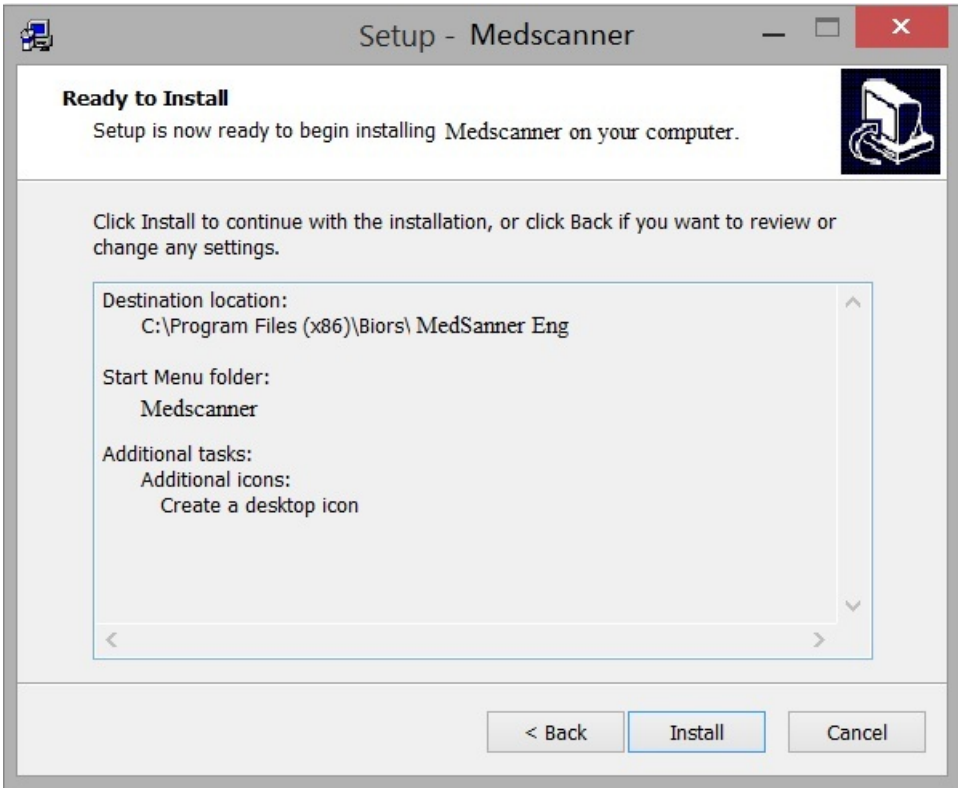
The Compact Disc menu appears. Select the **Program installation** item:

OR the installation file **medscaninst.exe** can be downloaded at the link http://www.biors.ru/arm-medscanner-biors/medscanner-downloads/. Then put the installation file into any folder on the hard disk and run that file.



In case a warning of security system appears, click the **Run** button:

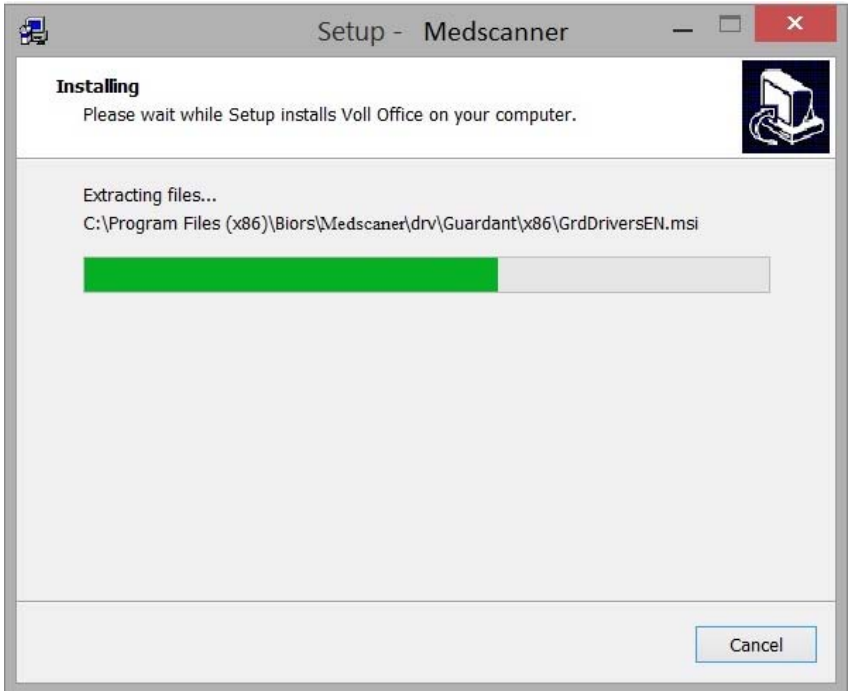
It is advisable to answer **Yes** to all questions of *Setup Wizard* during the installation and not change the folder for installation of the program (leave it as its default setting):



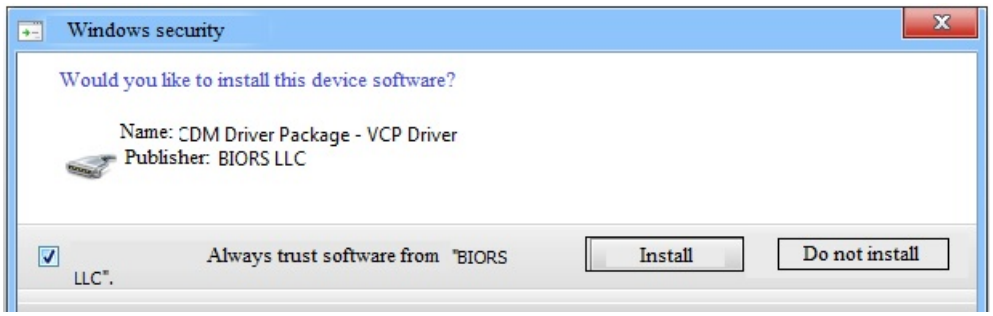
It is advisable to tick the **Create Desktop Icon** box for greater convenience in your work.

At the final stage of program installation the *Device Driver Installation* is run. Click the **Next** button and answer **Yes** to all questions of *Windows*.

The *Windows Security* messages sequentially appear during the driver installation process.

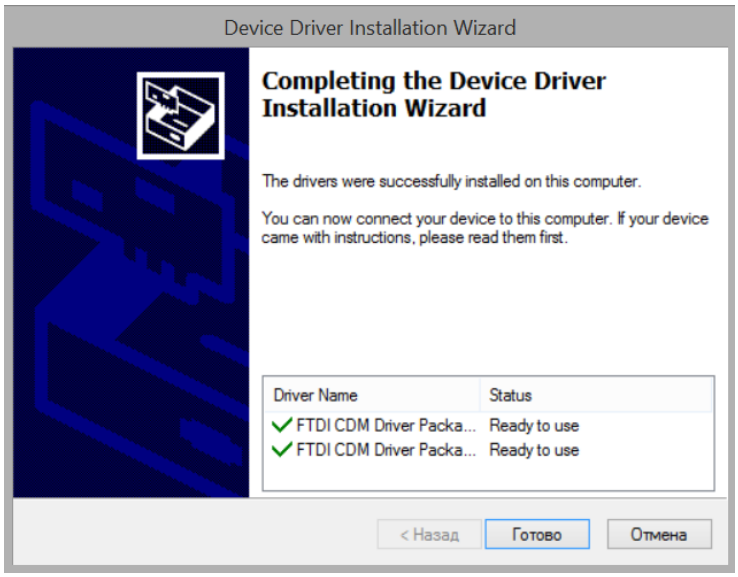


And further:



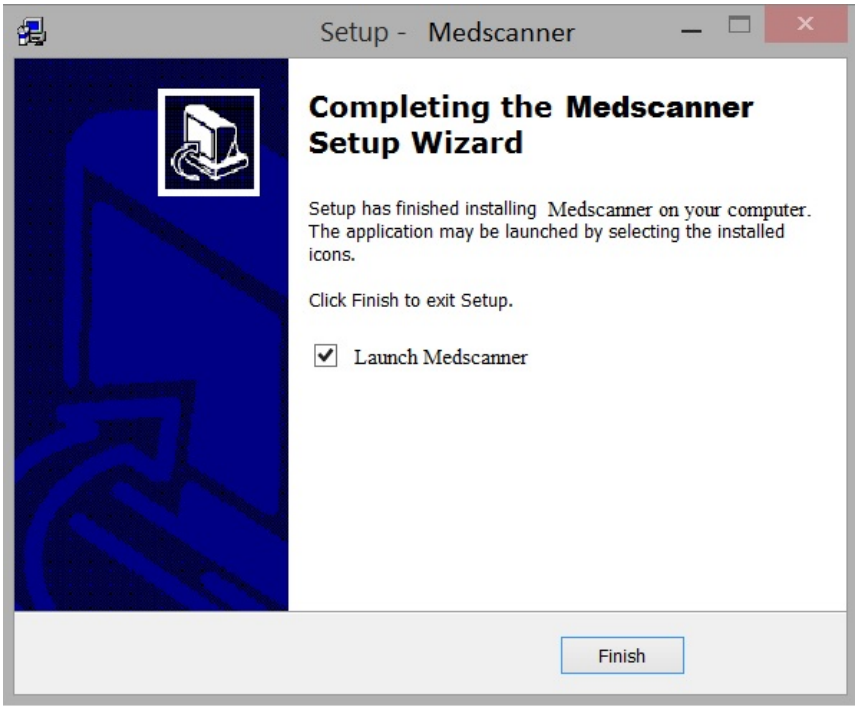
NECESSARILY always tick the box ***Always trust software from*** and click the **Install** button.

At the final stage of program installation the following window is shown indicating that the drivers are successfully installed:

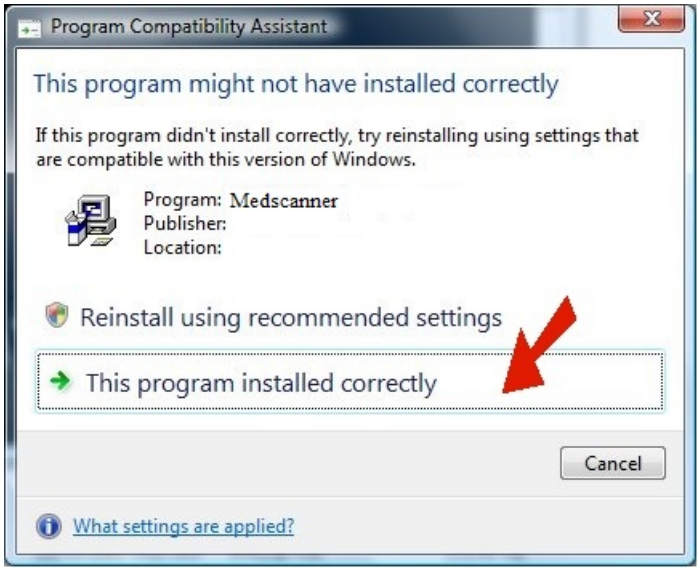


Click the **Ready** button.

Upon completion of the installation process, the *Medscanner* program starts automatically (if the *Launch Medscanner* box is not unticked).



After completion of the program installation or when the program runs for the second time, the message can appear (sometimes because of *Internet Explorer* security settings):



Confirm ***This program installed correctly*** or click **Cancel**.

Connection and setting of the *Medscanner*

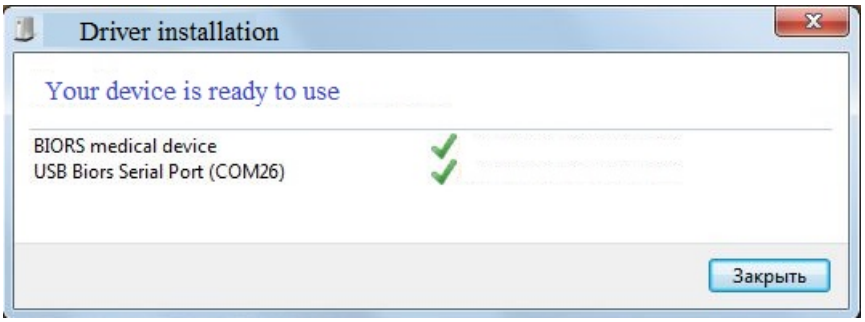
Connect *Medscanner* to the computer using USB cable included in the delivery set. If necessary, it is possible to connect DC voltage adapter 9V DC 1.0 A (connected to the 220 V AC power supply) to the power socket. **It is necessary to comply with stated power connection polarity, if a power unit produced by outside manufacturers is used.**

Medscanner is turned on by putting tumbler switch in "up" position. The hot connection/disconnection of *Medscanner* to/from USB port (without switching off the power switch) is permitted.

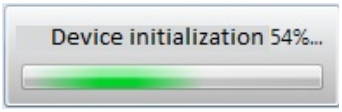
A short-term (for not more than 15 s) *Medscanner* shut down possibly occurs at the moment of connection 9V DC adapter.

Additional peripheral units (delivered separately) can be connected to RS-232 port.

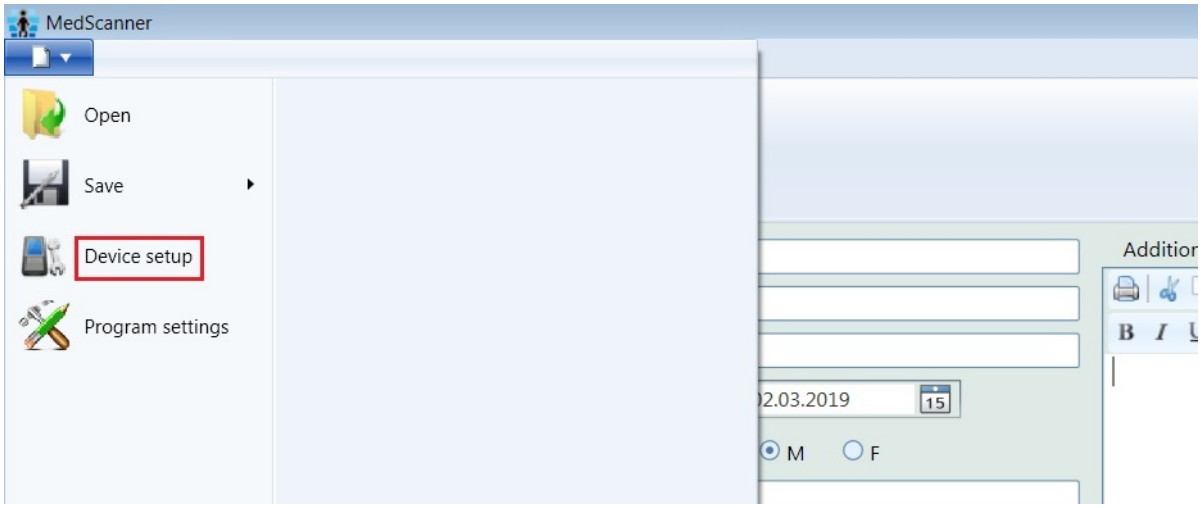
As such, setting and calibration of *Medscanner* is not required. After successful program installation close down the *Medscanner* program, turn on the device and wait for the driver installation to complete.



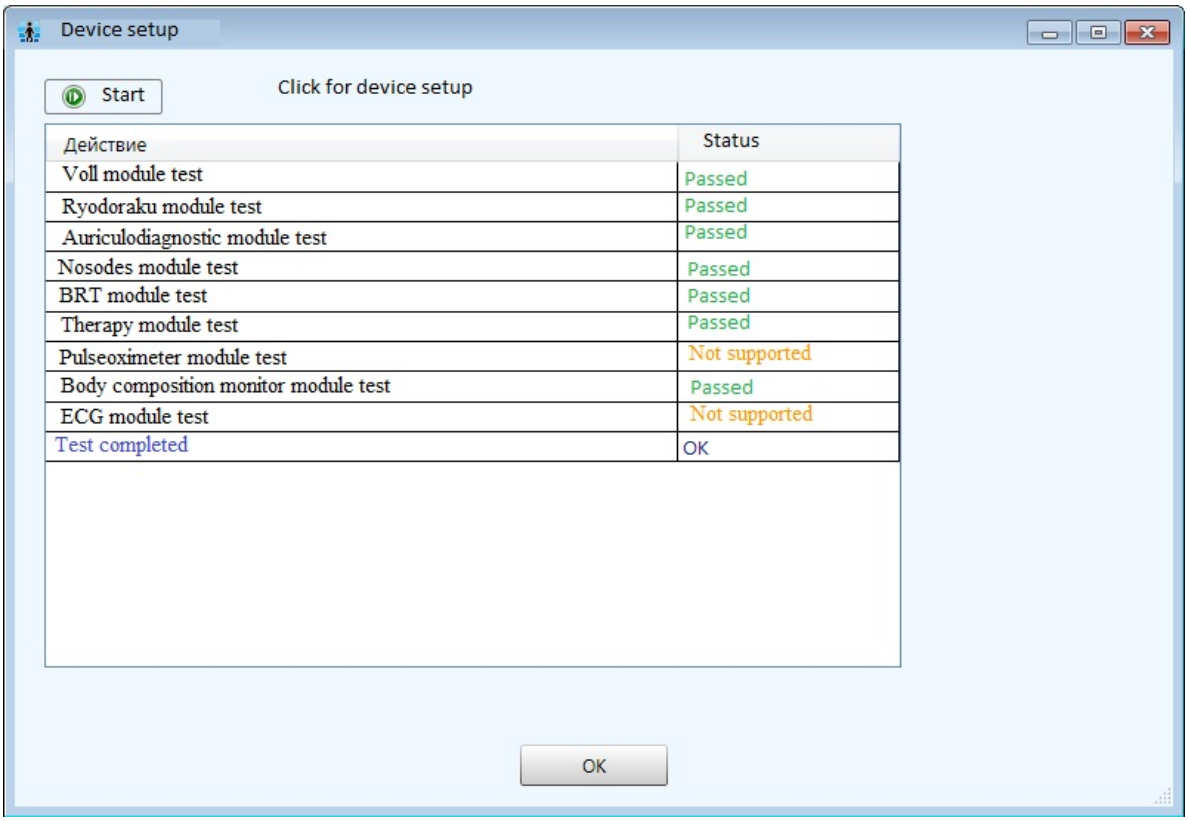
After the first start of the program it performs setup automatically if there is a connection to *Medscanner*. Working with the *Medscanner* program during the automatic setup process of the hardware-software complex is not possible. Do not disconnect device from computer!



To carry out forced test of *Medscanner* go to the leftmost top menu and select the **Device setup** option.



Then you should disconnect all the wires together with sensors from the front panel of *Medscanner* and click the **Start** button in the **Device setup** window. Self test of *Medscanner* is conducted with reporting about availability and state of its internal modules.

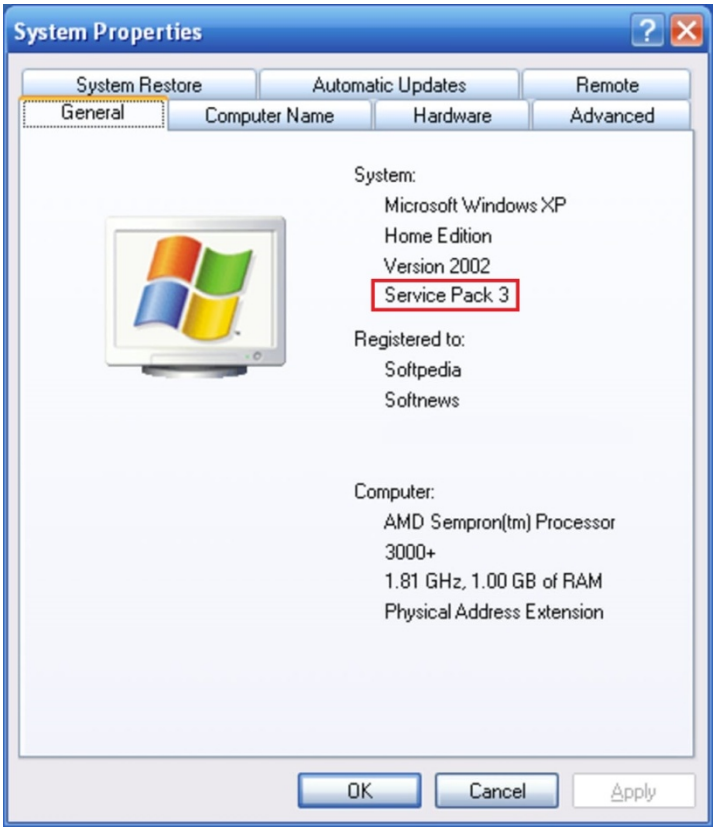


Absent blocks are indicated as **Not supported**. If during the test of any unit the message **Error…** appears, please contact the technical support BIORS.

Setting of the program under Windows XP

Note. Installation of *Medscanner* BIORS program for computers under *Windows XP* OS is not recommended.

First you have to make sure that *Service Pack 3* is installed in the system. To do that, open **System properties** and find the following line:

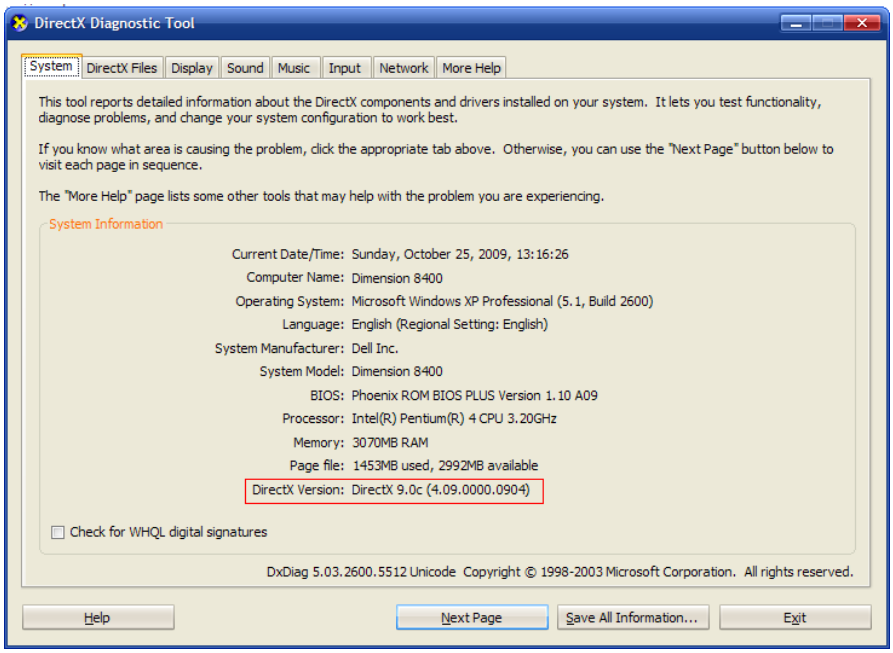


If *Service Pack 3* is not installed, download and install it. You can download it from here, for example: **http://www.microsoft.com/ru-ru/download/details.aspx?id=24**

Then make sure that *Direct X 9.0c* is installed in the system. Do the following:

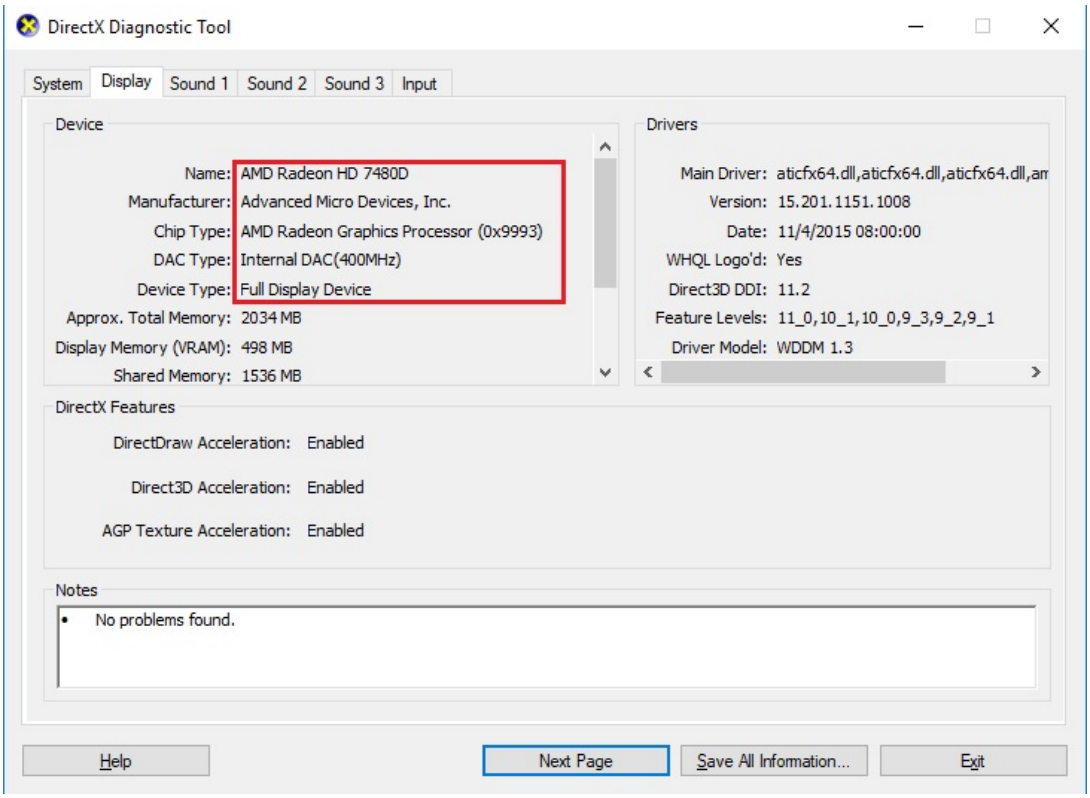
1. Go to the **Start** menu
2. Select the **Run** item
3. In the appeared window enter dxdiag

In the opened window you are supposed to see the following line:



If *Direct X* version is older that indicated one, you should download and install version higher. For example, it can be downloaded at the following link: **http://directx9.ru/directx_9**

You should also ensure that the latest drivers for graphics adapter are installed in the system. First you should find out its model. To do so, click the **Display** tab in the same program:



You can download the latest drivers for the particular adapter model from the website of manufacturer of your graphics adapter (for example, **http://radeon.ru/drivers/**).

Finally, it may be necessary to download and install the following *Microsoft* patches (in case they are not installed yet):
http://www.microsoft.com/ru-ru/download/details.aspx?id=21
http://www.microsoft.com/ru-ru/download/details.aspx?id=29

Contacting BIORS Technical Support

The manufacturer guarantees free technical support and assistance in resolving problems during one year from the date of purchase of *Medscanner*. Besides, every effort will be made to provide software users with free technical support after the specified time limit as well, but such opportunity is not guaranteed.

In case of problems with software or hardware (program is unstable: hang-up, disorderly close-down, data transfer delay or glitch, etc.) **please fill in the special form to contact the technical support http://www.biors.ru/service/tech-support/. In that form you should indicate the following information necessary for fast and successful resolution of the problem:**

1. Who and when bought our complex.
2. Which embodiment of *Medscanner* BIORS you use.

3. Version number of our software installed on your computer.
4. Information about *Windows* version on your computer (see below how to know it).
5. Name of antivirus program installed on your computer or specify absence of antivirus software.
6. In detail, point by point describe your actions before the problem appears. It would be advisable to attach the program screenshots with error descriptions to your e-mail. A screenshot can be taken by pressing the **PrtScn** button on the keyboard when you see needed image on the screen. Then taken screenshot can be pasted into a document in ***Word*** or *Paint* **format** (Click the **Edit** menu, then **Paste**), saved with a filename of your choice and sent us as an attachment to your e-mail.

Any complaints are accepted only for the latest version of *Medscanner* BIORS software. Therefore, prior to contact the technical support we strongly advise to download and install the latest version of *Medscanner* software from our website http://www.biors.ru/arm-medscanner-biors/medscanner-downloads/.

It is not recommended to take pictures of the monitor screen using photographic camera or camera phone, because in that case too unclear image is formed. It makes analysis of the issue much more difficult.

The technical support does NOT CARRY OUT user training in regards to setup and use OS *Windows*, installation of third party software as well as working with devices produced by other manufacturers.

System information

You can learn the system information using *Windows* tools by means of the msinfo32.exe utility. This utility provides detailed information about hardware resources, components (multimedia, input/output, networks, ports, memory), software environment and *Internet Explorer* settings.

System information. It displays the basic information about computer (the name and the version of operating system, installed processor, BIOS version, physical and virtual memory space and swap-file size).

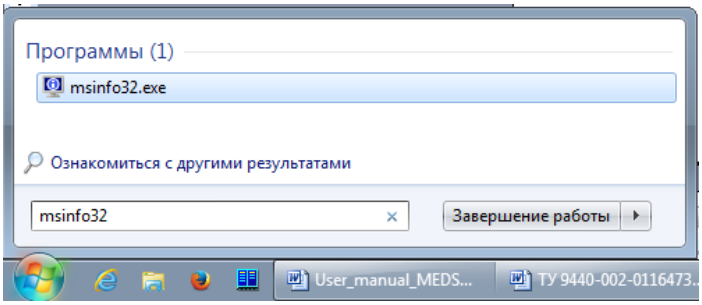
Hardware resources. It displays the information about hardware settings (direct memory access (DMA) and Interrupt ReQuest (IRQ) channel, input/output (I/O), memory).

Components. Detailed information about devices (CD-ROM, video unit, audiodevice, network card, keyboard, mouse, printer, etc.).

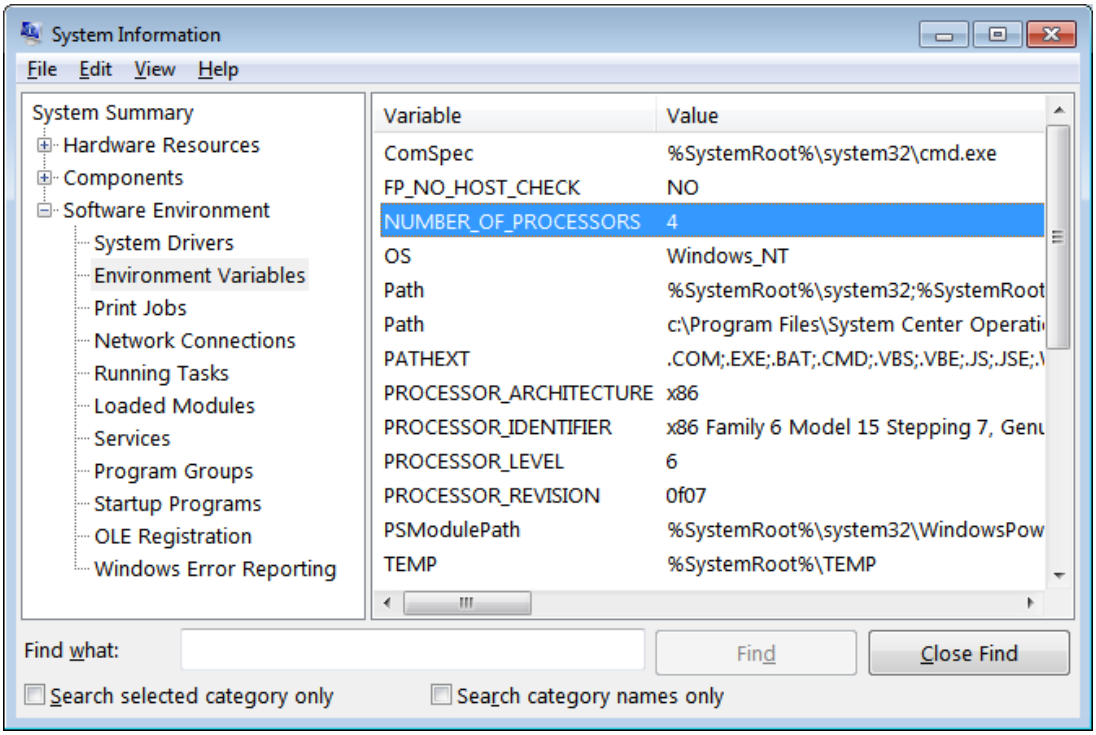
Software environment. Installed software, system drivers, running services, etc.

Browser parameters. Information about browser.

To find the information about your computer, go to the **Start** menu, then click **Run** or press simultaneously **WIN** + **R** key combination. In the opened window enter msinfo32.exe and click **OK**.



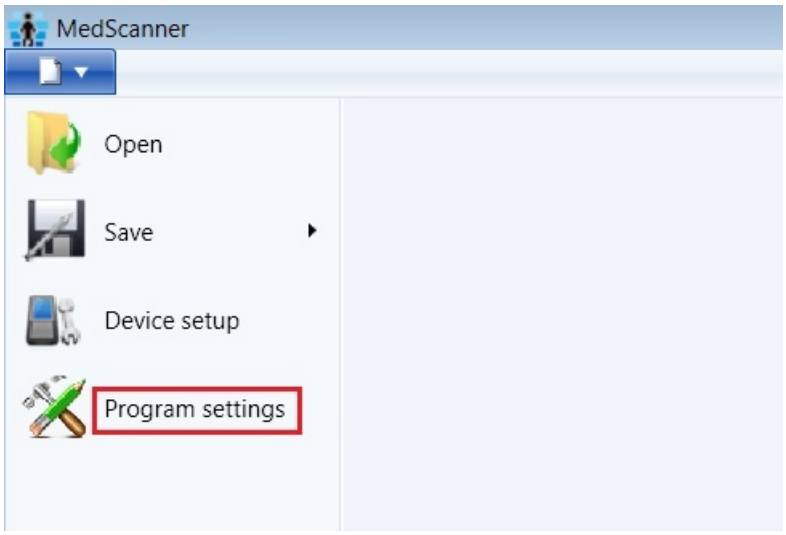
System information (MSINFO32.exe) is as follows:



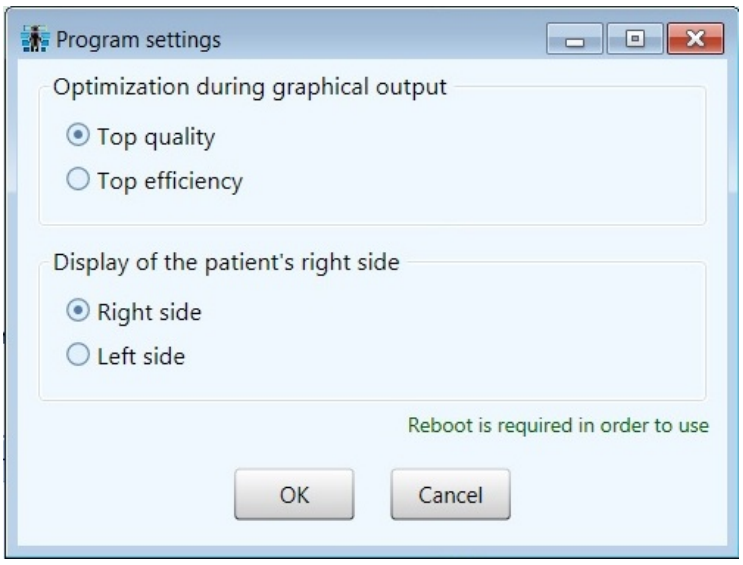
You can also easily save the image of the screen with system information to your clipboard, if you make a screenshot. A screenshot can be taken by pressing the **Ctrl** + **PrtScn** key combination on the keyboard when you see needed image on the screen. Then taken screenshot can be pasted into a document in *Word* or *Paint* (click the **Edit** menu, then **Paste**). Repeat the same operation for other option from the system information menu.

Program Settings

For displaying graphical information, images and reports in the program, a modern and relatively fast computer with a videocard is required. Make sure that the drivers of your manufacturer's VGA adapter are installed, not standard *Windows* drivers. By default, the program operates in the mode of the maximum image quality. If for some reasons it is evident that system does not handle and slows down, the user can change settings. Select the **Program Settings** in the menu:

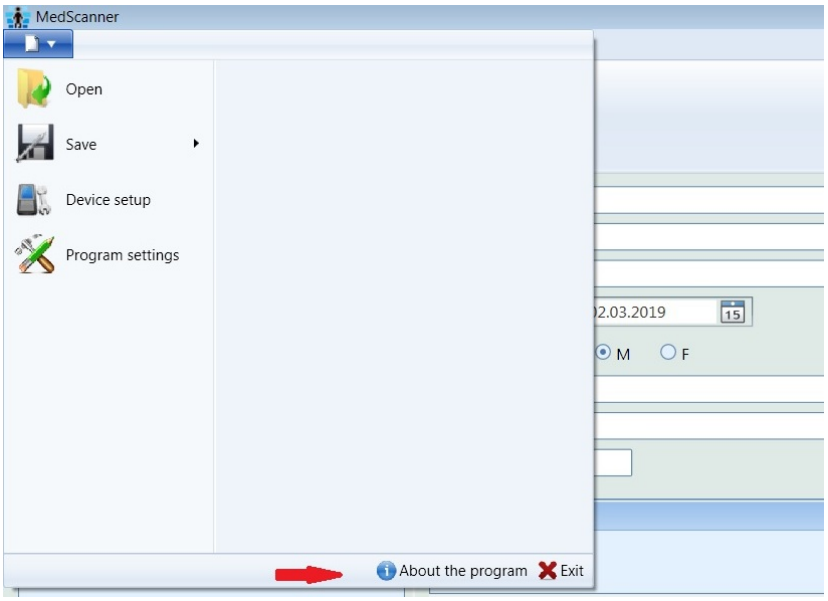


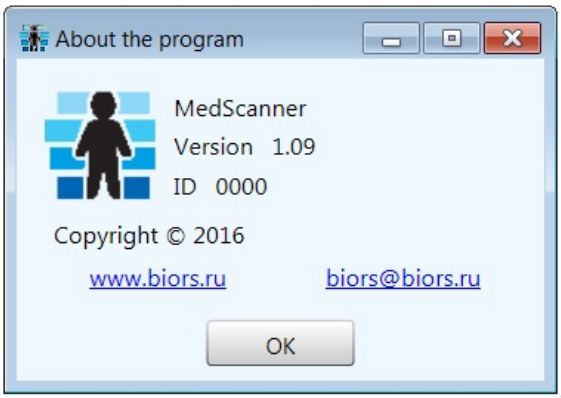
In the appeared dialog box select the **Top efficiency** item. Restart the program.



Setting ***Display of the patient's right side*** allows representation of "right side" either on the right or on the left.

To get information about program version and the device ID, select the **About the program** link in the bottom right corner of the settings window:



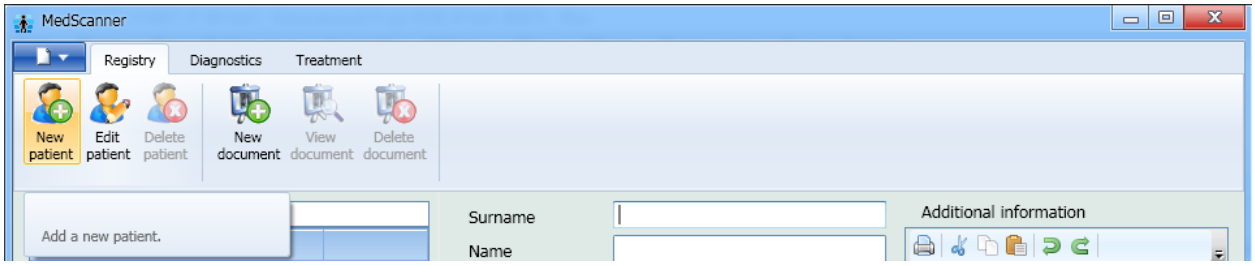


REGISTRATION AND ACCOUNTING OF PATIENTS (FOR ALL EMBODIMENTS)

Registry

Registration of a new patient

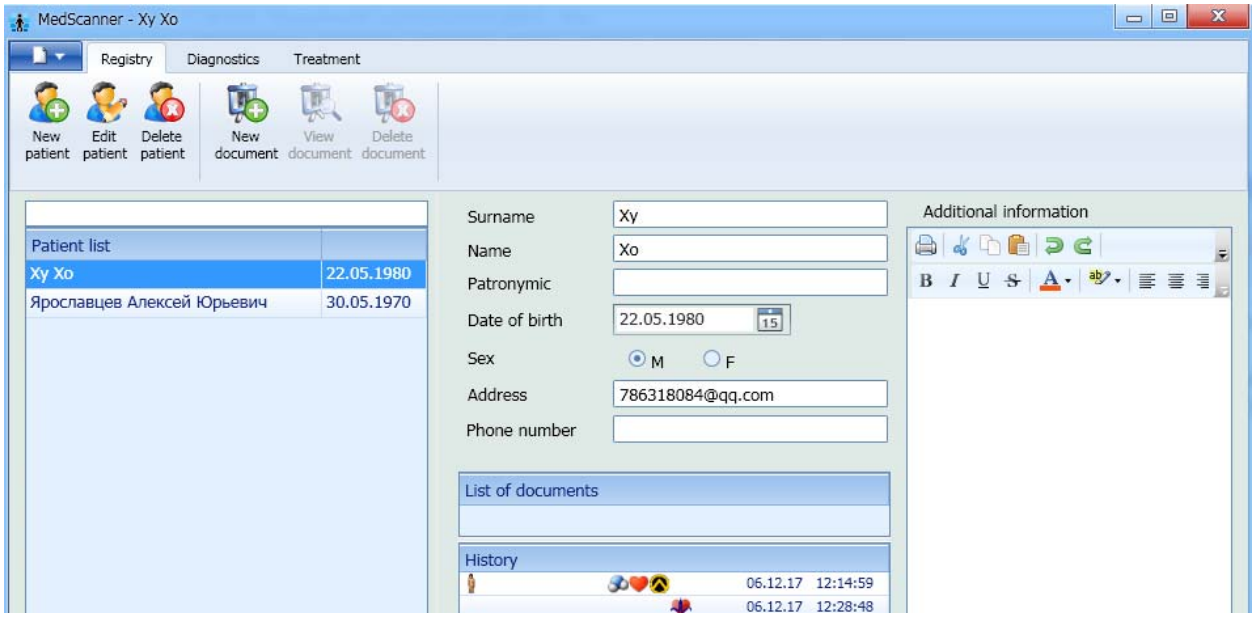
To register a new patient, click the **New patient** button.



Enter following information about a patient into appropriate fields:
It is obligatory to enter: surname, name, patronymic (middle name), date of birth, gender.
Optional: address, phone number, additional information.
After having filled out all fields please click the **Registration of a patient** button. If all fields are filled out correctly, an entry about a new patient appears in the **Patient list**.

Changing of information about a patient

Select the patient you need from the **Patient list**.



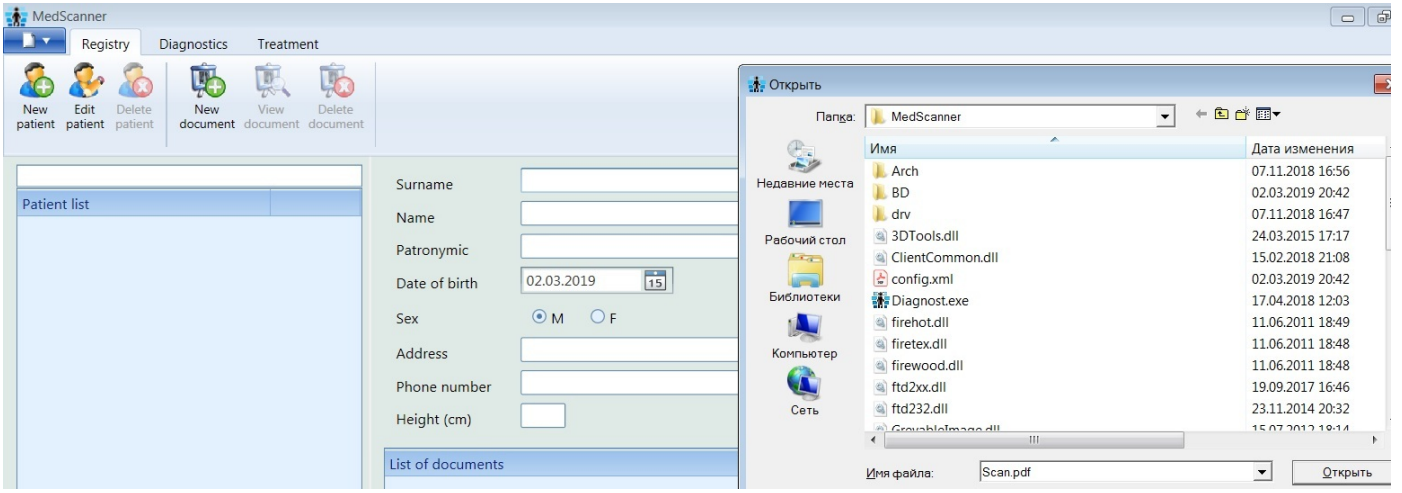
Information about the patient is displayed in appropriate fields. You can adjust the information in fields (address, phone number, additional information). After the adjustment is made, click the **Registration of a patient** button. In case the required fields have been adjusted (surname, name, patronymic (middle name), date of birth, gender) a new entry is created (the entry about a new client).

Deletion of information about a patient

Select the patient you need from the **Patient list**. Click the **Delete patient** button. Once deletion is confirmed, all information about the selected patient is removed from the program database.

Accounting of patient's third-party documents

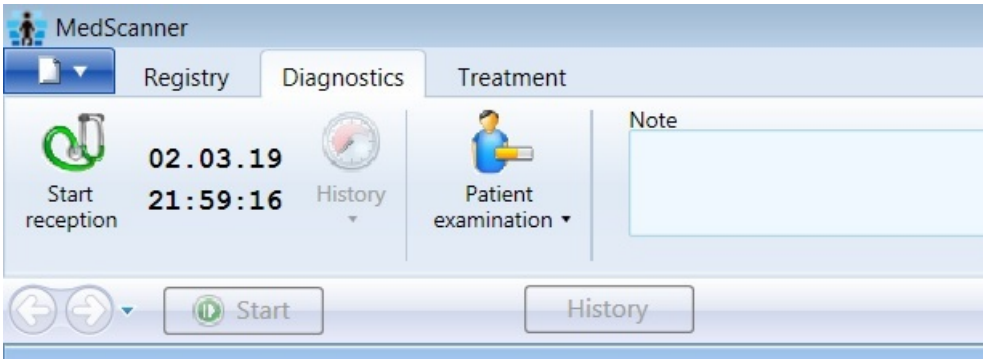
The program allows saving in the database electronic copies of various documents related to a patient. For example, you can save scanned results of patient examinations, a copy of insurance certificate, images and other documents. To save the document to the database, click the **New document** button. Find on the disk and select the file you need. Its name appears in the **Patient list** for the selected patient. To view the document, choose it from the list and click the **View document** button.



If the certain document type in *Windows* system is associated with a corresponding viewer program (for example, *Adobe Reader*), the document is shown in that program. To delete the document, click the **Delete document** button. Once deletion is confirmed, the document is removed from the program database.

Beginning to work with a patient

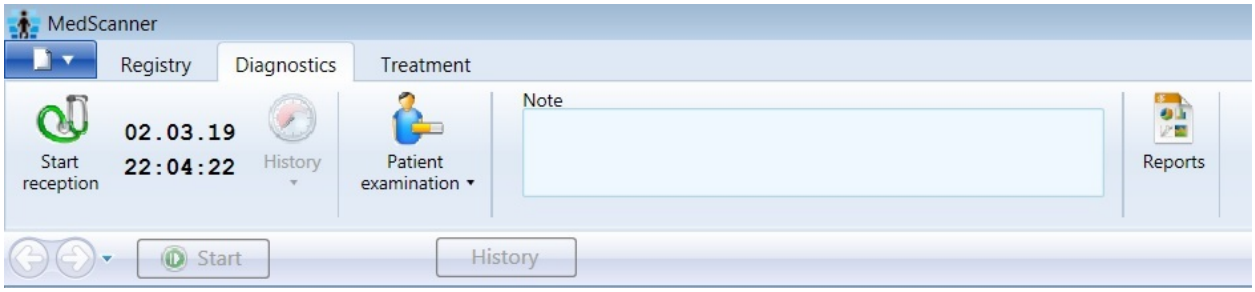
To carry out testing or therapy, select corresponding tab at the top: **Diagnostics** or **Treatment**. Before you start working, you should always click the **Start reception** button.



From that moment on, the program switches to the operation mode with saving and processing of results to view them in the **Reports** tab (on the right in the window). You should click the **Start reception** button only once, before the start of work with a patient. When all

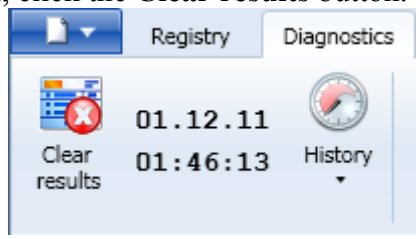
necessary procedures for the patient are performed and no actions needed to be taken, click the **Finish reception** button. It is necessary in order to determine for the program the start and end of preservation of information about doctor's actions in relation to a patient.

Subsequently, after reception of a patient, the final results of information processed can be seen by clicking the **Reports** button on the right.



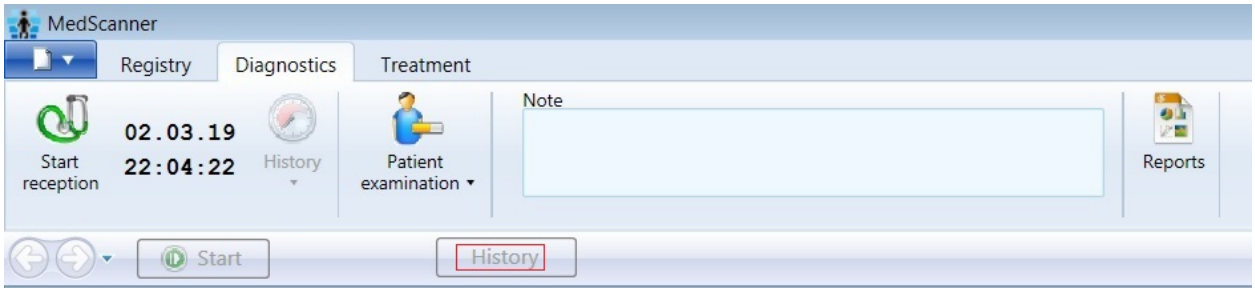
During reception of a patient it is also possible to view intermediate results of processed diagnostic data by clicking the same button. Deactivation of the report mode is also carried out by clicking the same button.

If the viewed results of working with the patient are no longer needed, or you need to start working with a new patient, click the **Clear results** button.



Viewing of the history of working with a patient

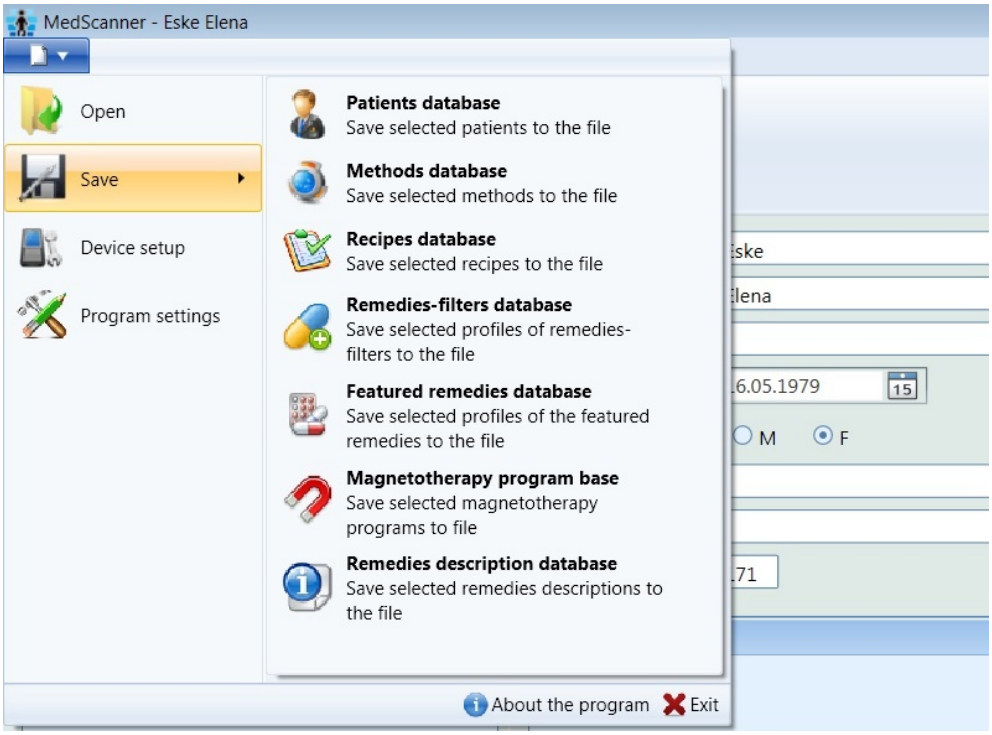
If you need to view information about previous patient's examinations, click the **History** button (it is inactive during current reception).



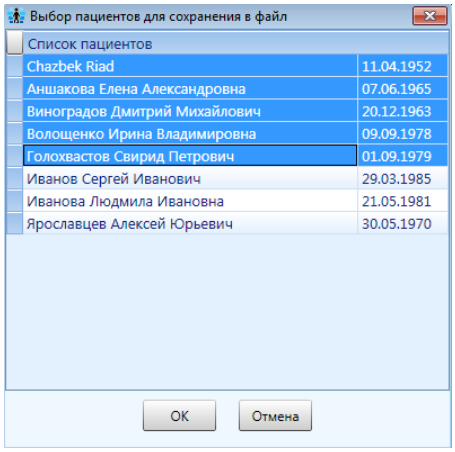
In the appeared menu you can view dates of previous patient's visits (previous patient's examinations are fitted with pictograms). If you select the desired time of the previous patient's visit, its results are displayed in corresponding program windows exactly the same as at the moment when the reception was completed.

Working with databases (of patients, techniques, prescriptions, filter medicines, recommended medicines, magnetotherapy programs, descriptions of medicines)

It is possible to save patient databases, created techniques, ready prescriptions, recorded filter medicines, created lists of recommended medicines, new magnetotherapy programmes, and additionally entered descriptions of medicines. To save a database on the hard drive or any removable media device (flash drive etc.), you should select the line **Save** in the top-left program menu (in the pop-up menu).

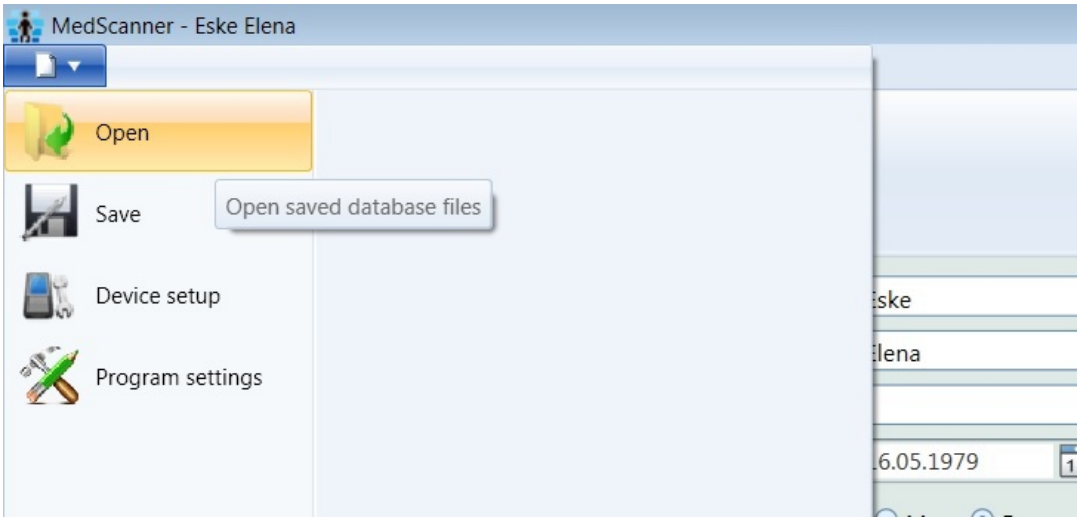


Then you should choose the needed item in the list of patients or techniques. To select several items in the saved list, you should press the **Ctrl** key on the keyboard and, holding it down, choose needed items. To select a block, you should press the **Shift** key and, holding it down, click with mouse left button the initial and final lines of the list.



After that you should enter the file name (for example, patient) that will be saved with the extension *.pat for the patient database or with other extension according to the type of a saving database.

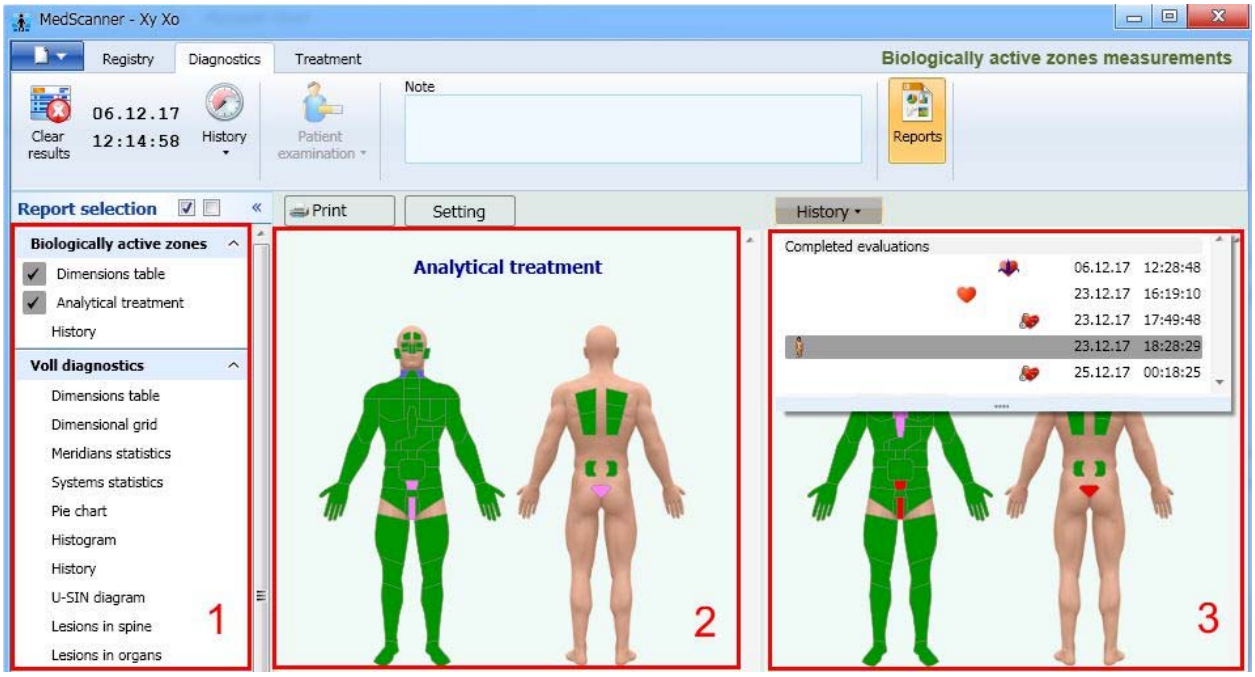
To open the patient or technique database, you should select the line **Open** in the top-left program menu (in the pop-up menu). Choose previously saved file (for example, patient.pat).



Note. It is possible to upload the information about all patients and their examinations from the program of HSC *Voll Office* to *Medscanner* software database. The back transfer is also possible, but examinations with the use of blocks that are not technically implemented in *Voll Office*, will be lost.

WORKING WITH REPORTS (FOR ALL EMBODIMENTS)

To display reports, as well as for processing and viewing of examinations results, you can click the **Reports** button at any time. The report window is conditionally divided into 3 parts:



In the **left part (1)** there is a menu with a list of available reports (tick them to select). It is not recommended to select all reports for the following reasons.

- Processing of all results at once can take quite a lot of time during which the program interface is not available.

- When selecting all reports, they are displayed as a long document. The search on it is performed by scrolling, that is not always convenient when you need to find information quickly.

- For printing to the printer not all reports are most commonly needed, but only ones you need at the moment.

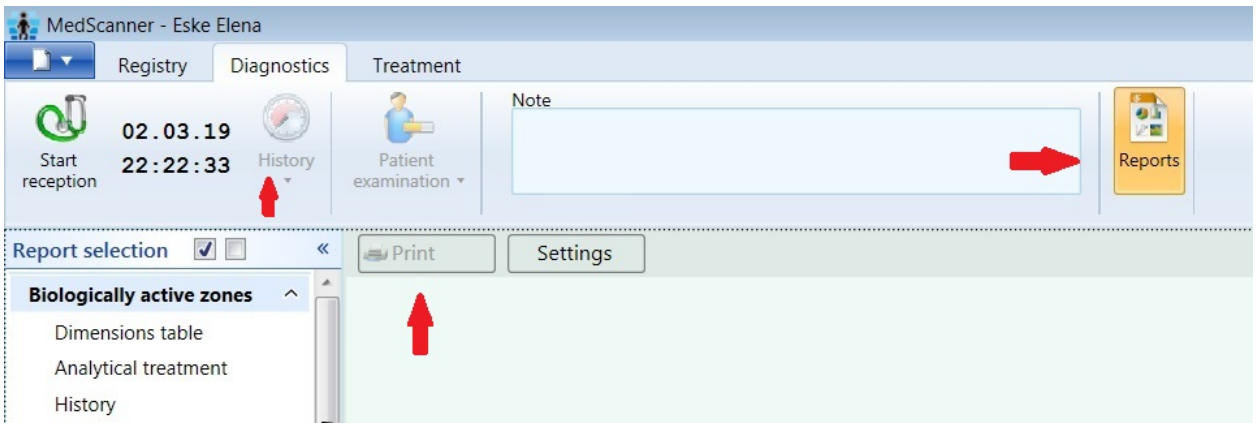
Therefore, the best result in terms of operation speed is achieved when only the report you need to view at the moment is ticked. When going to the next report viewing, it is advised to untick the viewed one. Though if the user is not intimidated by inconvenience mentioned above, there is a possibility to select all reports at once.

In the **middle part (2)** of the report window the reports of present examination are displayed. You can print them by clicking the **Print** button.

In the **right part (3)** of the report window the reports from **History** are displayed in order to compare them to the present examination. To select them, click the **Visit comparison** button and then the **History** button.

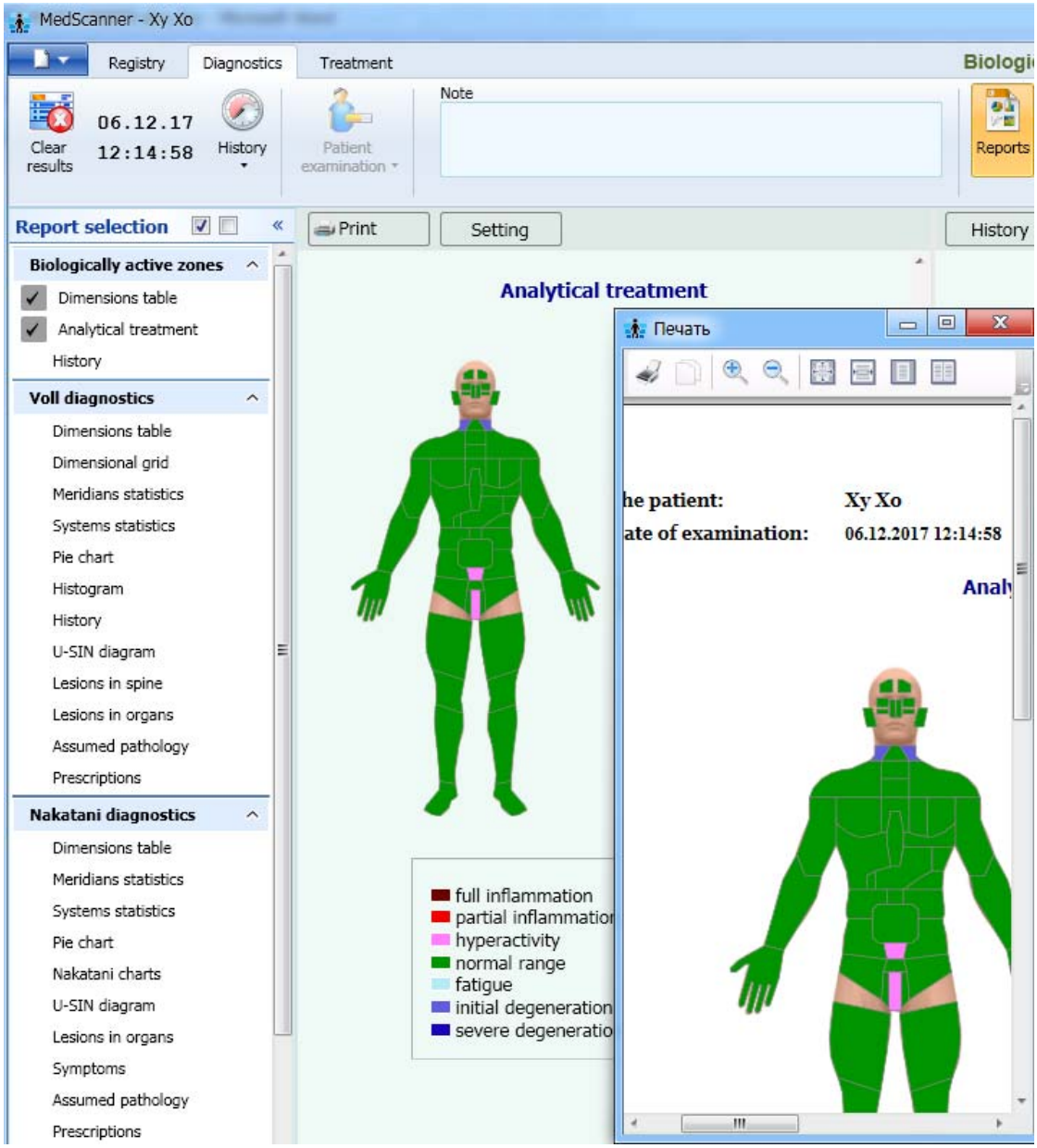
Report printing

To print results of any examination, you should select a patient in the **Registry** menu, go into the **Diagnostics** or **Treatment** menu and click the **Reports** button on the right:

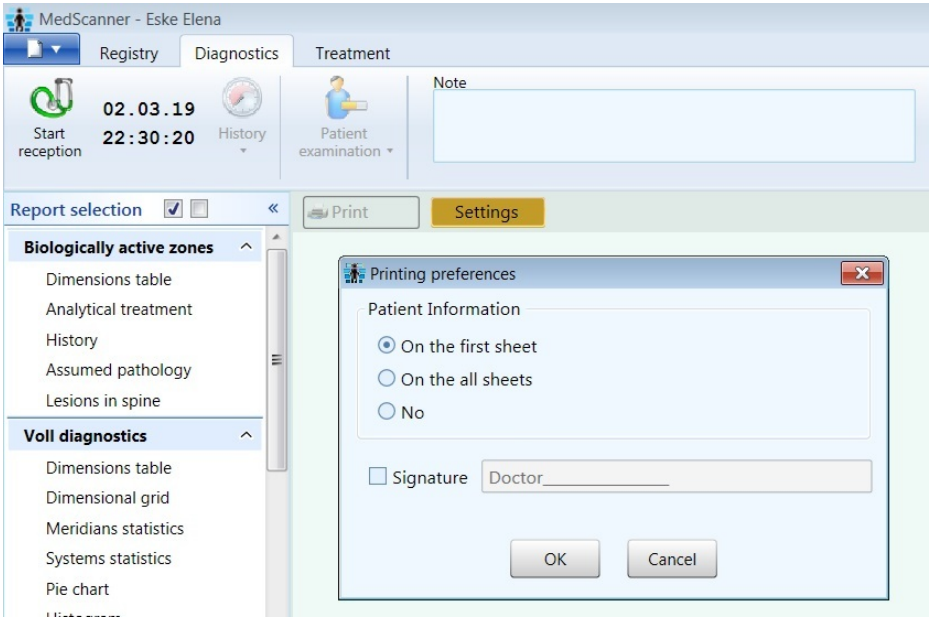


Then it is necessary to tick needed reports in the left column, click the **History** button and select examinations you need from the the drop down menu.

All ticked items will be printed. To print a document, you should click the **Print** button and then click the printer icon.



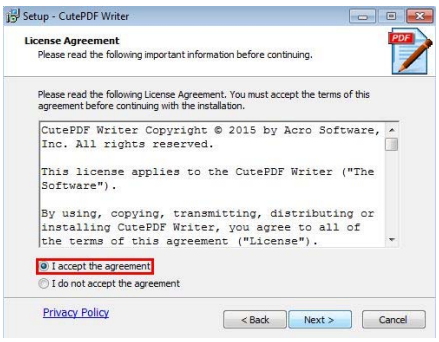
The **Settings** button allows setting the reports intended for printing:

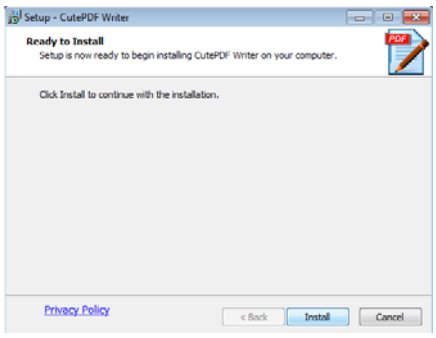


Saving reports in PDF format

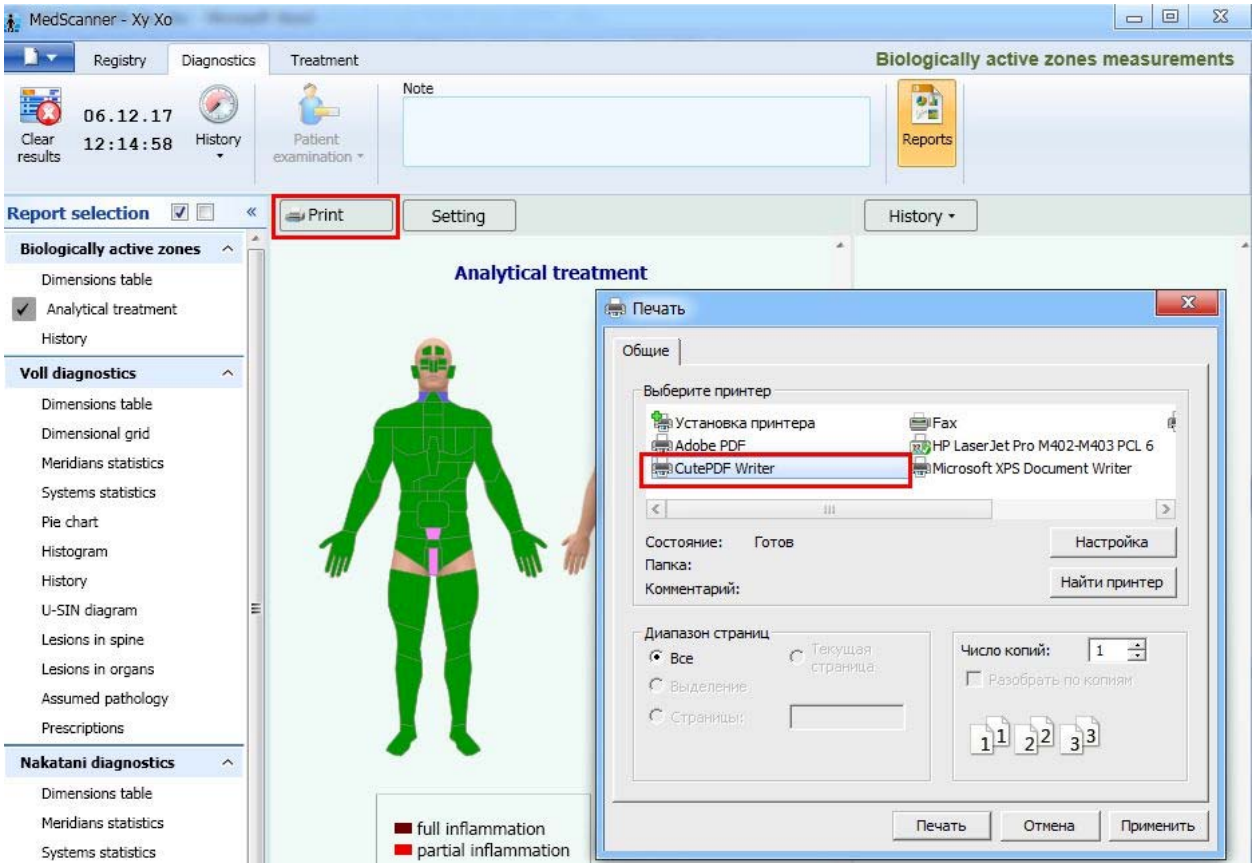
To save reports in PDF format, you should install the ***CutePDF Writer*** program. It can be taken from the flash drive (included into the delivery set) from the **CutePDF_Writer** directory or you can download the latest version from the manufacturer's website **http://www.cutepdf.com/**. You may also need to install the format converter **converter.exe** together with ***CuteWriter.exe*** (it is also on the flash drive, in the same directory).

To install the program, you should run the executable file ***CuteWriter.exe***, then click the **Next** button twice and then click the **Install** button:

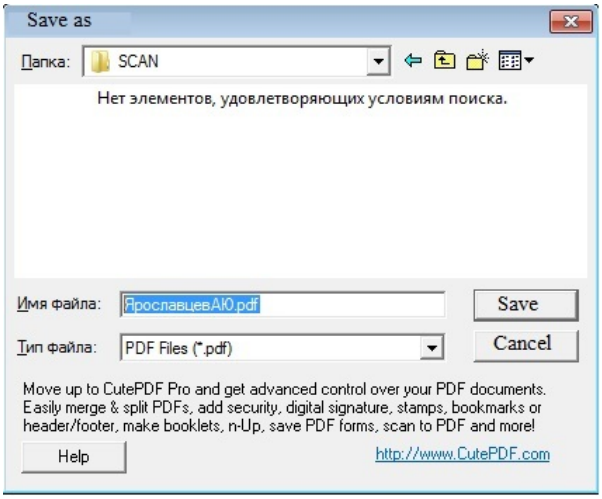




After that a possibility to save reports in PDF format appears in the printer selection dialog by clicking the **Print** button. Click the printer icon and select ***CutePDF Writer*** in the list of available printers.



Then click the **Print** button, choose a folder to save a file and enter a PDF file name (by default a name of the file is *System.Windows.Documents.pdf*).



Editing the content of the PDF file in *Word*

In *Word 2013* and higher you can convert PDF file to the *Word* document and change its content.

To convert PDF file you should open it like any other document.

1. Go to File > Open.
2. Select the location for the PDF file and click the Browse button.
3. Find the PDF file and click Open button.

More detailed information about the work with PDF files in *Word* is presented on the site of *Office* support **https://support.office.com/ru-ru/**

DIAGNOSTICS

(FOR *MEDSCANNER BIORS*; *MEDSCANNER BIORS-01*; *MEDSCANNER BIORS-02*; *MEDSCANNER BIORS-03*; *MEDSCANNER BIORS-04* EMBODIMENTS)

Preparation for the electropuncture measurements

Workplace requirements

The room for electropuncture diagnostics and therapy should be used only for these purposes. Artificial floor coverings (such as PVC covering or carpeting) in the room for the electropuncture measurements should be avoided due to the possible static build-up. The following materials are advisable for workrooms because they do not build up a static electric charge:

- linoleum coverings,
- wood coverings,
- stone flooring.

X-ray units, microwave devices, ungrounded electrical wires should not be located near the room. During electropuncture measurements, electrical appliances in the room must be turned off. This relates to:

- TV set,
- cell phone, radio telephone,
- paging device,
- broadcasting, especially FM or AM stations,
- X-ray apparatus,
- ultrasound machine.

Power supply lines of 220 V should be placed not closer than 30 cm to a patient. It is advisable to ground big metal screens and metal handles.

If the daylight fluorescent lamps are used for the artificial lighting, they should be placed at a distance of not less than 1.5 m to an examined person (the distance between filament lamps and an examined person should be at least 0.5 m). The air humidity and the room temperature should be maintained within 70–80% and +20–22°C respectively.

A processor and a monitor should be placed as far away as possible from the measurement location (at least at a distance of 50 cm). Doctor's workplace must be so equipped that he can work in a comfortable, stress-free working posture. A doctor should operate with active electrode, operator control and computer equipment easily. The comfortable environment and physical rest conditions for a patient should be provided. It is advisable to ensure that no one enters the working room during the examination.

Requirements regarding a doctor

Electropuncture diagnostics and therapy can be performed by graduate medical education specialists trained as reflexologists or qualified in traditional medicine. (The Russian Federation has a relevant law: see Resolution of the Government of the Russian Federation of 16.04.2012, № 291 "On Licensing of medical activity").

During examination a doctor should wear the clothes made of natural fabric to avoid effects of static electricity. Doctor's hand carrying out measurements and procedures, should be in a stable position, without tension. Before measurement, a doctor should not press on a point (practice shows that search of a BAP for measurement should be done only according to corresponding

anatomical landmarks). During measurements a doctor should not touch a patient's skin with the hand, so it is advisable for a doctor to wear thin cotton or rubber gloves.

Requirements regarding a patient

The electropuncture diagnostics with the use of any method (Voll, Nakatani, Schimmel diagnostics, etc.) requires that patient's clothes and underwear are made of cotton, not creating static electricity. It is advisable to wear a white non-starched lab coat on bare skin. Before examination a patient should take off shoes, socks (as well as stockings or pantyhose). Any tight clothing should be unbutton. It is desirable that women remove IUD, piercing jewelry, manicure-related and pedicure-related products, cosmetics, etc. the day before the examination. Skin areas on which electrodes are placed must be clean, without skin damage, scars, papillomas and other skin lesions or birthmarks.

A patient should not take any medicines (except for vitally needed ones) or coffee on the day of examination and one day prior to the examination. Any alcohol intake 3–5 days before examination is prohibited. Previously taken medicines, as well as rings, chains, etc. (removed before the examination) may be nearby in order to perform the follow-up compatibility test. The test procedure is described in the "**Medicine testing**" section of the present Manual.

When electropuncture diagnostics is carried out, it is necessary to pay attention to moisture of palms and soles. Their excessive sweat or skin dryness can distort the results of measurements of BAP electrical parameters, making them less significant from the diagnostic perspective. Therefore, in case of excessive sweat you should wipe the skin with a dry napkin. In case of skin dryness (if values are below 82 cu) you should moisten the skin area with a wipe soaked in sodium chloride, 0.9% solution.

On the contrary, the **head electrodes** must be always moisten with plenty of clean cooled boiled water. It is advised to put small wet pieces of gauze under electrodes (not extended beyond their edges) for better contact with skin of a patient's forehead.

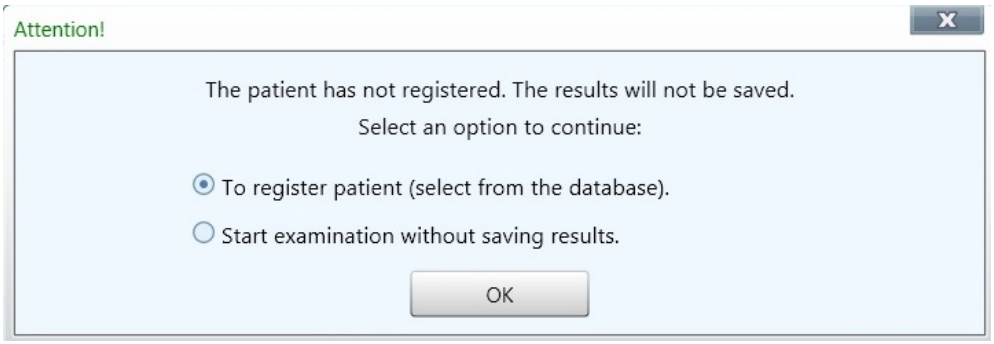
Examination should not be performed earlier than 1.5-2 hours after physical activity, meal or physiotherapeutic sessions. It must not be conducted earlier than 3 days after investigations related with powerful radiation (radiological methods, radioisotope diagnostics, nuclear magnetic resonance, etc.). An exception are cases when examination is carried out for the analysis of changes developing in the body under the influence of radiation.

If possible, it is necessary to stop intake of medicines one day prior to electropuncture diagnostics. The decision to stop the medicines intake before examination is taken by a doctor trained in electropuncture diagnostics.

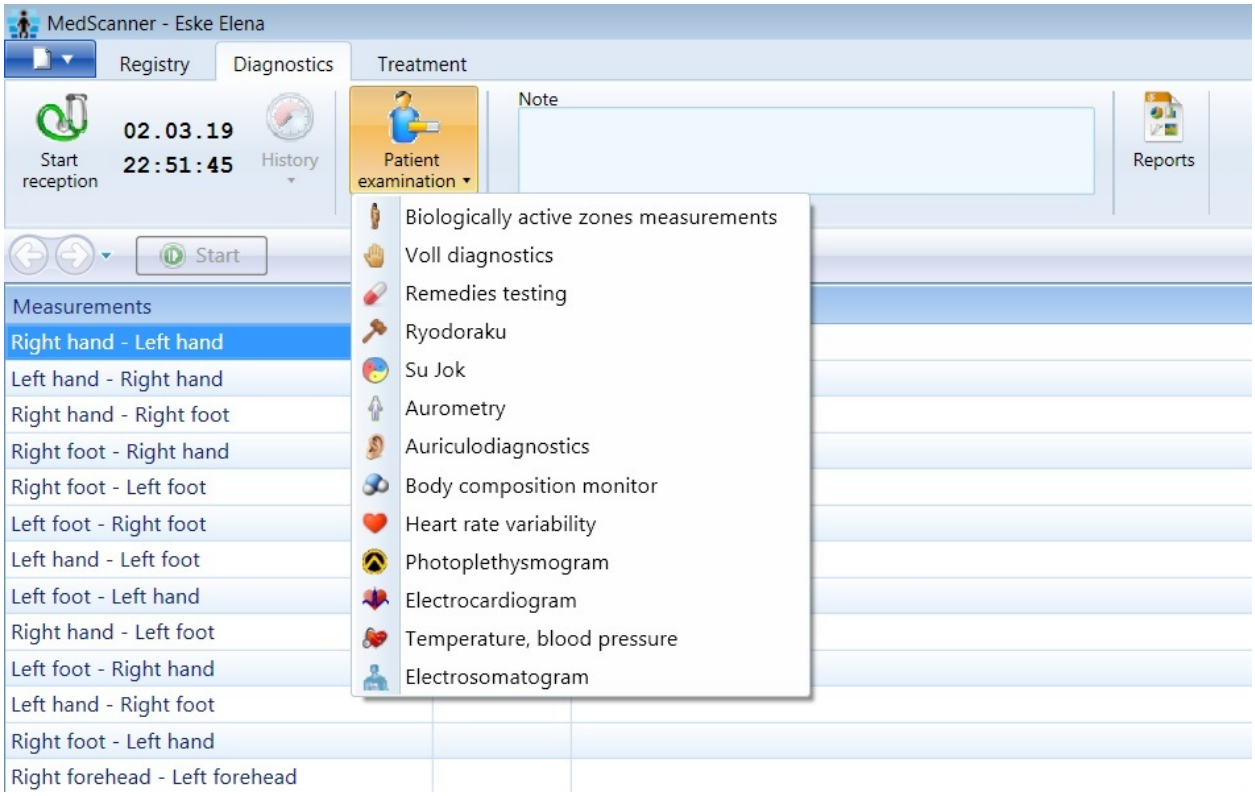
Directly before the examination a patient should have a rest for 10–15 minutes. It is not advised an examination after physical activity, psychoemotional stress and against a background of any physiological discomfort.

MEASUREMENT OF BIOLOGICALLY ACTIVE ZONES
(FOR ALL EMBODIMENTS)

Select a patient or register him/her in the **Registry** menu. If you do not do it, the program warning message appears:



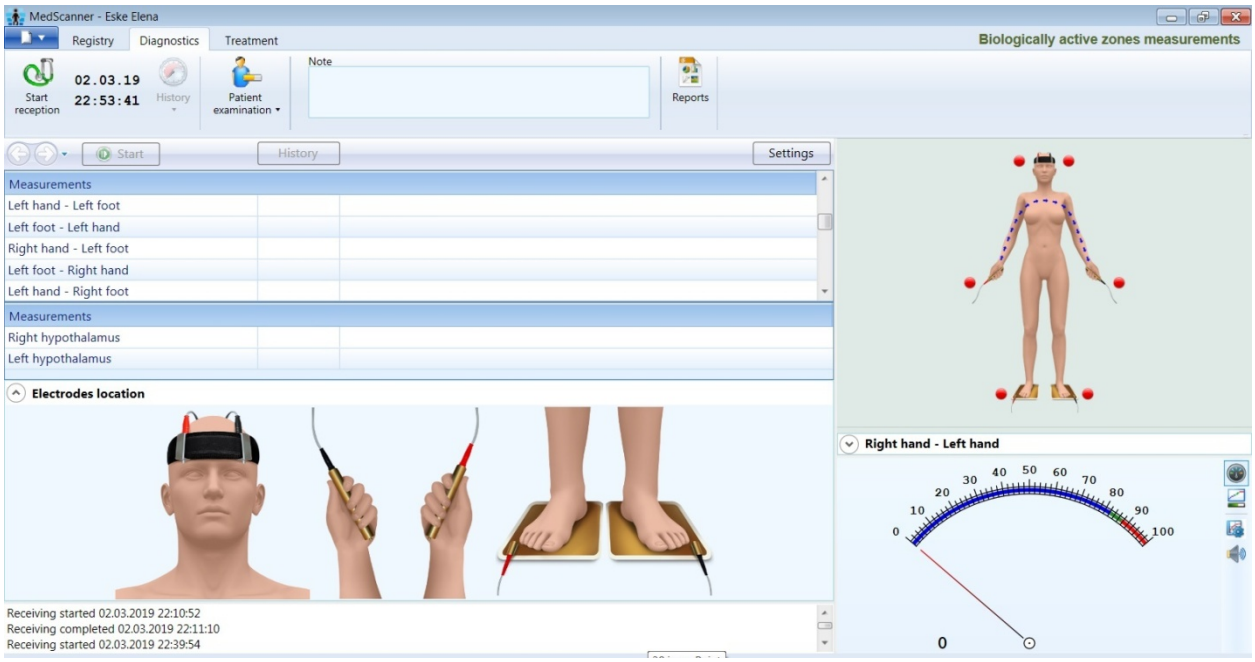
Select the **Diagnostics** tab. Select **Measurement of biologically active zones** in the **Examination** menu:



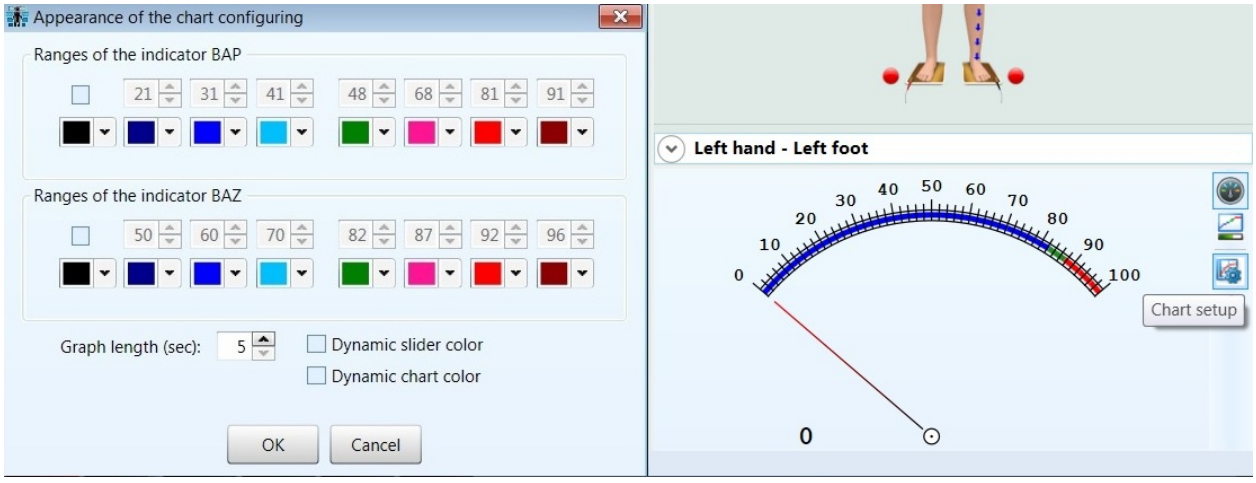
It is necessary to wipe metal parts of electrodes with alcohol and then with towelettes impregnated with formaldehyde (it is bactericidal, fungicidal and antiviral). A patient should bare his/her feet and remove any metal objects (watch, bracelet, ring, eyeglasses, etc.) before connecting electrodes. Cream, powder and other cosmetics must be removed from a patient's forehead. There are contraindications: any skin lesions in areas of contact between electrodes and skin or a cardiac pacemaker in a patient.

Connect electrodes with the use of cables to corresponding sockets ("Feet" — "Hands" — "Head") on the *Medscanner* housing. **The red** plug must be on the **right** side of an examined person. The "Feet" socket is for the footpad electrodes, the "Hands" socket is connected to

cylindrical electrodes and the “Head” socket should be connected to forehead electrodes. Place electrodes on patient’s skin. Patient’s bare feet must be placed on the foot pads. A patient should hold the hand (cylindrical) electrodes in his/her hands. Usually during measurements the skin moisture level should be normal. If palms and feet skin is wet, it should be dried with a wipe soaked in alcohol. If skin is too dry, it is necessary to wet it with clean cooled boiled water. Head electrodes **must** be soaked with 10% hypertonic saline (to prepare it, you should dissolve a whole teaspoon of salt in 100 ml of cooled boiled water). After that head electrodes must be fixed on a patient’s head with a belt. To see the electrode placement layout, call the corresponding menu at the bottom of the program window.

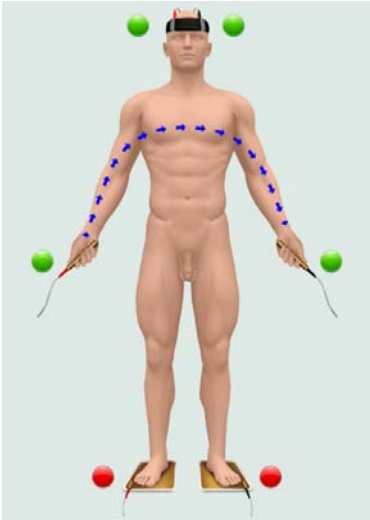


If you need to change measurement ranges for some reasons, you can do it through the dialog box **Chart setup**. Select corresponding values for BAP and BAZ indicators in the relevant **Ranges of the BAZ indicator** tab.



Click the **Start reception** button.

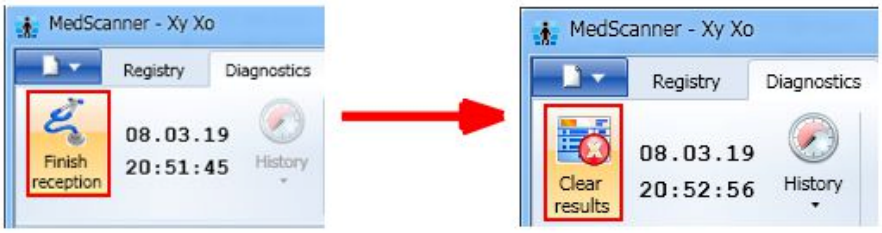
Make sure all electrodes are placed on a patient’s skin (the color of all bubbles that indicate leads in the image of a human body on the right is supposed to switch from red to green):



Click the **Start** button. The program performs measurements on all quadrant leads automatically. If the measurements are performed incorrectly, the message appears:

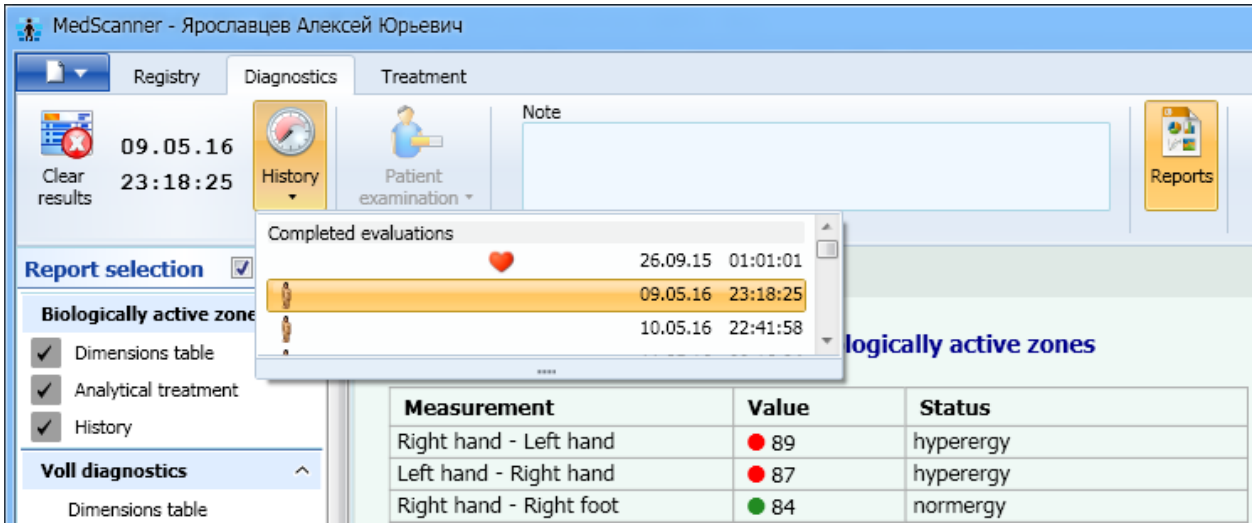
The results are not sufficient for the integral analysis. Probably this is due to poor electrode-to-skin contact.

At the end of the diagnostic procedure click the **Finish reception** button, view measurement results and click the **Clear results** button. The program window becomes clear and obtained results are saved to the database.



Reports on the biologically active zones

To view measurement results, click the **Reports** button on the right and tick relevant reports on the left after the diagnostic procedure. To view a history of visits, click the **History** button on the left.



Interpretation of BAZ measurement results

- 82–86 cu — normergic reactivity type and eutonia of autonomic nervous system;
- above 86 cu — hyperergic type of reactivity and hypertension of the sympathetic nervous system;
- below 82 cu — hypoergic reactivity type and hypertension of the parasympathetic nervous system.

High *Medscanner* values on the "Hand – Hand" lead (over 92 cu) can be most frequently observed in psychomotor agitation, expectation neurosis, vegetative-vascular dystonia, sympathetic agents and other stimulators (alcohol, tobacco) intake before examination, premenstrual period or latency period of acute respiratory disease and other infectious illnesses, as well as in persons always wearing synthetic underwear that accumulates static electricity.

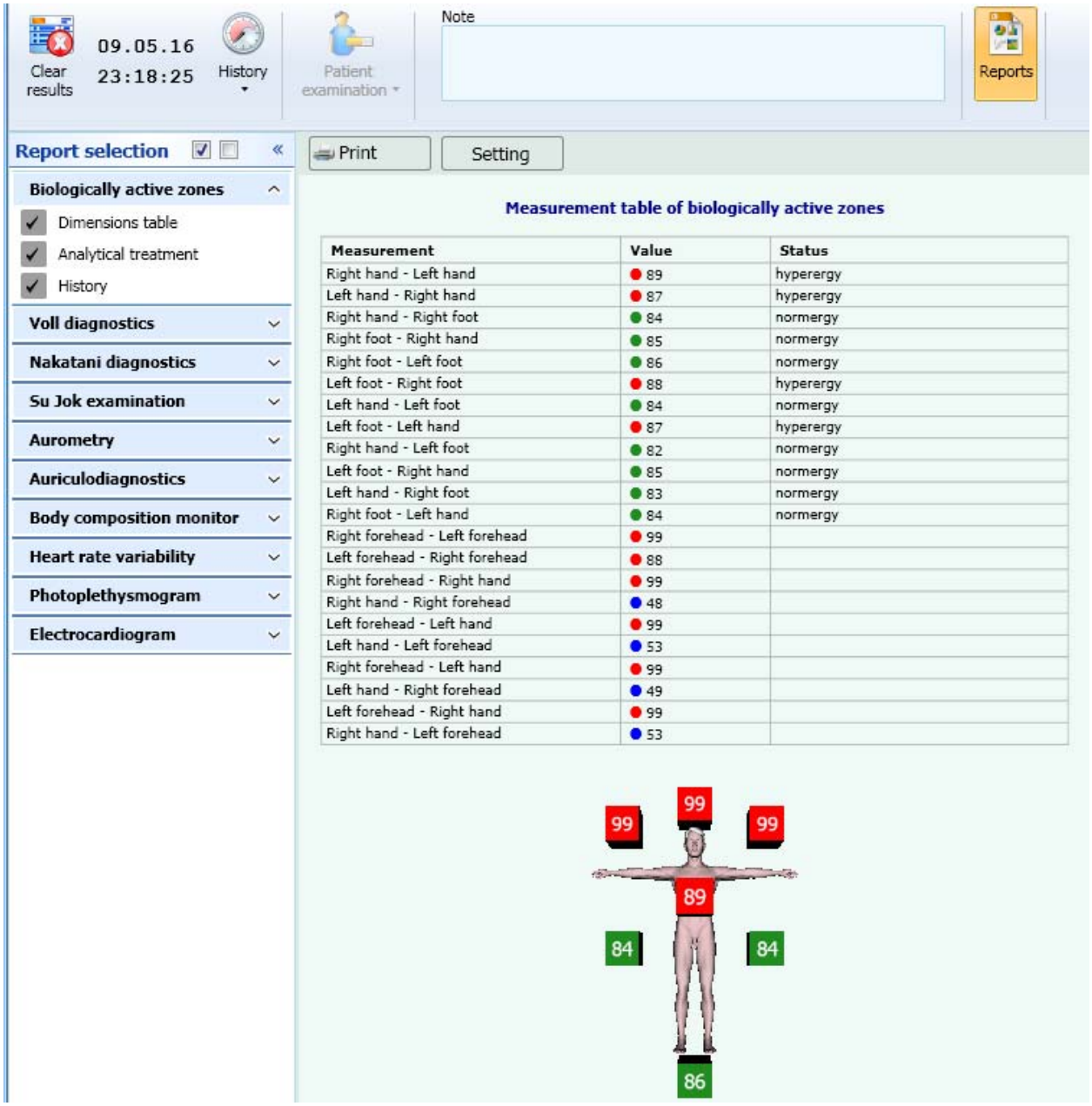
Low *Medscanner* values on the "Hand – Hand" lead (below 80–70 cu) can be most frequently observed in elderly people with energy deficiency, in anemia, cervicothoracic degenerative disc disease, coronary artery disease, carbohydrate metabolism disorder, hypothyroidism, endogenous depression, long-term intake or overdose of beta-blockers, glucocorticosteroids, painkillers, narcotic drugs, antipsychotics and sleeping pills.

Scale readings	**Type of non-specific reactivity**	**ANS tone**
96–100	Extreme hyperergia	Amphotonia
92–95	Significant hyperergia	Significant sympathicotonia
87–91	Hyperergia	Hyperergia
82–86	Normergia	Eutonia
70–81	Hypoergia	Parasympathicotonia
60–69	Significant hypoergia	Significant parasympathicotonia

50–59	Pronounced hypoergia	Pronounced parasympathicotonia with depletion of sympathoadrenal system reserves
Below 49	Areactivity	Defensive or protective CNS inhibition

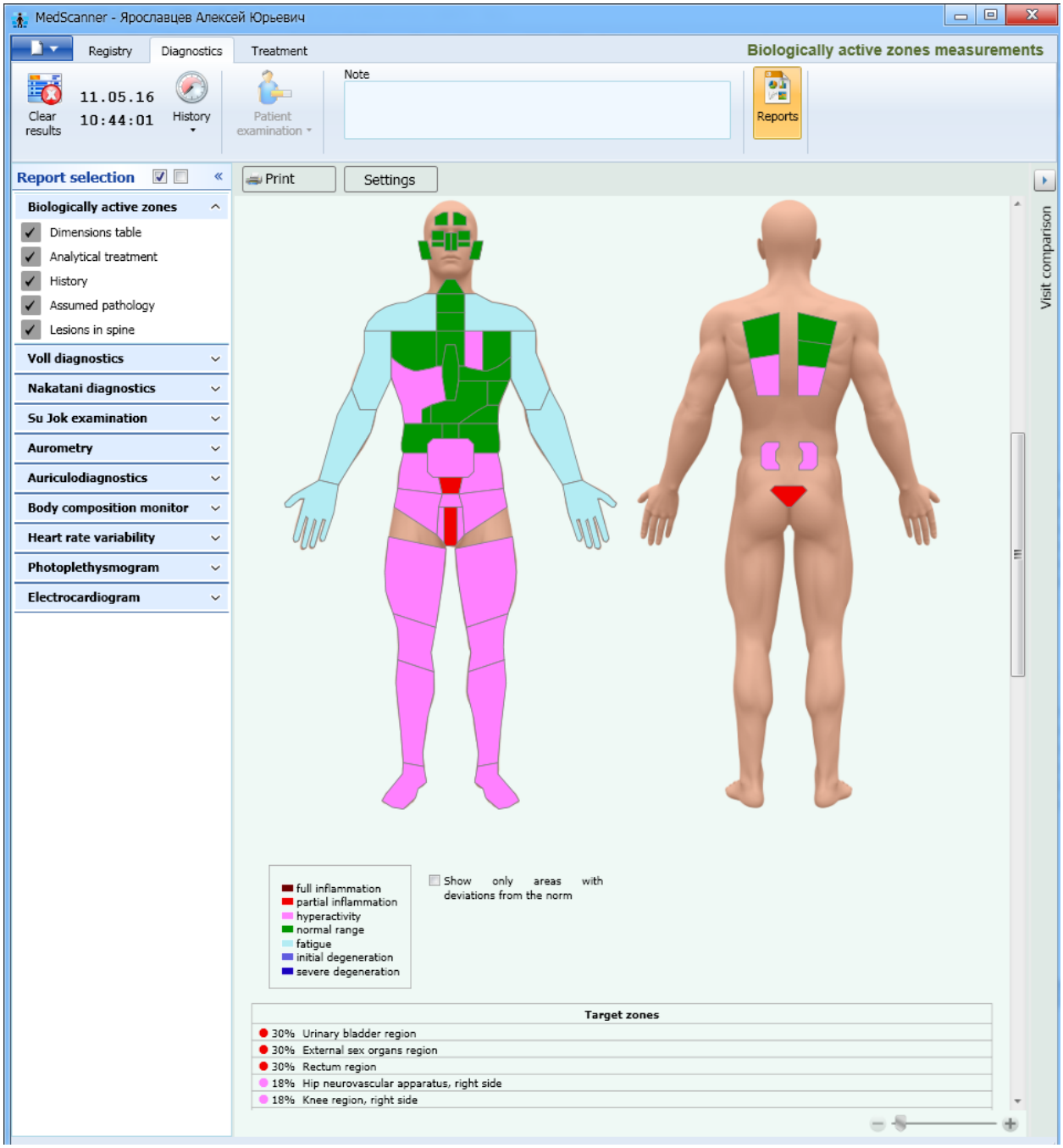
Besides, values reduction on the “Hand – Hand” lead to 70–80 cu can be observed in the evening and after meal, that reflects the physiological parasympathicotonia (according to the principles of electroacupuncture, it relates to “energy storage” in internal organs).

The measurement results on the “Hand – Hand” lead are important for prognosis of some diseases and can be used for rapid assessment of therapy efficiency.

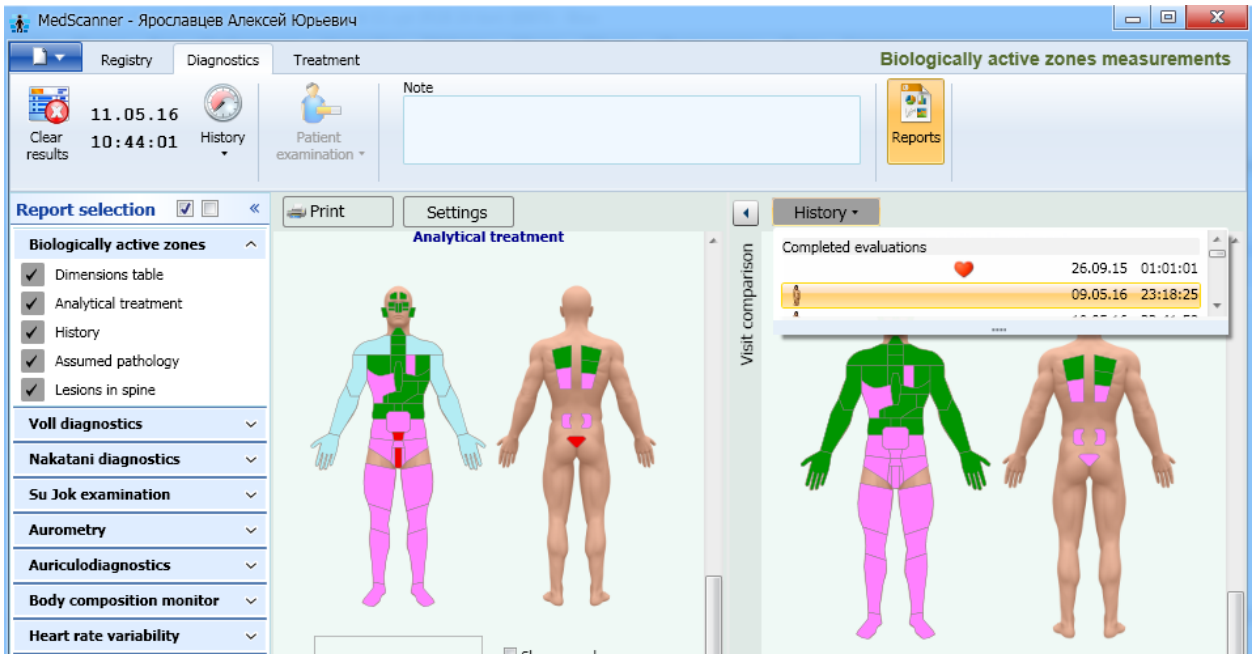


Integral analysis (electrosomatography)

Upon completion of the examination on the quadratic leads with the use of 6 electrodes, the program carries out the integral analysis of obtained results using special algorithms of electrosomatography with graphical interpretation of the body region state. Analysis of the obtained information makes it possible to build the graphical model of the body state in general and make a conclusion about the state of individual organs and systems. The image of human body presents the areas of electrical conductivity with abnormalities found during examination. The name of the region appears when you place the cursor over the corresponding area of the patient's body image. The areas are shown conditionally, on the path of testing current. Therefore, when assessing, you should take into account that at the location of, for instance, thyroid or parathyroid, there are also tonsils or trachea. Under the image of human body the list of areas with the observed impaired conductivity (the so-called "target zones") is shown with their probabilistic assessment.



The result of any other examination can be displayed for the comparison in the next right **Visit comparison** window. Besides, under images the box ***Show only areas with deviations from the norm*** can be ticked. In that case zones with normal conductivity values are removed from the human body image.

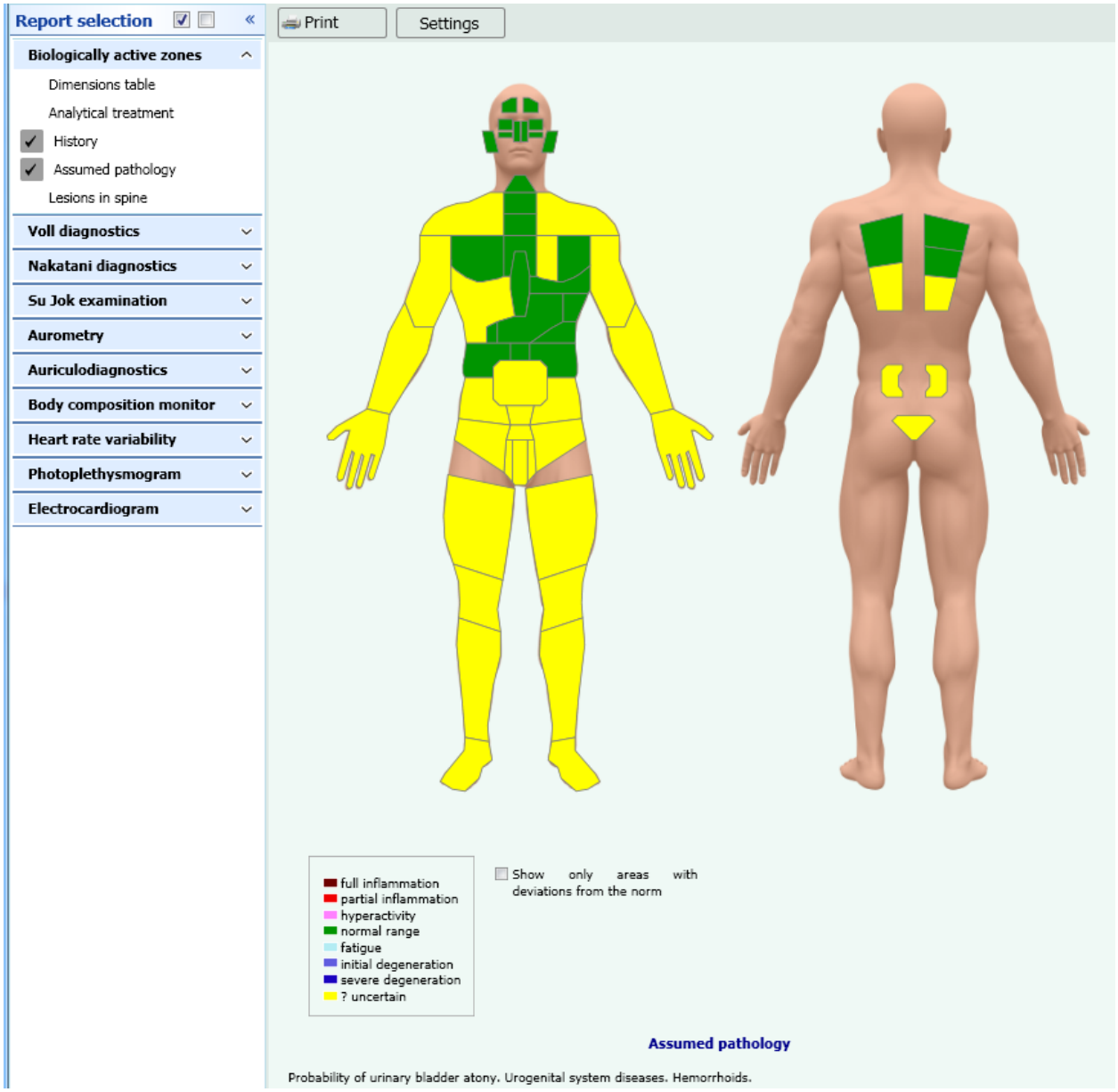


Presumptive pathology

After detection of deviations in volume conductivity, the program automatically evaluates results and issues a conclusion about presumptive pathology:

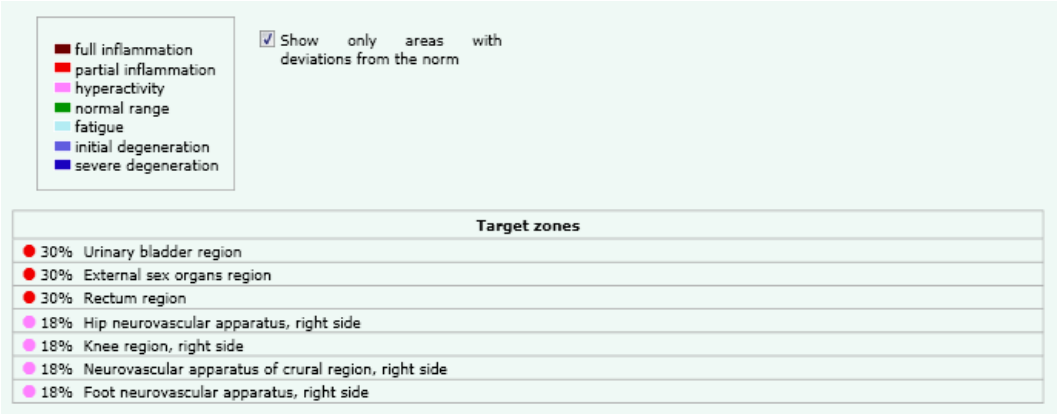
Dynamic perspective test

This report is the averaging of the integral analysis reports over the last several days. The dynamic perspective test (the follow-up control) is used to detect the areas of stable abnormalities regarding conductivity. The areas representing the equivocal values are yellow. These abnormalities can be related to the person's psychoemotional state at the time of examination.



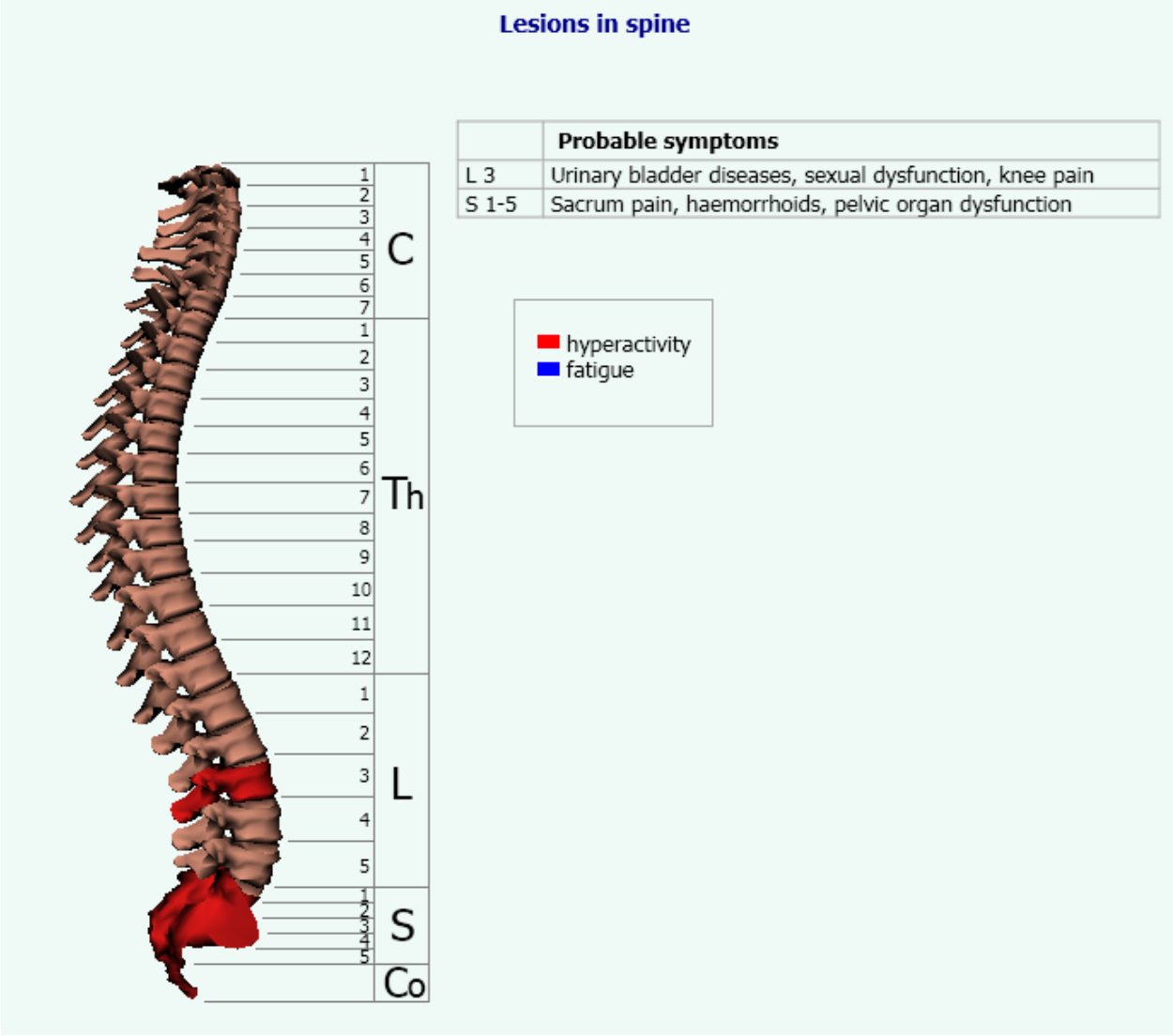
Note. For the correct display the follow-up state you should choose the most recent examination.

Therefore, the target zones under the images of human body in this report are shown only for the stable abnormalities regarding conductivity, recurring over several examinations.



The lesions in the spinal column and probable symptoms

If the results are sufficient for the analysis, the automatic report about spinal column state is displayed as well as probable symptoms related to the detected condition.



VOLL DIAGNOSTICS

(FOR *MEDSCANNER BIORS*; *MEDSCANNER BIORS-01*; *MEDSCANNER BIORS-02*; *MEDSCANNER BIORS-03*; *MEDSCANNER BIORS-04* EMBODIMENTS)

General information

Voll electropuncture diagnostics is primarily understood as measurement of "energy potential" of biologically active points (BAPs) on human body using a device. This method provides registration of resistance (conductance) values of biologically active points on which constant potential of 1.28 V is set. On the results of diagnostics the analysis of points and meridians state is carried out, information about diagnoses and treatment is provided. Diagnostics results are sent to other subsystems for further tests and treatment.

When performing electropuncture measurements, you should connect black plug of a patient cable to cylindrical electrode and put it into the patient's hand. Connect red plug to active electrode probe and press it to the biologically active point with constant pressure. The pressure level on a point depends on a tip diameter for an electrode probe. Its value individually determined for every patient.

Optimal pressure level on a BAP is a value within:

- 500–1000 gram-forces for a 2 mm tip,
- 600–1100 gram-forces for a 3 mm tip,
- 700–2000 gram-forces for a 4 mm tip,

To optimize the pressure on a point, you should occasionally dip the tip of the electrode probe into a cup filled with some cotton-wool that is wet with clean cooled boiled water or saline solution.

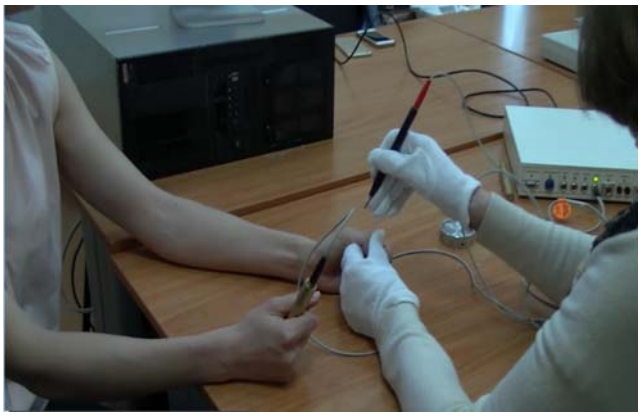
Work sequence

1. A patient takes the cylindrical electrode in one hand and places the other hand on a horizontal smooth surface (for example, on a table). To make measurements on feet points more comfortable, a special foot stand can be used.

Position of the passive electrode during Voll measurements

Position of the active electrode (probe)	**Position of the passive electrode**
Right hand BAP	Left palm
Right foot BAP	Right palm
Left hand BAP	Right palm
Left foot BAP	Left palm
Corporeal BAPs of the right side (including head and face BAPs)	Right palm
Corporeal BAPs of the left side (including head and face BAPs)	Left palm

2. During measurements on one hand, a patient holds the passive cylindrical electrode into contralateral hand (on the opposite side of the body). If the measurements are performed on feet, the passive electrode is placed into the ipsilateral hand (on the same side of the body). A doctor may hold the patient's palm or foot with his/her free hand, but in that case a doctor should wear a rubber or cotton glove. A patient's arm must rest against something (a table, for example). It is desirable for a patient to sit in front of a doctor, diagonally opposite.



3. A doctor determines the measurement point projection on the right hand using anatomical landmarks and embedded acupuncture atlas.

4. A doctor places the active measuring electrode on a BAP projection and gradually increases the pressure on the electrode, monitoring on the scale of the screen until reaching the measurement plateau (when pressure increase is not accompanied by value increase).

5. The measurement is performed no taking the electrode probe off. The duration of the entire measurement should not be less than 5–10 seconds when the value is steady-state. If the value decreases ("indicator drop"), the measurement continues until the value is stabilized.

6. During examination a patient should hold the cylindrical electrode in his/her hand even if the measurement process interrupts.

The active electrode is placed on end points located on phalanges of fingers and toes at an angle of 45° to the skin surface. To make measurements on distal points, an electrode should be leaned laterally or medially, with rotation of a probe. To make measurements on proximal points, an electrode is placed perpendicular to the skin surface.

To minimize the energy impact during electropuncture measurements, a doctor should touch a patient as little as possible.

The skin in the area of measurement point should not be too moist or too dry. Only an extensive experience can help to determine an appropriate degree of a skin moisture. It is impossible to express an appropriate degree of a skin moisture as a value. In case of excessive sweat in the BAP area it is necessary to wipe (dry up) the skin with alcohol solution.

BAP search

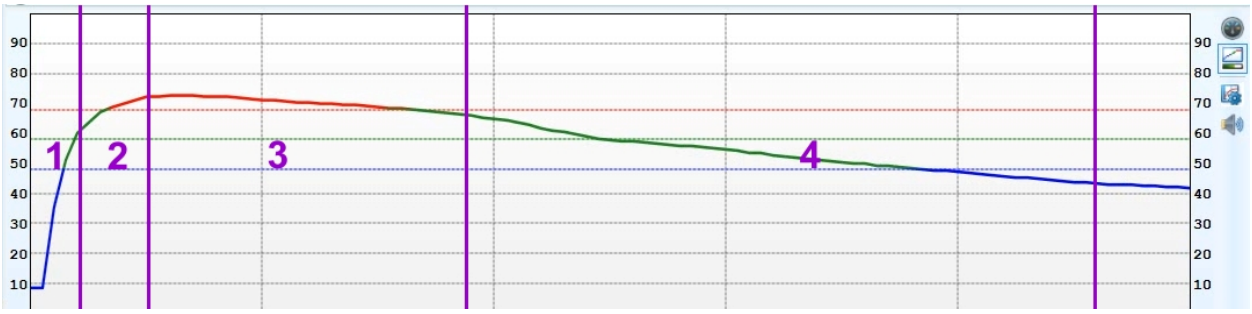
BAP diameter is approximately up to 6 mm, so you should count 2–3 mm for the point area itself and 2 mm more for so-called areal zone. Normally BAP is located in a bone dimple. To obtain accurate values, it is necessary to put the point electrode in the center of a point.

BAPs are located on energy channels (meridians), mainly in the deep skin layers, close to periosteum. To find a BAP, put the point electrode on the skin vertically in the BAP area (according to images in embedded anatomical atlas) and move it superficially in circular motion, without changing the force of pressure.

When you see the highest deviation of the indicator, this is the BAP.

When the probe is placed on the BAP, you should immediately and confidently increase pressure. You should not hesitate, because slow pressure increase leads to too low measuring value and excessively stimulates a point. This, in turn, results in incorrect values.

The determination process of correct measuring point value involves 4 phases.



Phase 1 — a rapid build-up of pressure on BAP with a probe until the deviation of the indicator clearly slows down.

Phase 2 — the pressure on the probe should not be increased. The pressure should remain unchanged adapting to this indicator rising.

Phase 3 — obtained value is read if deviation of the indicator does not change with increase of pressure on the probe.

Phase 4 — it is necessary to keep pressure and watch the indicator, whether “indicator drop” occurs (note the drop value).

At first, a medical beginner should learn to find end points of meridians (the very first points in rapid diagnostics), located in angles of finger and toe nail beds, on first phalanges.

These points are relatively large and lay superficially under the skin. You can easily localize them topographic-anatomically in order to use for diagnostics.

You can perform self-training as follows. Take in one hand both cylindrical electrode and electrode probe. Place your other hand on the table in order to use it for measurements. It is permitted to hold a cylindrical electrode in the measuring hand.

The interpretation of BAP measurement results

Scale readings (cu)	**Interpretation**
100	Acute generalized inflammatory (purulent) process
90–99	Acute catarrhal inflammatory process
82–89	Subacute local inflammatory process
66–81	Prepathologic organ or tissue system dysfunction
52–65	Zone of physiological function tension of an organ or a tissue system
50 ± 1	“Ideal” norm
42–48	Early stage of dystrophic process, dysmetabolitic disorders
32–41	Progressive dystrophic process
22–31	Destructive pathology with partial atrophy of cell structures of an organ or a tissue system
0–21	Total atrophy or malignization of cell structures of an organ or a tissue system

Doctor Voll R. developed empirically the scale described above. It enables to determine the energy state of a BAP (related organ). Besides, it is possible to draw diagnostic conclusion, analyzing values in BAP and quadrant measurements.

Doctor Voll's technique allows using for the diagnostics and electrotherapy the points, which were known in Ancient China, 4–5 thousand years ago. Besides, Dr. Voll opened new measurement points on meridians which are in direct connection with certain organs, tissues and systems.

The diagnostic values, obtained during BAP measurements, become crucial for a patient and a doctor. First of all, these values enable to determine either absolute health, or disease, or onset of a disease (latent stage). It is important because the earlier the treatment starts, the earlier it can be possible to prevent its further development. As a last resort, we can warn the patient that he/she has a disease or liability to certain diseases.

In other words, using Voll electropuncture diagnostics, a doctor is able not only to determine whether or not a patient has a disease, but also identify a predisposition to one or another disease. That is why an annual check-up with use of electropuncture diagnostics is necessary in order to prevent almost any disease. It is advisable to carry it out twice a year.

The phenomenon of "indicator drop"

Special attention needs to be given to the "indicator drop". To watch the phenomenon of "indicator drop", invariable pressure on the probe is required. This phenomenon mainly matters when values are higher than 50.

It is known already, that the normal range of BAP values is 40–65 units of the scale. Higher values indicate inflammation, lower values point to degeneration. However, degenerative processes in tissues and organs are often accompanied by inflammation. This may manifest in high values and "indicator drop". For example, the pointer goes down to 50 from 75 (initial value).

Therefore, emphasis should be placed on the phenomenon of "indicator drop".

To get the correct and reproducible value, it is important to carry out the following operations:

1. The point search.

2. The proper pressure on the probe.

3. The direction of the pressure on the probe.

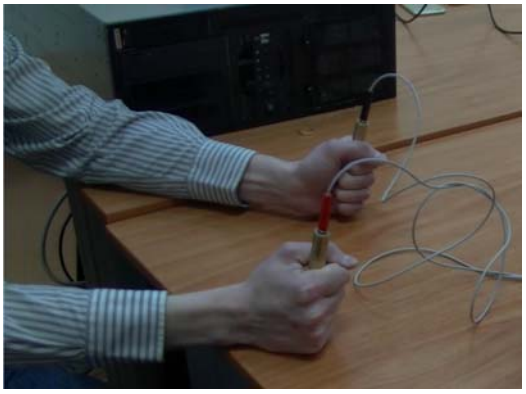
When the BAP center is found, you should gentle but fast push the probe end (placed at an angle of 45º to the skin surface) into the point on the line of channel, making a small rotation.

Once the correct level of pressure on the probe is reached, just keep pressure at a constant level and do not increase it by no means. In that case only you can watch a body reaction expressed as an "indicator drop".

The influence of age. Based on that BAPs in young persons are measured at normal pressure, it is not difficult to ascertain the following: for children it is sufficient to touch the point with a tip of measuring electrode (or with a special more thin electrode for children),

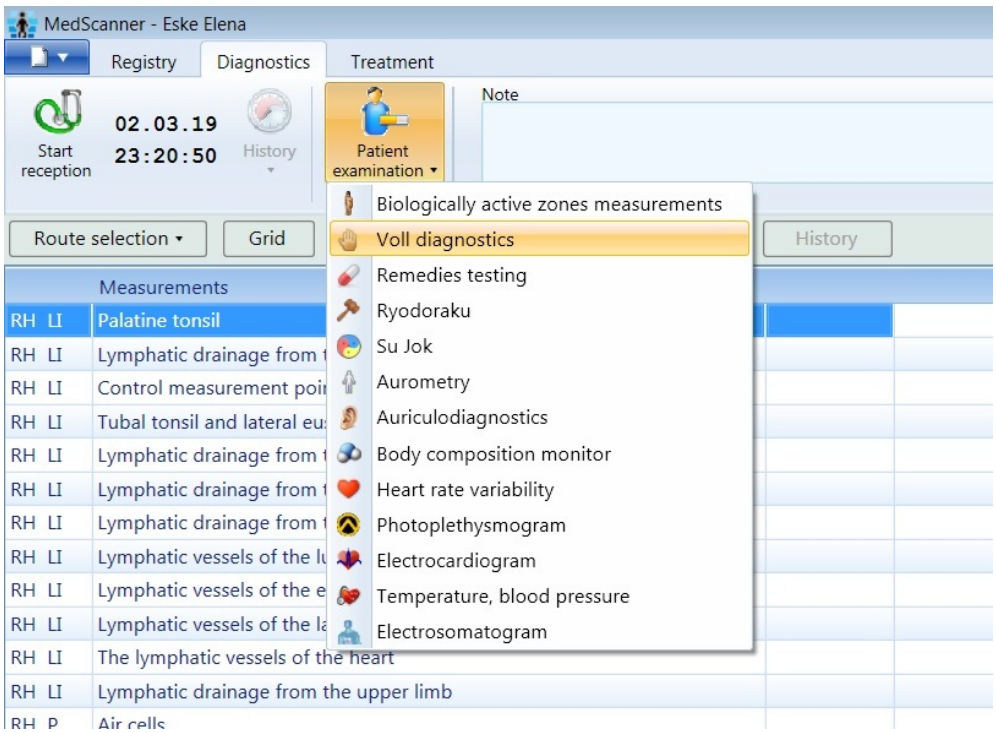
because their skin is very thin. With the age, the pressure must be heavier because skin is getting thicker and less sensitive. Examination of older persons requires a significant pressure sometimes, in order to reach BAPs located in the deep layers of skin.

Compensative therapy. In some cases, when diagnostics and especially medicine testing go wrong, and during quadrantic diagnostics too high or too low values are registered (below 82 or above 89), it is desirable to stop diagnostics procedure, move to the **Therapy** menu and **"roll-in" or "roll-out" the energy** (i. e. you should perform general quadrantic electrotherapy). The procedure is described in the "**Compensative therapy**" section of the present Manual.



Working with the program

Select a patient or register him/her in the **Registry** menu. Go to **Diagnostics** menu. Select **Voll diagnostics** in the **Patient examination** menu.



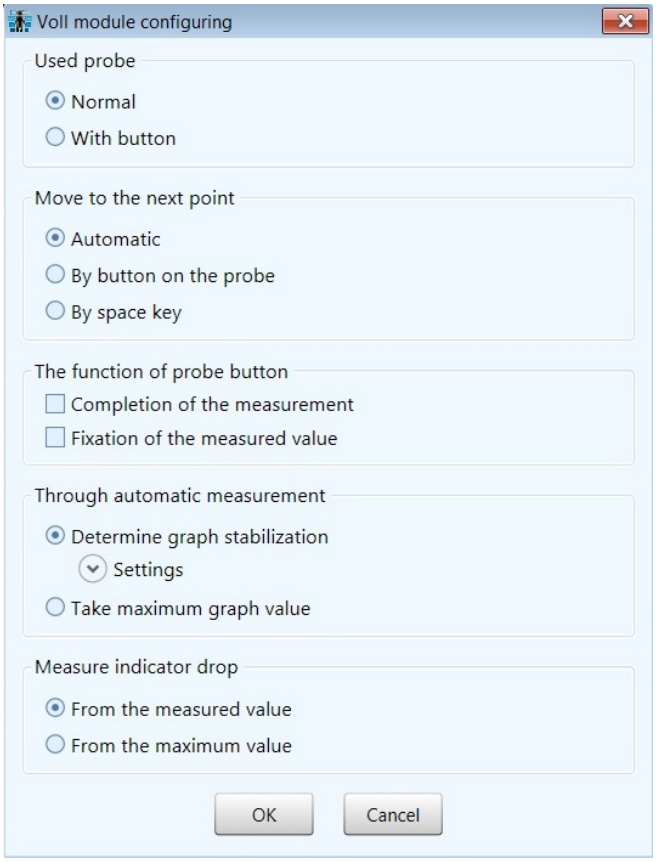
Connect a patient cable to the "BAP" socket on the front panel of *Medscanner*. Connect the black plug of a patient cable to the passive cylindrical electrode that a patient holds in his/her hand (opposite to the side of measurements). Connect the red plug to the probe that is set on

BAP. If you intend to use a probe with a touch sensitive button, connect it to the “Sensor” socket (in that case the red plug of a patient cable is not used; it is desirable to avoid its contact with the *Medscanner* or a patient). A 3 mm or 4 mm attachment should be on the probe.

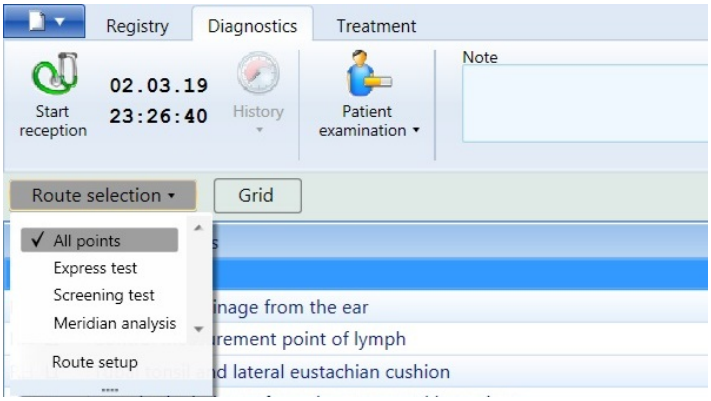
Click the **Settings** button. In the appeared dialog box select desirable probe type: traditional or having a touch sensitive button. Besides, select the way how the program goes to the next BAP during measurements: automatically after measuring is completed and the probe is taken off a BAP, by pressing of a touch sensitive button on a probe or by pressing of the **Space** key on the keyboard.

The *Through automatic measurement* setting allows selection of a measurement starting point. Either the program determines the beginning of a plateau (stabilization) on a graph and starts counting up from that value (by default the duration of stabilization is 1 s), or it is possible to set measurement counting up from the maximum value on a graph.

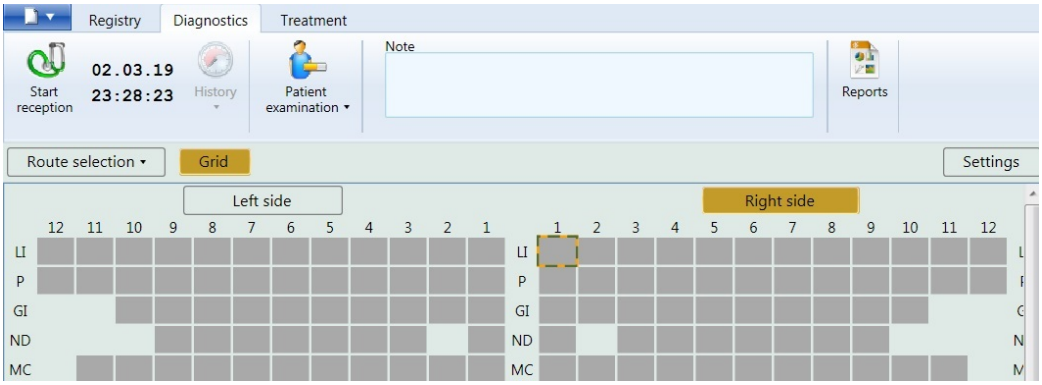
If the probe with a touch sensitive button is used, there is a possibility to set program actions when a touch sensitive button is pressed: either *Completion of the measurement* and automatic switching to the next BAP on a measurement route, or *Fixation of the measured value* (the data reading is continued that allows estimation of “indicator drop” value).



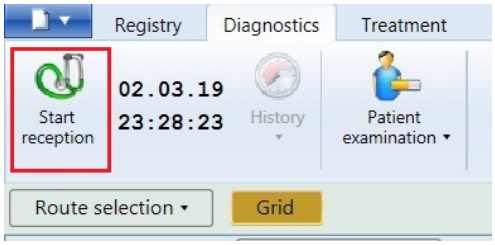
Select desirable route of diagnostics in the **Route selection** menu (a general list of BAPs intended for measurements).



The list of points can be displayed in two ways: either as a traditional list (by default) or as a grid (to select, click **Grid**):



Click the **Start reception** button in the upper right of the window:

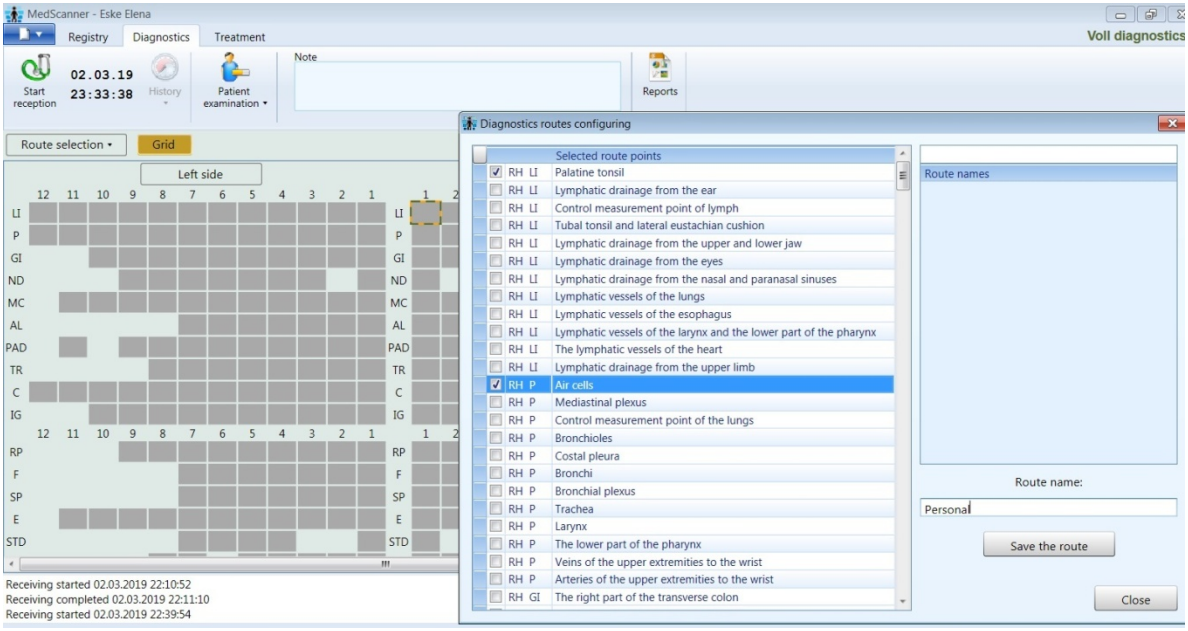


Select a point for a measurement on the BAP list. Press the electrode to the BAP, make a measurement. Sequentially going through the point list, make measurements on every BAP from the list (or on needed BAPs only).

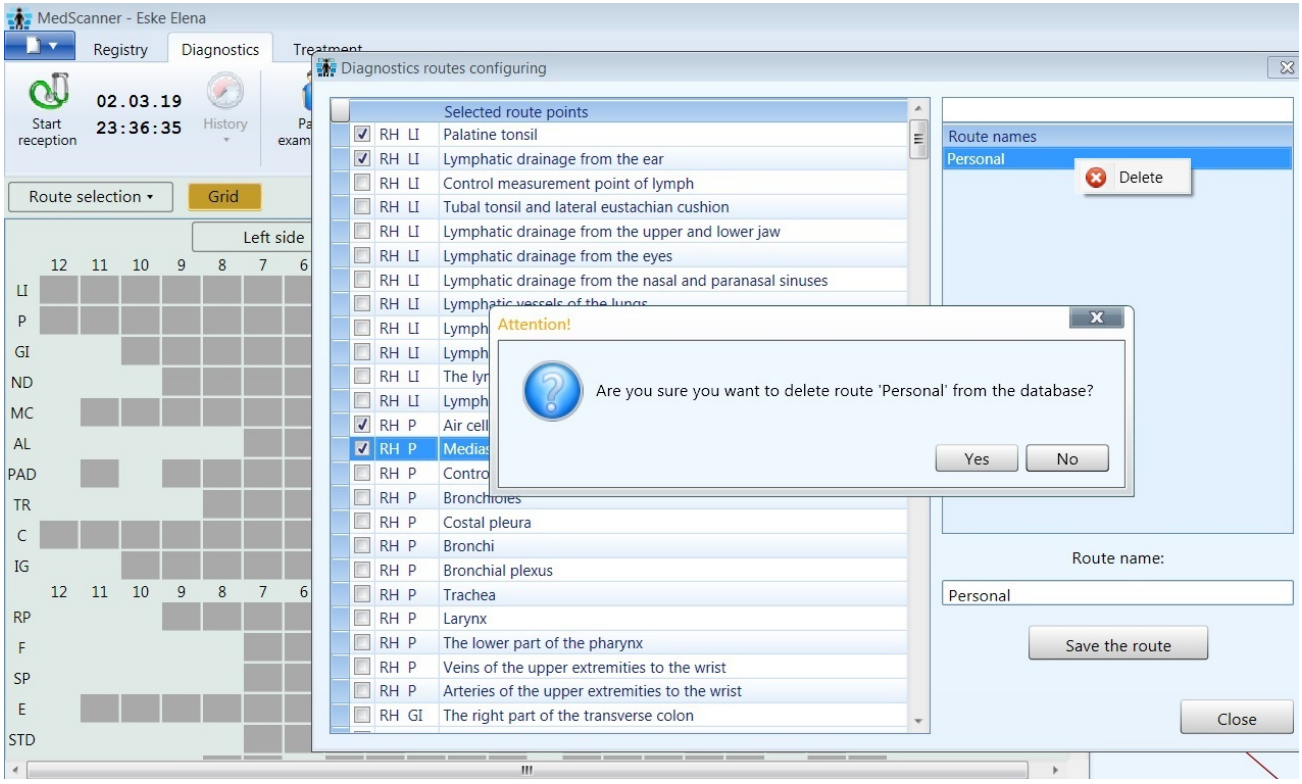
Voll diagnostics routes setup

Select **Route setup** from the **Route selection** menu.

In the appeared dialog box tick needed points for diagnostics, enter the name of a new route in the **Route name** box and click the **Save the route** button.

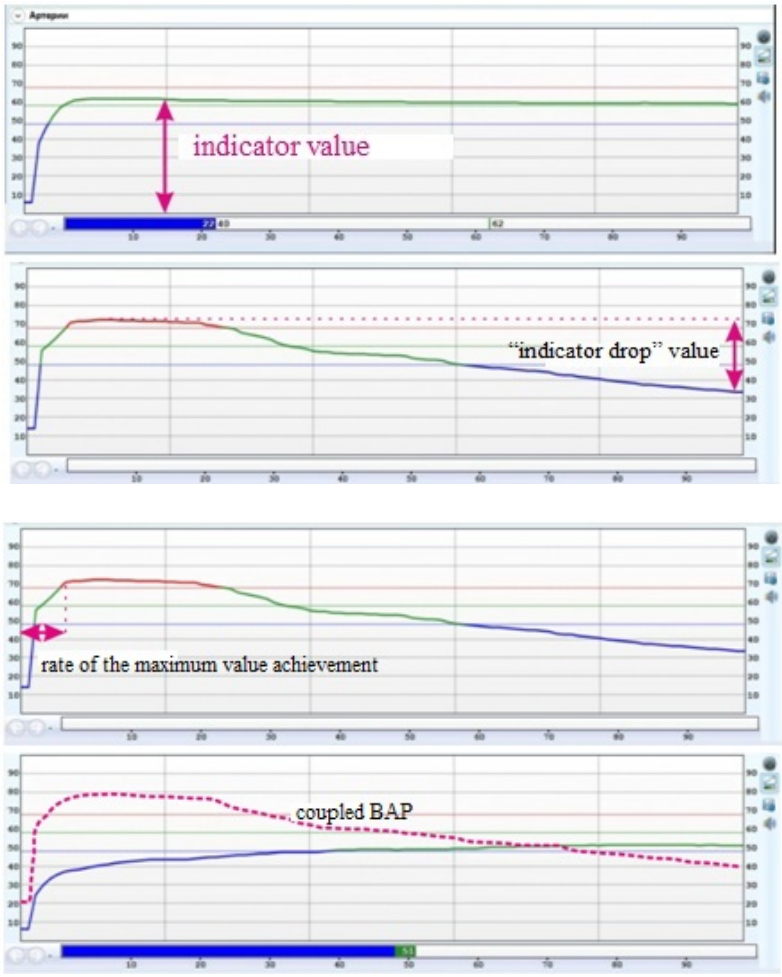


To delete the route, select it in the list of diagnostics routes, click with the right mouse button and select **Delete** in the appeared menu.



Interpretation of Voll diagnostics results

To detect any pathology during electropuncture examination, the following parameters should be considered: an indicator value, an “indicator drop” value, rate of the maximum value achievement, asymmetry of coupled BAPs values. Those parameters can be approximately evaluated from the graph of the measurement performed.



Interpretation of indicator values during Voll measurements

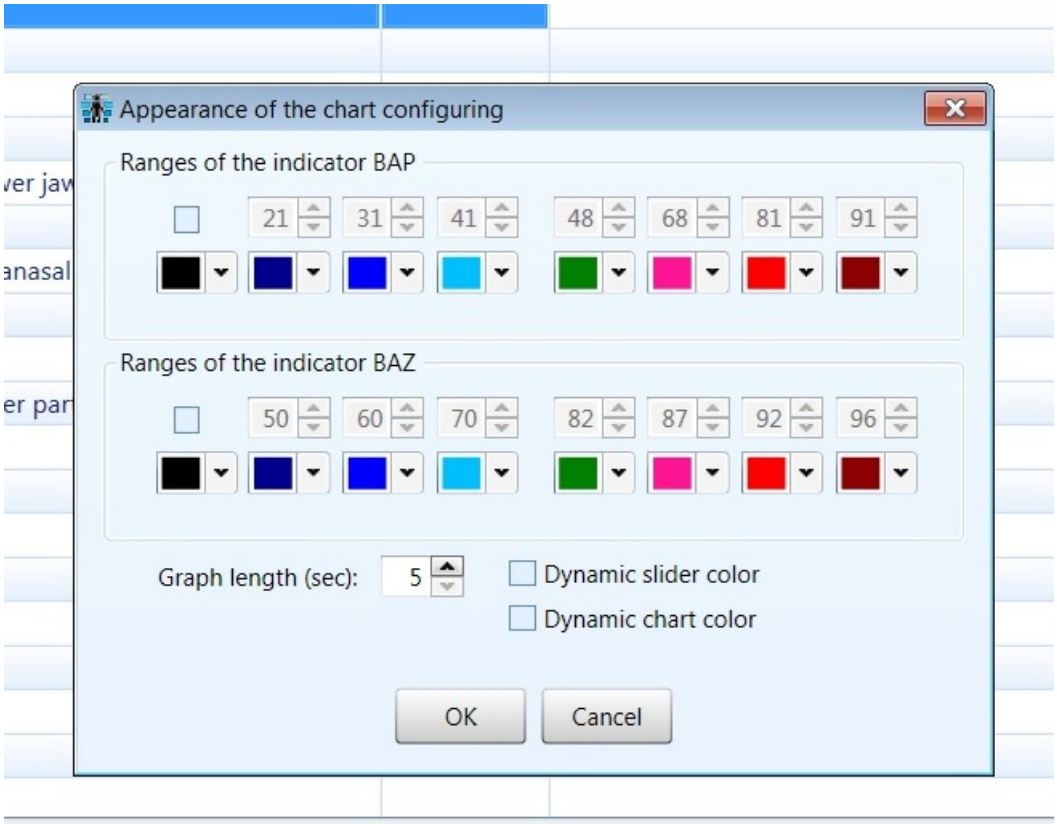
Values (cu)	Interpretation
100	Acute generalized inflammatory process (purulent)
90–99	Acute catarrhal inflammatory process
82–89	Subacute local inflammatory process
66–81	Prepathologic organ or tissue system dysfunction
52–65	Zone of physiological function tension of an organ or a tissue system
50 ± 1	"Ideal" norm
42–48	Early stage of dystrophic process, dysmetabolitic disorders
32–41	Progressive dystrophic process
22–31	Destructive pathology with partial atrophy of cell structures of an organ or a tissue system
0–21	Total atrophy or malignization of cell structures of an organ or a tissue system

Interpretation of "indicator drop" values during Voll measurements

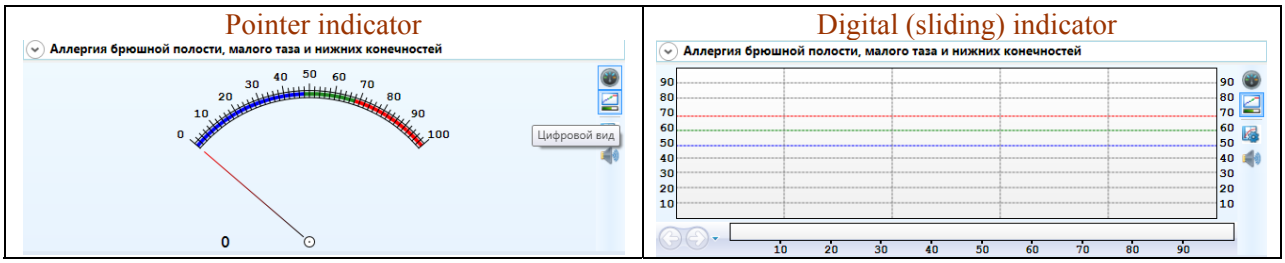
ID value (cu)	Interpretation
5–10	Latent (asymptomatic) disease course with a mild cellular destruction
11–20	Pathologic process with a moderate cellular destruction
21 and higher	Pathologic process with a significant cellular destruction
in the range of 50-100	Pathologic process with a possible regression, reparative function is retained
below 50	Pathologic process with a significant cellular destruction, reparative dysfunction, atrophy, fatty or cicatricial degeneration of organ cells
50–75	Dysfunction of autonomic nervous system or neurohumoral regulation, compensatory increase of cholinergic mediation, prevalence of inhibitory processes over processes of excitation

Information display settings

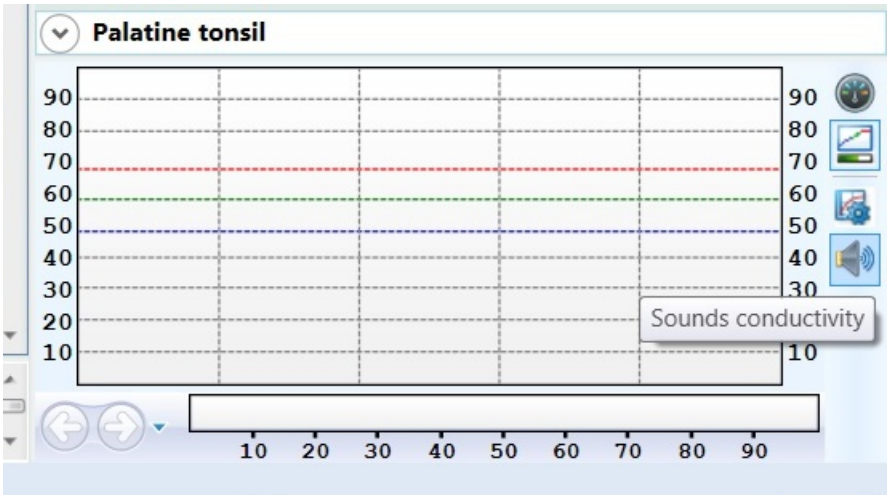
If you need to change measurement ranges for some reasons, you can do it through the dialog box **Chart setup**. Select corresponding values and color in the **Ranges of the BAP indicator** tab. Besides, you can use this window to change the length of displayed and saved measurement graph (in seconds) as well as the way of change of slider bar color (the color can change dynamically).



During measurements either the indicator pointer deviates (if the classic Voll indicator is used) or the slider bar shifts (if the more easy-to-interpret modern indicator is used). To change the view of a classic pointer indicator to more easy-to-interpret slider (and vice versa), click one of the corresponding buttons.

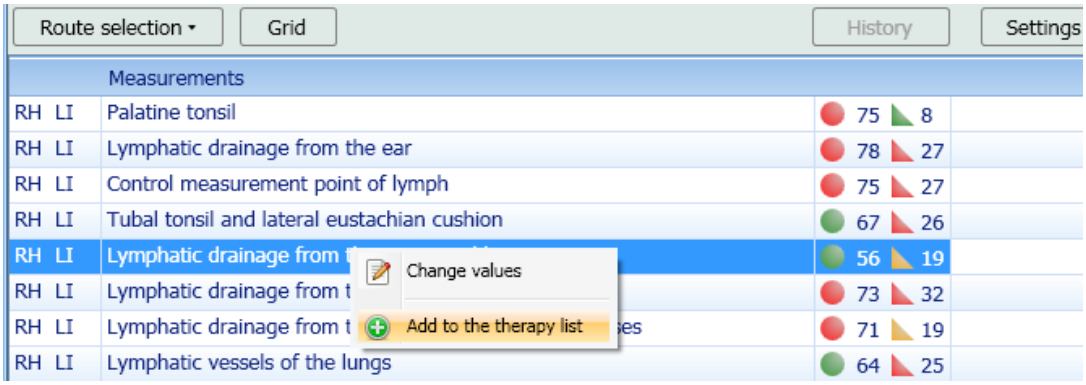


To turn on or turn off the sound accompanying a point conductivity level, click the **Sounds conductivity** button.

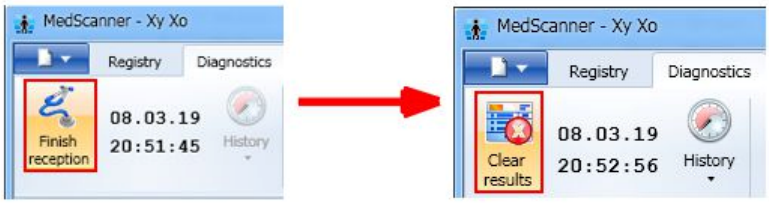


The more a slider or a pointer deviates from zero, the more frequency of sounds increases, that makes possible not to look at the screen during measurements of biologically active points. Experience has shown that for experienced users the background sound while working is an irritant, so sounds in the main menu during diagnostic process are turned off. To turn it on, click the button near a measurement graph.

When diagnostics is completed, click **Finish reception** button, view the measurements results. Then points or leads can be selected to add them to the **Treatment** menu for further therapy or to change values manually. To do that, click the needed item on the list with a right mouse button and select **Add to the therapy list** in the appeared menu.

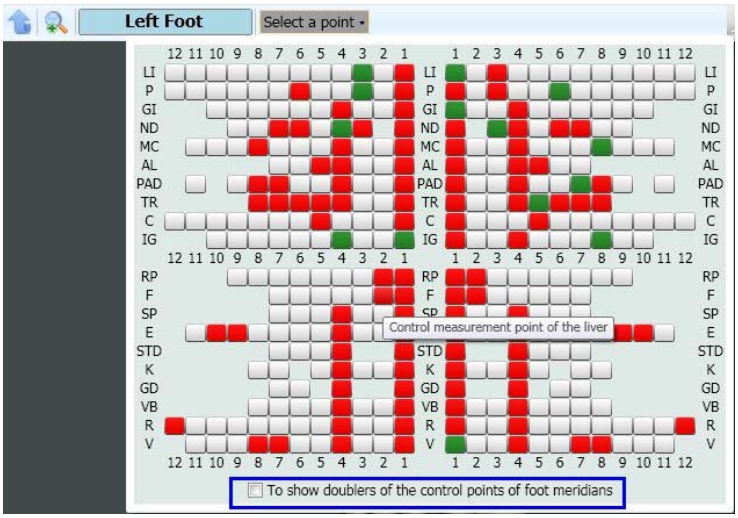


To finish the session, click the **Clear results** button. The examination results are transferred to the computer memory.



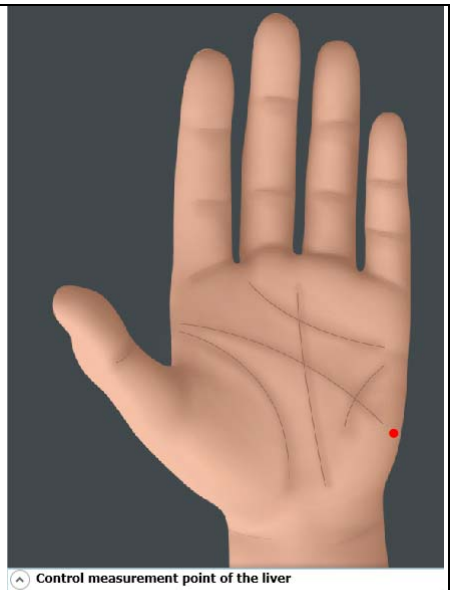
Projections of foot BAPs on hands

You can enable projections of foot CMP on hands in the **Select a point** menu above the image. The main difference between these and Voll's BAPs is they are localize not in bone dimples (as according to Voll's technique), but at the intersection of dermal ridges on palms.



Control measurement point of the liver

Integrated assessment of the liver condition as independent organ; but mainly secondary manifestations at the processes, influencing hepatic tissue.



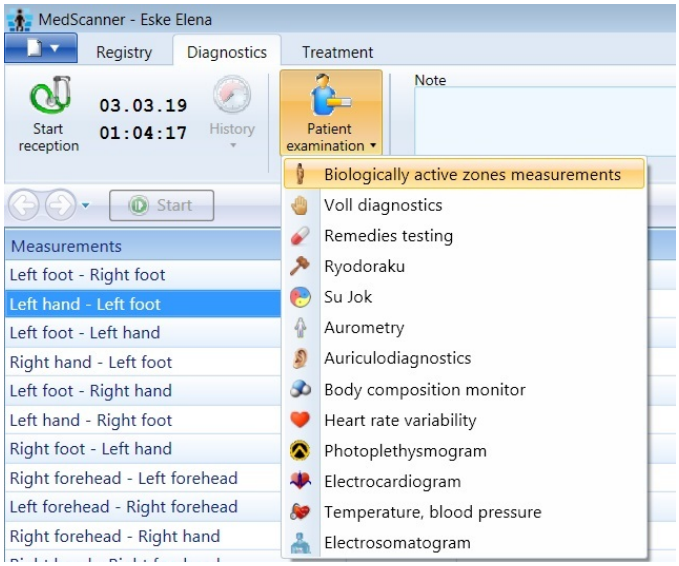
Control measurement point of the liver

Location: the point is located at the projection of the medial border of the proximal transverse palmar line, in the area of the intersection of this line and the medial palmar contour (the line that continues external contour of the 5th finger).

Below the figure it is also possible to call a short description of BAP.

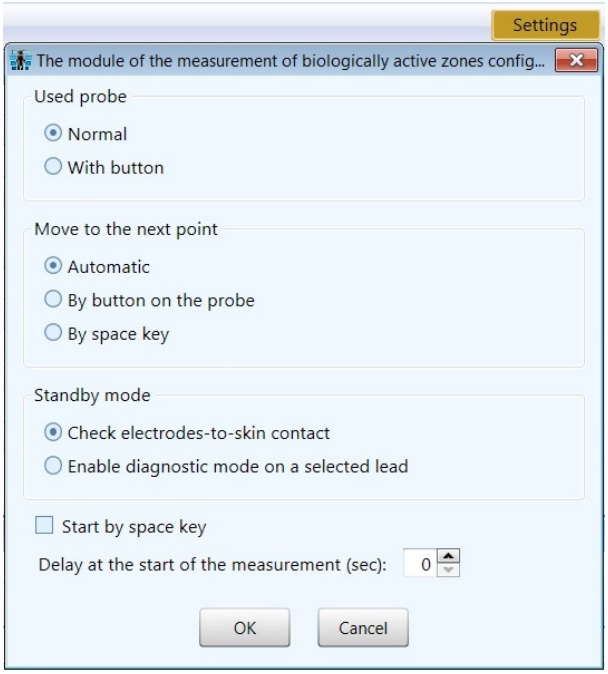
Hypothalamus BAP measurement

Select the **Diagnostics** tab. Select **Biologically active zones measurements** in the **Patient examination** menu.



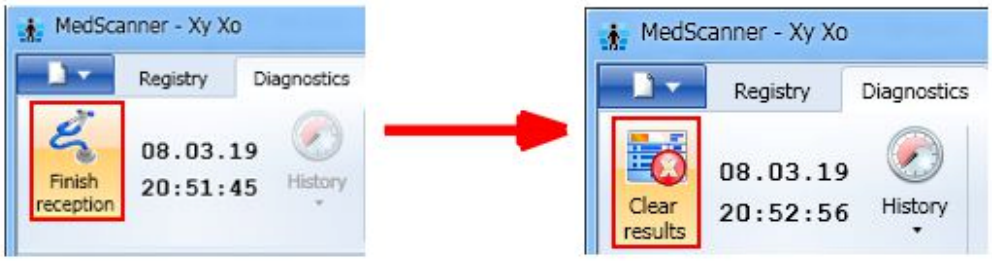
Connect a patient cable to the "BAP" socket on the front panel of *Medscanner*. Connect the black plug of a patient cable to the passive cylindrical electrode that a patient holds in his/her hand (opposite to the side of measurements). Connect the red plug to the probe that is set on BAP. If you intend to use a probe with a touch sensitive button, connect it to the "Sensor" socket (in that case the red plug of a patient cable is not used; it is desirable to avoid its contact with the *Medscanner* or a patient). A 3 mm or 4 mm attachment should be on the probe.

Click the **Settings** button. In the appeared dialog box select desirable probe type: traditional or having a touch sensitive button. Besides, select the way how the program goes to the next BAP during measurements: automatically after measuring is completed and the probe is taken off a BAP, by pressing of a touch sensitive button on the probe or by pressing of the **Space** key on the keyboard.



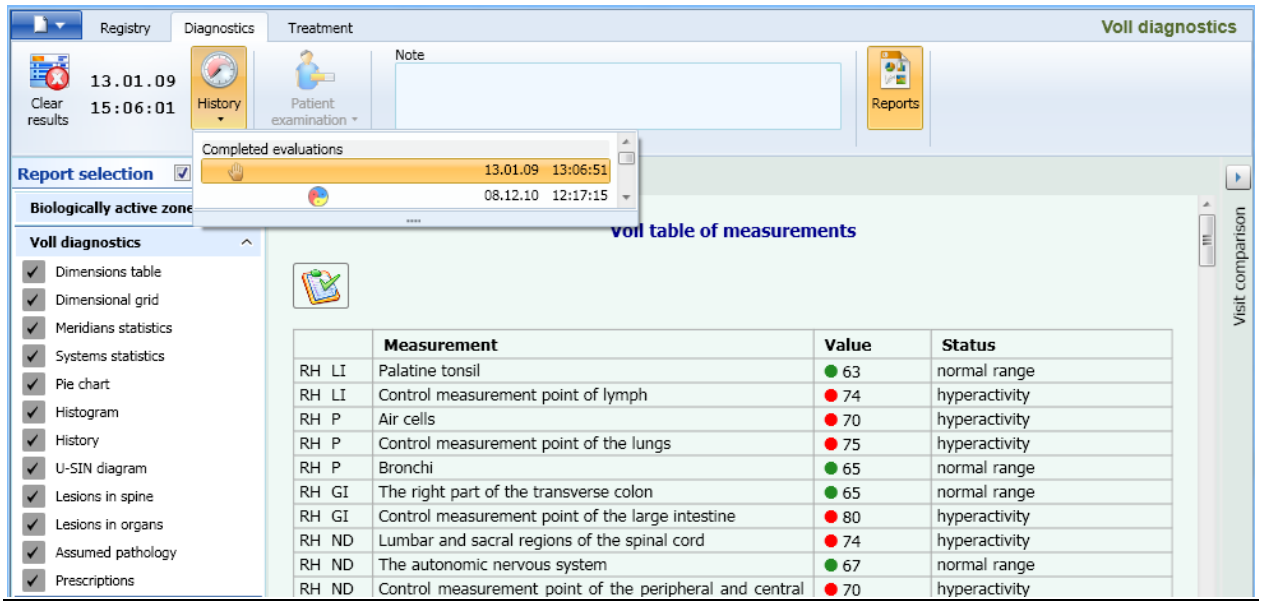
Select a point on the list of hypothalamus points for measurements. Click the **Start reception** button at the top right.

Press the electrode to the BAP, make a measurement. It is usually assumed that the normal range for hypothalamus points is within 78–82 cu. Upon completion of examination sequentially click the **Finish reception** and **Clear results** buttons.

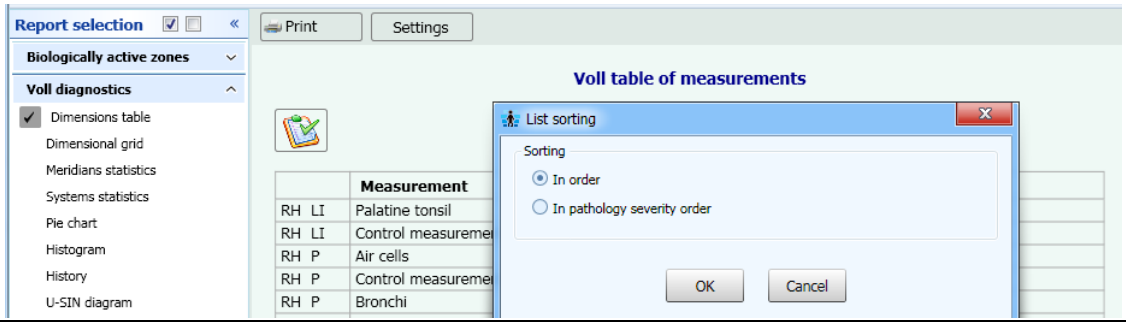


Voll diagnostics reports

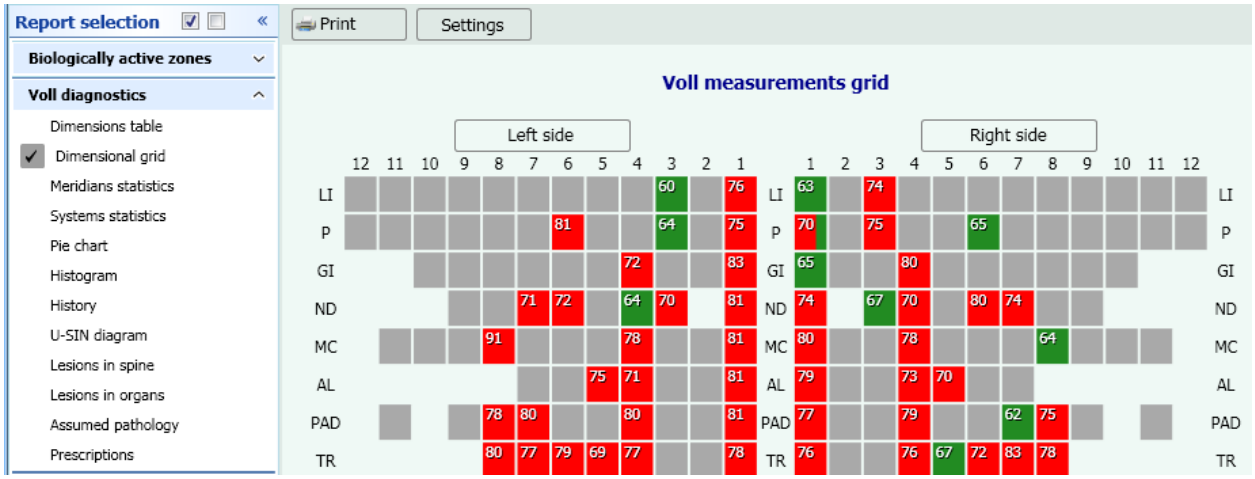
To view measurement results, click the **Reports** button on the right and tick relevant reports on the left after the diagnostic procedure. To view a history of visits, click the **History** button on the left.



To sort data in measurement tables, select the  button above and left of the table.

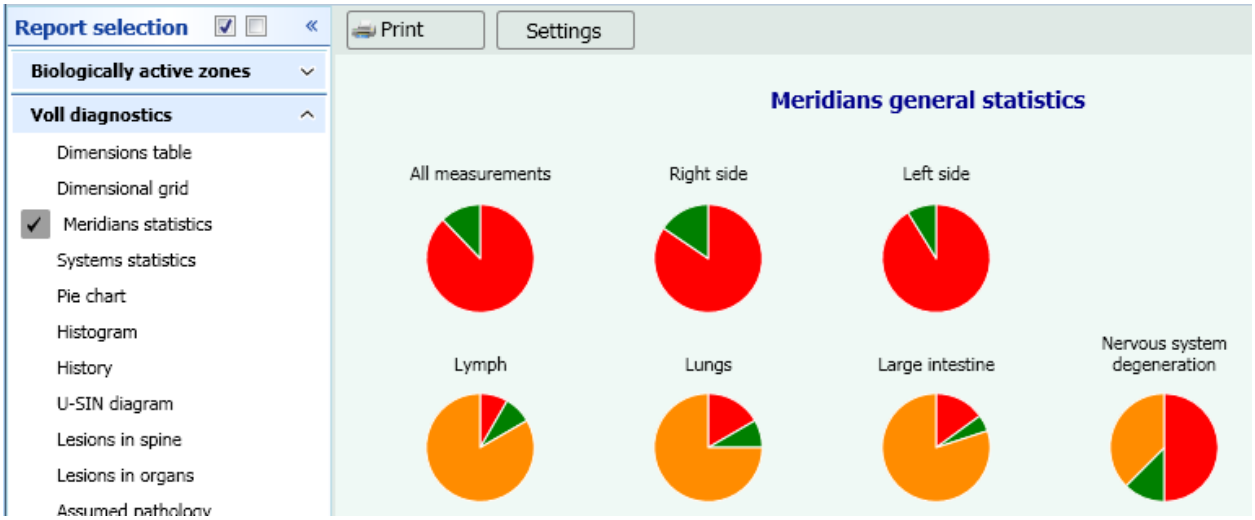


Dimensional grid shows measured BAPs.



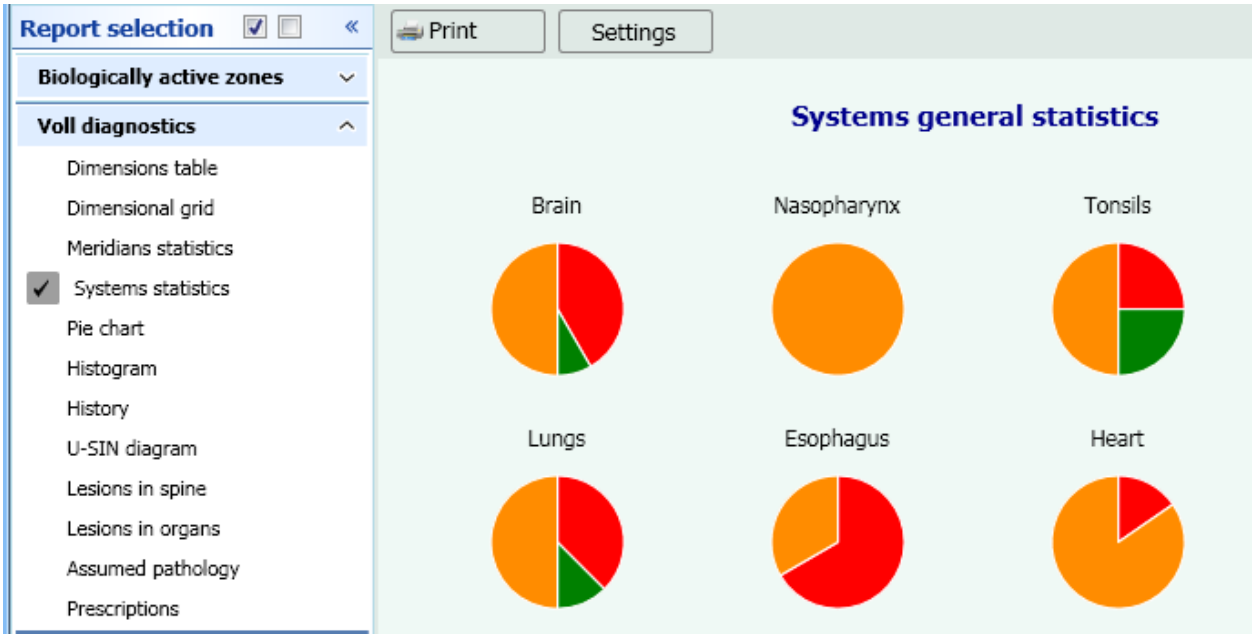
Statistics by meridians

The total number of measured BAPs and the ratio of normal and pathologic BAPs in every organ are presented in the form of pie charts. BAPs with increased level of energy are marked in **red**, BAPs with decreased level of energy are marked in **blue**. **Green** color indicates normal level of energy. **Orange** color indicates BAPs on which the measurements were not carried out.



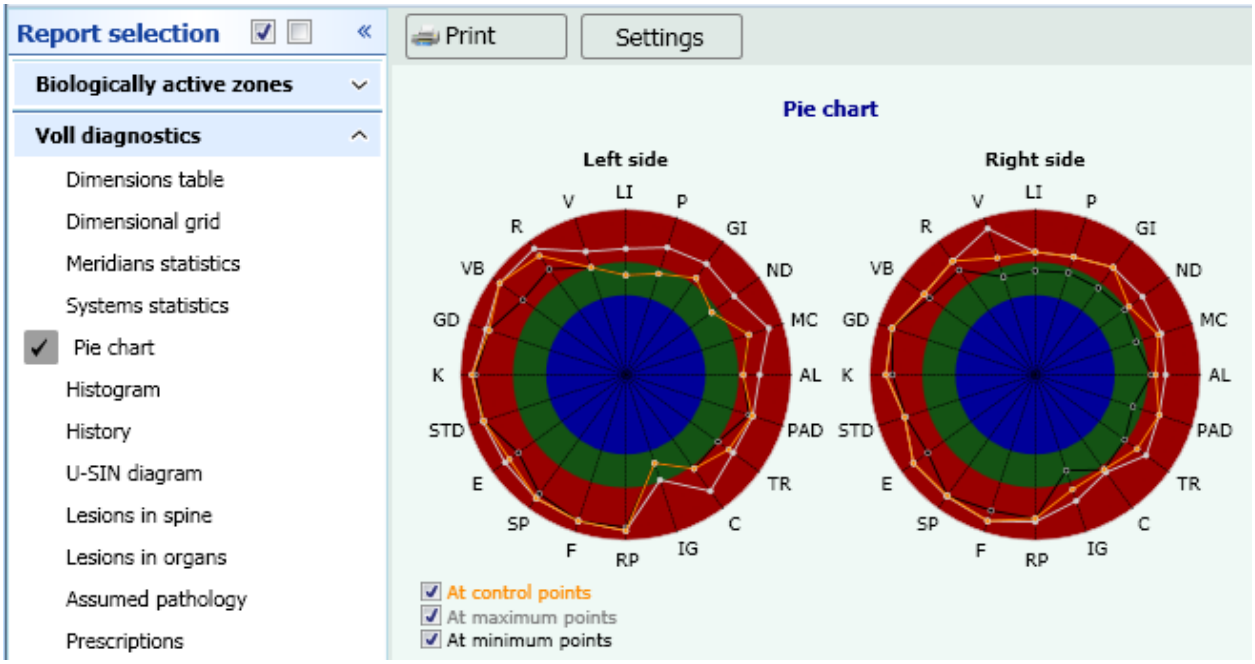
Statistics by systems

It is similar to statistics by meridians but it shows statistics by patient's organs and systems:



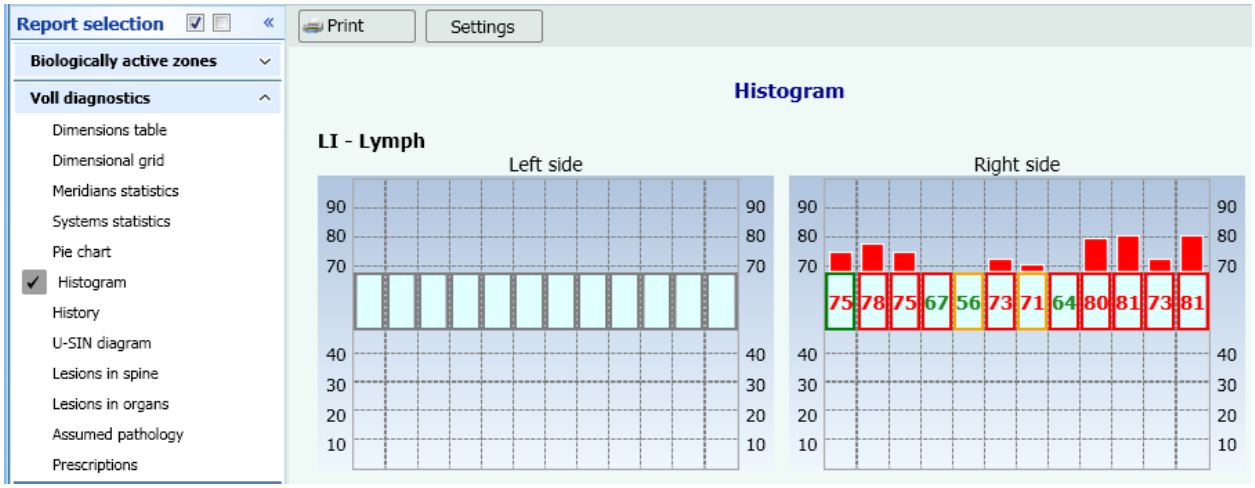
Pie charts

The meridians BAPs deviations from the norm are shown. It is possible to tick the display of pie charts on the graph by CMP, maximum and minimum points.



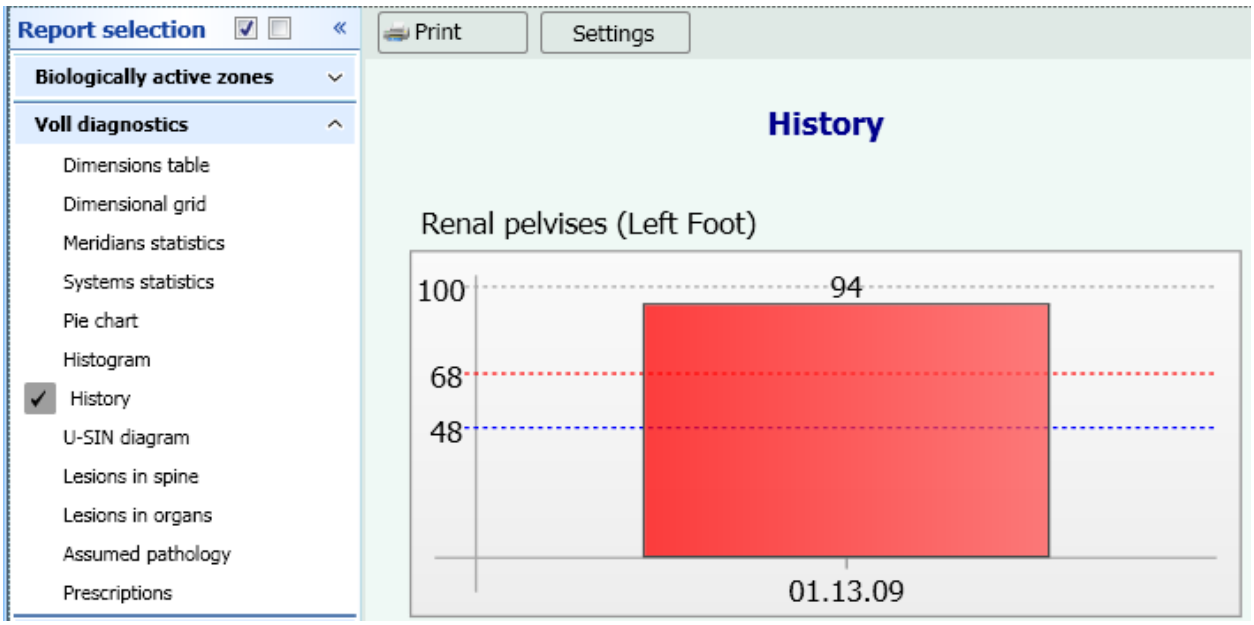
Histograms

The meridian BAPs deviations from the norm are shown indicating the numerical value for a BAP:



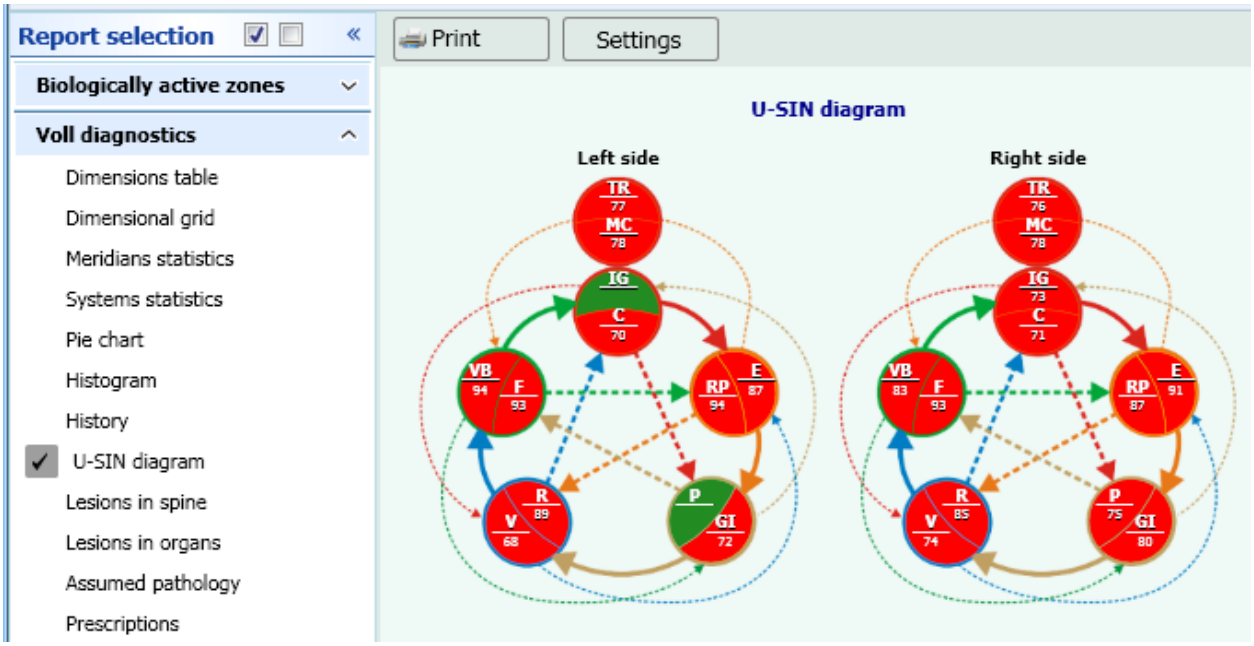
Dynamics report

Measurements on the worst BAPs are shown over the last five visits on different days.



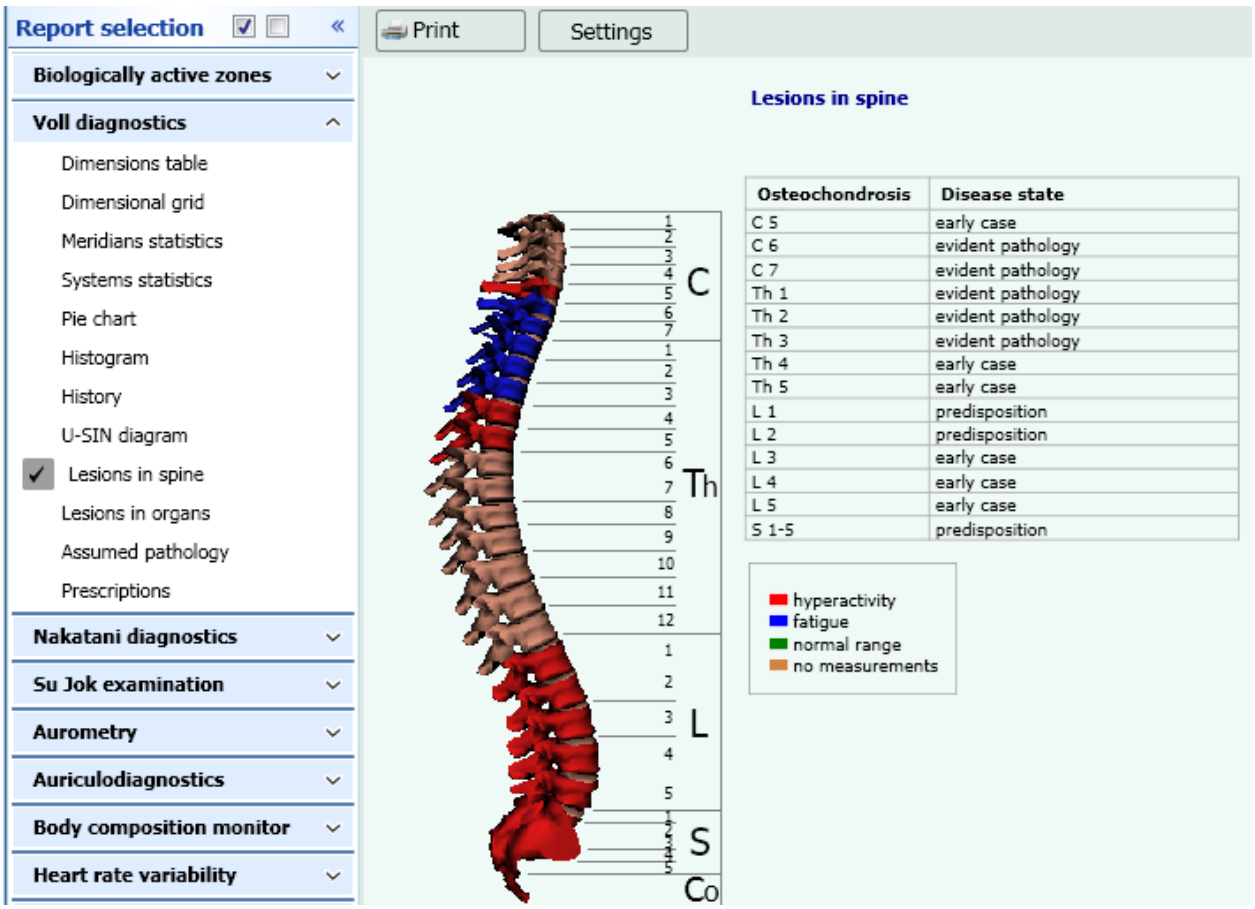
U-SIN diagram

Cycle of U-SIN (Wu Xing) Five Elements is shown.



Lesions in the spinal column

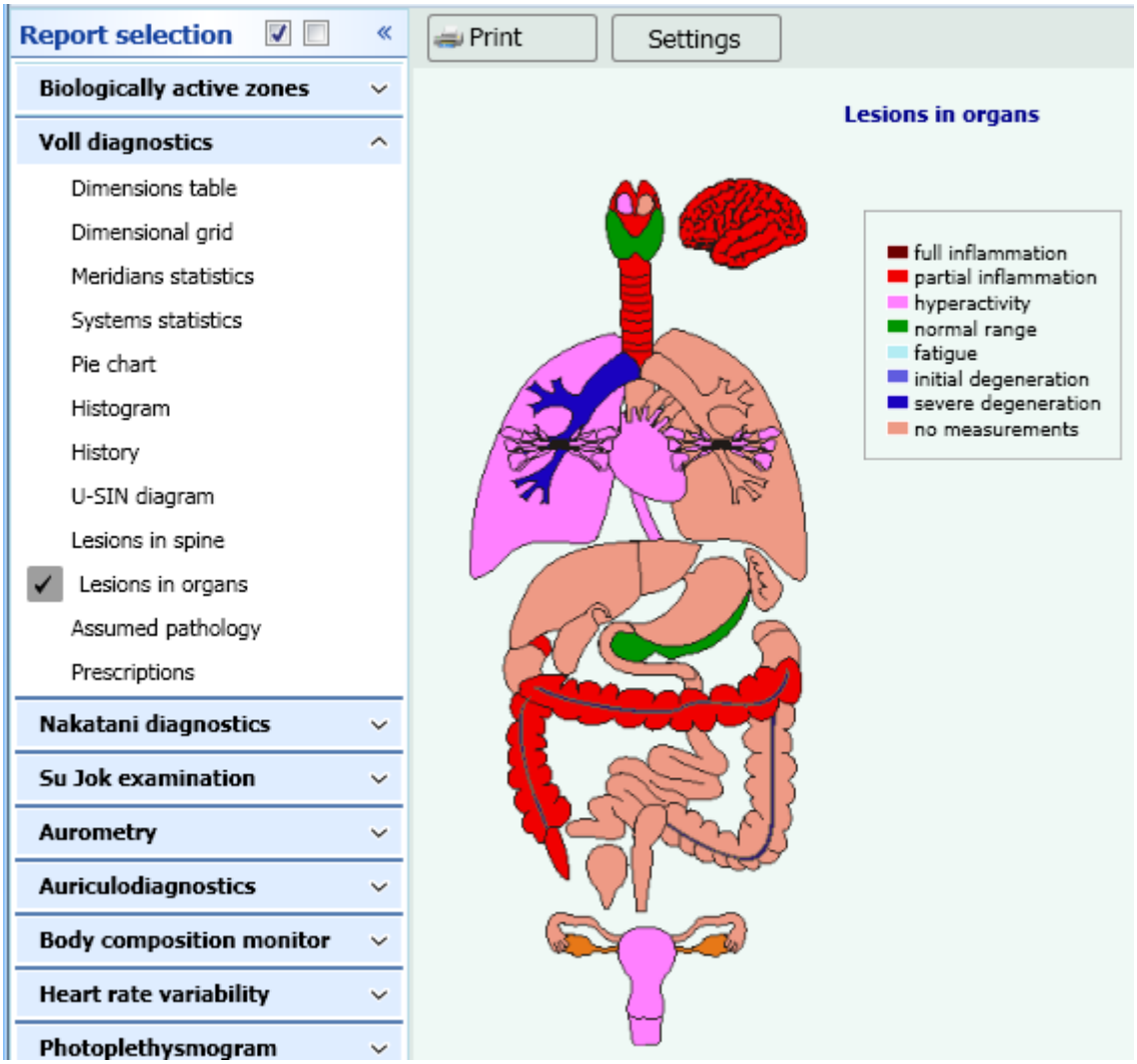
Spinal bones state is displayed to carry out further compensative electrotherapy (for example, using a roller electrode).



Osteochondrosis	Disease state
C 5	early case
C 6	evident pathology
C 7	evident pathology
Th 1	evident pathology
Th 2	evident pathology
Th 3	evident pathology
Th 4	early case
Th 5	early case
L 1	predisposition
L 2	predisposition
L 3	early case
L 4	early case
L 5	early case
S 1-5	predisposition

Report on organs

Illustrative visualization of a patient's general health status:

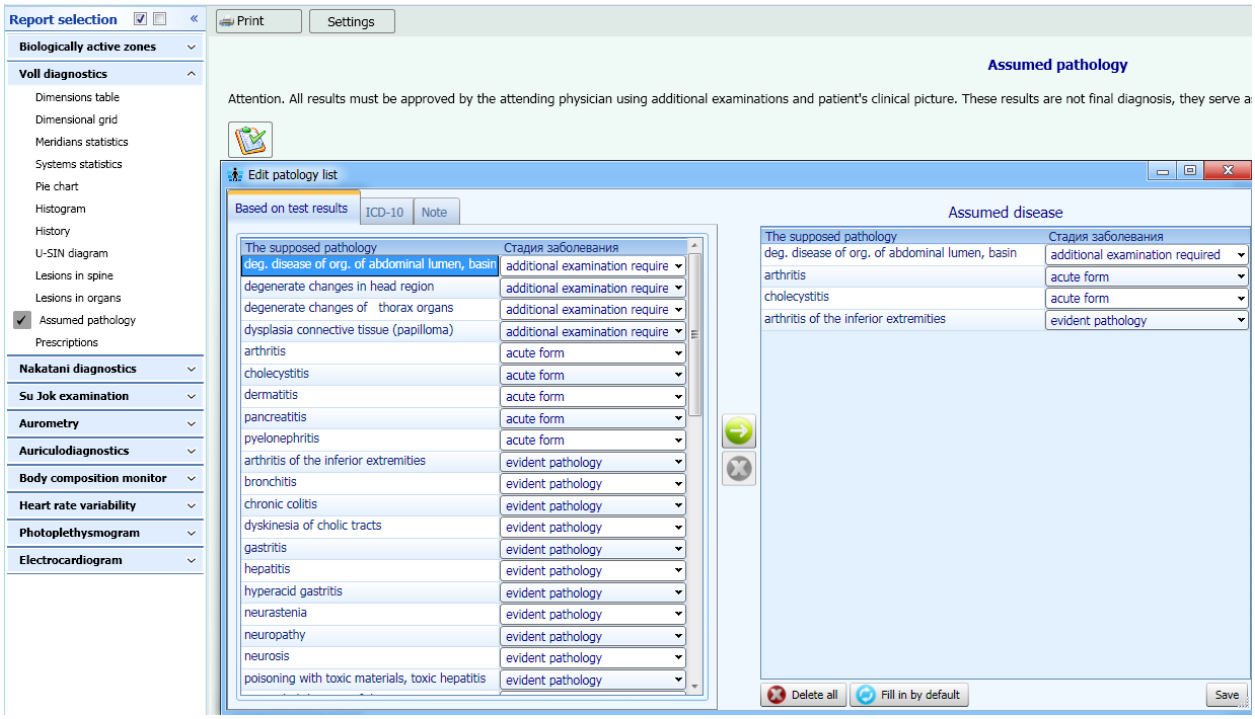


Editing of obtained results

After diagnostics the program issues estimated values for revealed pathologies and recommends prescriptions. These results can be edited by clicking the  button above and left of tables.

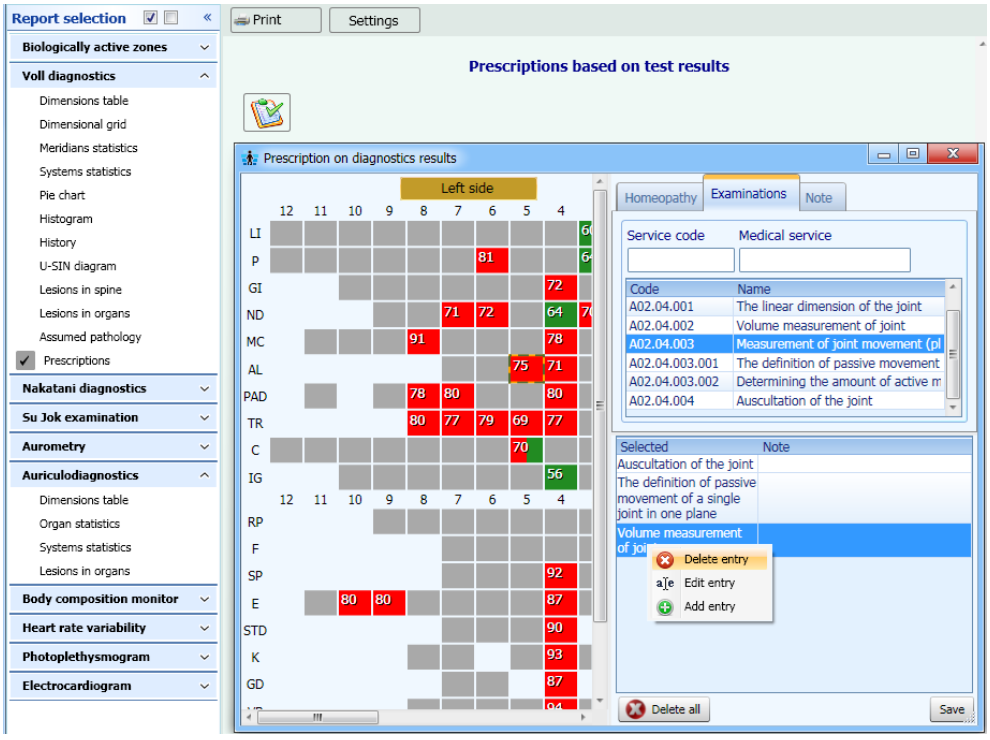
Editing of presumptive pathologies list

In this window you can edit presumptive stages of a disease, add diagnoses and pathologies from ICD 10 (then they appear in separate table in a report) as well as add a comment to the certain examination by mouse double click. After changes are made, click the **Save** button at the top right of the window.



Editing of prescriptions

This window is for editing of medicines and examinations prescriptions that are recommended by the program. You can also add a comment: both to the certain item and to all prescriptions at once.



Recommended medicines should be ticked; examinations from the range of medical services can be selected on the list. To add a comment, double click the line of a selected medicine or an examination. To delete unnecessary examination or edit it, click the line with its name with the mouse. After changes are made, click the **Save** button at the bottom right of the window.

MEDICINE TESTING (FOR *MEDSCANNER BIORS*; *MEDSCANNER BIORS-01*; *MEDSCANNER BIORS-02*; *MEDSCANNER BIORS-03*; *MEDSCANNER BIORS-04* EMBODIMENTS)

Dr. Reinhard Voll found that medicines and other substances (jewellery, nail make-up, cosmetics, clothes, food, etc.), contacting with human body, influence on BAP measurement results. That discovery marked the beginning of a new concept in electropuncture named medicine testing. Dr. Morrel tried to explain physics of medicine testing and found the influence of tested medicines on erythrocyte sedimentation in numerous experiments. Sedimentation improved by 20–40% once a suitable medicine was administered to the human body.

Medicine testing is performed on the worst BAP previously identified. First an initial BAP measurement without medicine (no load) is made. Then the testing medicines in desirable potencies are included to the measuring circuit and measurements are repeated in order to determine the BAP reaction to the included medicine. Quantitative and qualitative medicine dosing is considered complete if it leads to improvement of unsatisfactory BAP values (more than 65 or less than 40) to normal value (50) and "indicator drop" value lowering. It is not advisable to perform medicine testing using more than three remedies on one BAP (a point is inactivated, become "exhausted"). If a point is inactivated, another BAP should be selected (from the worst BAP list as well) and testing should be continued.

In homeopathy the following **dilution scales** are usually used:

1) A decimal scale, which is labeled with **D** or Roman numeral **X**;
2) A centesimal scale, which is labeled with **C** or **CH**;
3) A mil scale, which is labeled with **M**;
4) A fifty thousand-scale, which is labeled with **LM** или **Q**.

If a homeopathic remedy in the database has not certain potency, it means that the medicine is recorded with classical potency **C3**.

The **1M** potency indicates **C1000** potency.

It is very difficult for a doctor to learn medicine test by carrying out the self testing. It is necessary to involve another person for the practice. To do that, a doctor sits down against a patient and searches corresponding BAPs. Before the procedure, it is necessary to wet a probe slightly and remove excess moisture. Water excess on a probe increases skin electrical conductivity. Therefore, the patient's body must be free of visible water drops.

During the testing the passing current is measured. Changes in electric current value directly depend on resonance effect between exogenous current, passing from device through the human body, and endogenous current, passing through the body "channels". Resonance increases the current magnitude while dysresonance reduces it. The closer is exogenous (from the *Medscanner*) current frequency to that of endogenous current, the higher is resonance probability. And the higher is resonance probability, the sharper is positive-going slope. All other phenomena (plateau and "indicator drop") also depend on resonance duration. It shows how long the body can keep the endogenous frequency equal to exogenous. The amplitude-

frequency characteristic of current from *Medscanner* does not change while the graph changes, which indicates changes of internal conditions of resonance existence.

Dr. Voll recommended distinguishing three steps during testing:

1) Placing.
2) Pressure build-up.
3) Keeping.

1. Placing: a doctor localizes a BAP using the probe and fixes the probe.

2. Pressure build-up: a doctor shifts glance from the probe on the BAP to device scale and increases pressure on the probe applying slight acceleration in moving start and probe rotation in moving end. Device indicator can show high values. Let us assume that indicator shows 70.

3. Keeping: it is necessary to remember a pressure level on the probe. The pressure should be the same in further measurements.

Even slight pressure on the probe causes BAP micro trauma. Therefore pathological pressure on BAP makes further measurement useless until the BAP restores.

It is necessary to learn how to determine the correct value when a probe presses on BAP with minimum effort, otherwise the most important phenomenon ("indicator drop") could be missed.

It may be that all medicines cause indicator rising to 50–55 after determining of diagnostic value of 70 (assumed), and device shows the same values without medicines. It is evidence of BAP inactivation due to excessive pressure on it.

If a doctor appropriately performs the testing procedure, the following process is observed. So, the device shows 70. The probe should be removed from the skin surface. Select the needed medicine from the *Medscanner* database or place a substance (homeopathic granule, tablet, vial, piece of food, etc.) into the cup. The probe is applied again to appeared cavity on the skin in the place of tested BAP with the same pressure and at the same angle. If the indicator rapidly reaches the same position of 70, that medicine is not suitable for the patient and must be set aside. If the indicator shows position below 40, the medicine overburdens the patient, it is actually harmful. If the device indicator slowly moves to the level in the range of 40–65 during another medicine testing, this medicine is suitable for the patient.

Insufficient pressure and BAP overexcitation are not allowed during the procedure. The slightest signs of indicator slowing down or value decrease should be noted. Thus, eventually medicine that causes energy balance will be found, i. e. we will watch slow moving of indicator to the level in the range of 40–65 on the device scale. This is the medicine testing. During BAP retest, when the tested medicine is removed from electric circuit, the indicator should show 70 again. It is necessary to remember that multiple measures (more than three) on the same BAP during testing process can inactivate (exhaust) it, even if pressure on the probe is correct. During training process it is necessary to learn to sense the pressure level that injures a BAP if exceeded.

Of course, many things depend on operator because each operator has his own rhythm of pressing. For some operators the standard positive-going slope is 0.5 s while for others is 1.1 s. For testing purposes each operator should find his own individual rhythm to reach the "plateau" during "neutral" medicine testing. Neutral medicine is empty testing cup or standard Voll point

testing. Thus we can “calibrate” ourselves: connect the empty cup to circuit and perform pressures: “one... two...” Once growth of “standard” 0.5 s is reached, it is necessary to start testing and connect medicines. Testing clarifies all: if a slope increases more rapidly, we should pay attention to the certain medicine. If a slope is within norm, then we should continue, etc.

Procedure of medicine testing

1. Perform measurement without medicine in order to determine initial BAP parameters.

2. Put a medicine into the testing cup (connected to both *Medscanner* “Reprinter” sockets) or make a contact between testing substance or object and skin in any way.

3. Perform measurement on the same acupuncture point very gently, applying similar pressure level on the probe.

Signs that the medicine can be considered effective for the treatment:
a) “indicator drop” value is decreased significantly or completely absent;
b) initially measured BAP value improves to 40–65.

4. Selection of the medicine amount (1, 2, 3 tablets or other potency) depends on whether values change to normal. If the value begins to rise (i. e. worsen) when medicine amount is increased, then the previous amount of medicine should be left in the cup with the subsequent testing of an additional medicine.

For evaluation of the body response to a medicine, a graph is displayed on the screen. It allows evaluation of the positive-going slope rise speed, length and shape of the plateau, as well as an “indicator drop” value. It is necessary to gain experience in order to learn how to recognize required moments in the graph.

The graph is saved completely in the **Recipe** window. The comparison of two graphs (measurements with and without medicine) is the basis for a decision on medicine influence on the body.

The interpretation of a graph parameters. To better understand the processes in human body, the graph values are interpreted in the order of increasing importance. The first thing to consider is a positive-going slope (1), then a negative-going slope (3). A plateau value (2) does not play a special role during medicine testing.

1. *Positive-going slope (a graph from the moment of pressure).* The body encounters with information for the first time, and its response to this information allows assessment of the body's compensation abilities, reactivity and level of possible effects of the tested substance on a human body. If the slope is sharp, the body is "familiar" with this substance. Depending on the slope characteristics, it is possible to assess how the body deals with this impact (and other aspects). Initial slope is not a random process although it has some dependence on pressure on the probe. Therefore it is better to apply the rhythm of stepwise pressure, make kind of "self-calibration" in order to press the BAP with the same intensity and watch slope changes against that background.

2. *Plateau value allows evaluation of the overall health of an examined person but not characteristics of the substance.*

3. *Negative-going slope is a line after reaching the plateau (or "indicator drop" according to Voll).* With data from positive-going slope, it is detailing of the body response and level of its compensation regarding tested substance.

Therefore, it is possible to perform testing and selection of a large variety of medicines which are consistent in the therapeutic action to the patient. Most important, the "indicator drop" phenomenon should be eliminated, and improvement of the value is the second most important goal. If you add an additional medicine and after that values rise above 65 or decrease below 40 (together with "indicator drop" value increase), that remedy is unsuitable for the treatment.

When testing infectious agents, it is necessary to know how to discern what exactly caused the current condition: immunity disturbances or microorganism virulence, since our life environment is not sterile and we always interact with many infectious agents. Virulence of infectious agents to immunity defense ratio determines whether we response to infection or not.

Usage of medicine testing

Medicine testing is intended for the individual selection of homeopathic and allopathic medicines, recording of electronic medicine copies to the database and detection of allergens and substances (such as environmental toxins, cosmetics, perfumes, jewels) that may have some undesirable impact on the body.

Medicine testing is registration of changes in electropuncture parameters when a tested substance is included into the passive electrode circuit. For this purpose, a duralumin cup is used that connects to the tap from the "Reprinter" socket.

Testing of homeopathic remedies is the most extensively developed, but it is possible to test minerals, metals, organopreparations, etc.

Program allows testing certain medicines as well as carrying out treatment with medicines that improved acupuncture point state during the testing.

Medicine testing procedure

It is advised to perform Voll diagnostics before testing. In case of too high or too low values it is necessary to carry out procedures for energy alignment (e. g. electrotherapy).

Before each procedure of medicine testing the container should be thoroughly washed with flowing water. Then clean the container with a wipe or a swab soaked in alcohol solution and let it dry. Small amount of medicine (10–30 grams or 1 tablet for tableted dosage form) is enough for testing and biotransference. The medicine should be placed into the cup without package, i. e. powder without bag, tablet without blister, etc. Fluids are placed into the cup inside of a glass or glass vial.

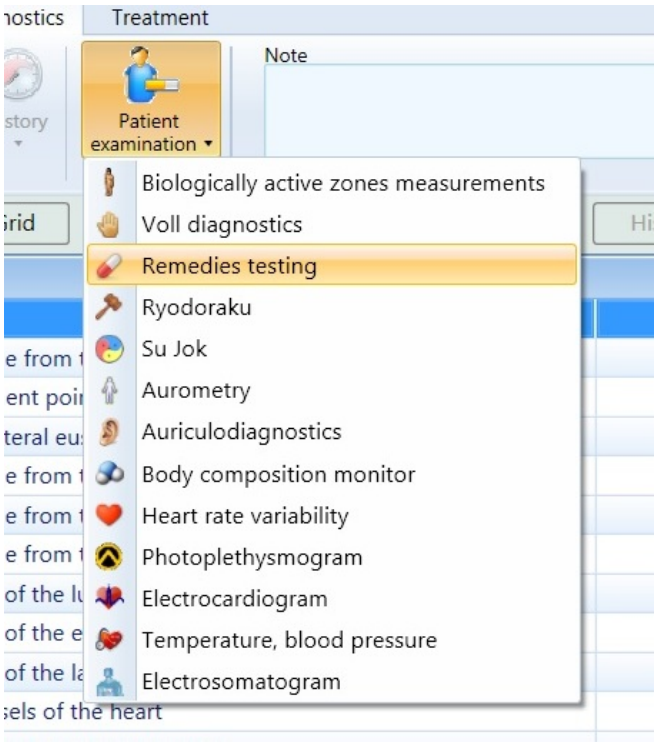
After diagnostics a list of medicines recommended for treatment is issued. It is advisable to test these medicines for patient compatibility in order to select the most suitable ones and reject ineffective medicines. To do that, choose one of two ways:

1. Testing of medicines from the database. It is the most convenient way, since "actual" medicine presence is not required because its energoinformational copy is used. Cup is not connected because the medicine is included into human bioenergetical circuit from the available database. Examination is performed by pathologies revealed. For example, if abnormalities on measurement points of large intestine meridian are found, Nux vomica medicine is selected in *Homeopathy* section of the database, and second measurement of revealed pathological BAPs is performed.
2. Tested medicines, minerals, jewelry, etc. are placed in the cup which is included into the human bioenergetical circuit by connecting to both "Reprinter" socket contacts of the *Medscanner*. Examination is performed by pathologies revealed. For example, if abnormalities on measurement points of large intestine meridian are found, Nux vomica homeopathic medicine (10–30 granules) is placed into the test cup, and second measurement of revealed pathological BAPs is performed.

Medicine testing is considered successful if parameters after second measurement together with a testing medicine are normalized, i. e. values are within 50–65 units and "indicator drop" is eliminated for maximum number of readings. In that case it is advised to include the medicine on the list for further prescription.

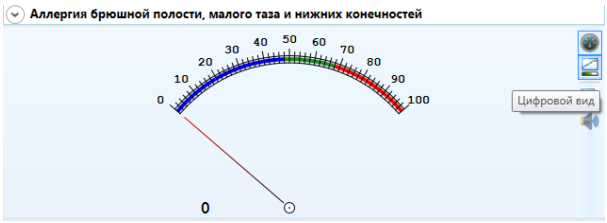
Working with the program

Select a patient or register him/her in the **Registry** menu. Select the **Diagnostics** tab. Select **Remedies testing** in the **Patient examination** menu:



For easy-to-interpret visualization it is recommended to change the indicator display (at the right bottom corner of the window), making its view more modern and digital:

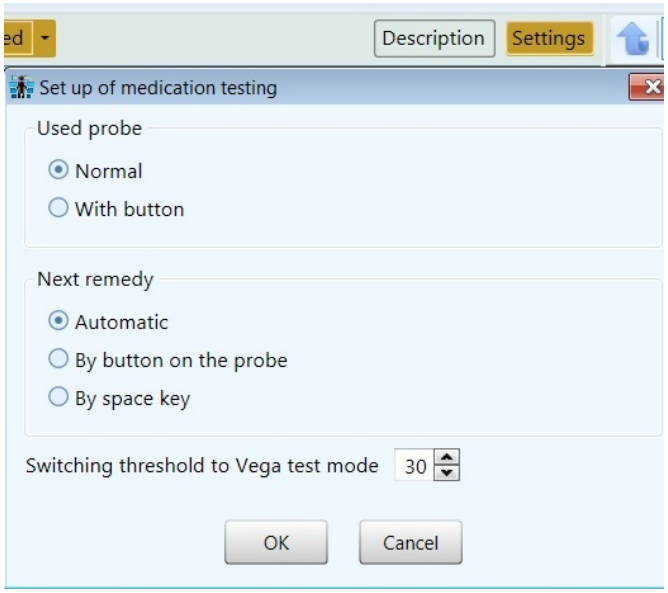
Pointer indicator



Digital (sliding) indicator

Preparation to measurements is similar to that of Voll diagnostics procedure. Connect a patient cable to the “BAP” socket on the front panel of the *Medscanner*. Connect the black plug of a patient cable to the passive cylindrical electrode that a patient holds in his/her hand (opposite to the side of measurements). Connect the red plug to the probe that is set on BAP. If you intend to use a probe with a touch sensitive button, connect it to the “Sensor” socket (in that case the red plug of a patient cable is not used; it is desirable to avoid its contact with the *Medscanner* or a patient). A 3 mm or 4 mm attachment should be on the probe.

Click the **Settings** button. In the appeared dialog box select desirable probe type: traditional or having a touch sensitive button. Besides, select the way how the program goes to the next BAP during measurements: automatically after measuring is completed and the probe is taken off a BAP, by pressing of a touch sensitive button on the probe or by pressing of the **Space** key on the keyboard.

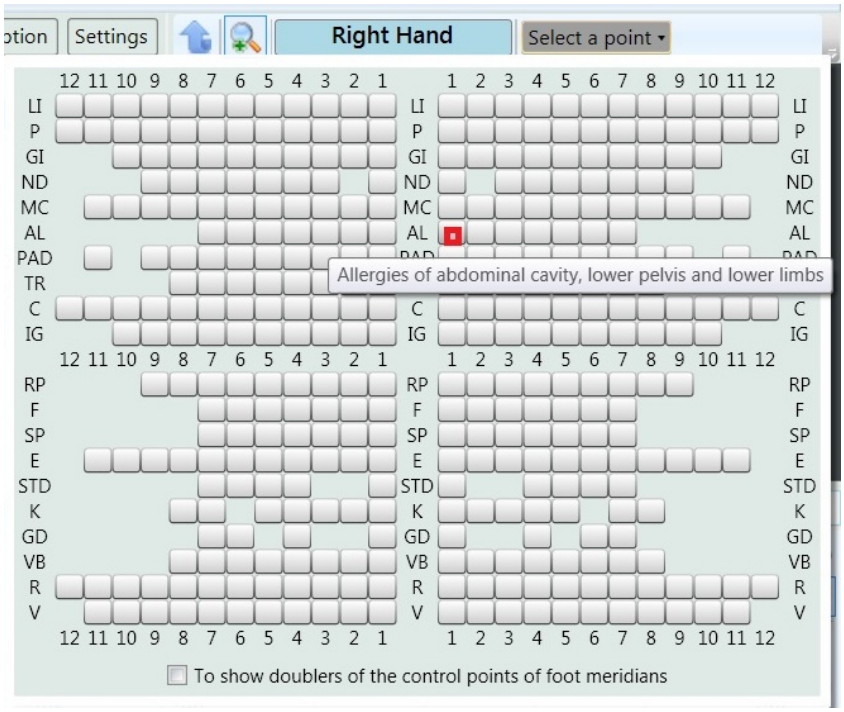


Connect input and output of “Reprinter” to the metal container (cup) with a wire. Wires must be inserted into holes on opposite sides of the cup. This container is for testing medicines (minerals, cosmetics, perfume products, etc.) which are absent in the *Medscanner* selector. Cup enable occurs at the moment of medicine testing only, by means of the built-in key.

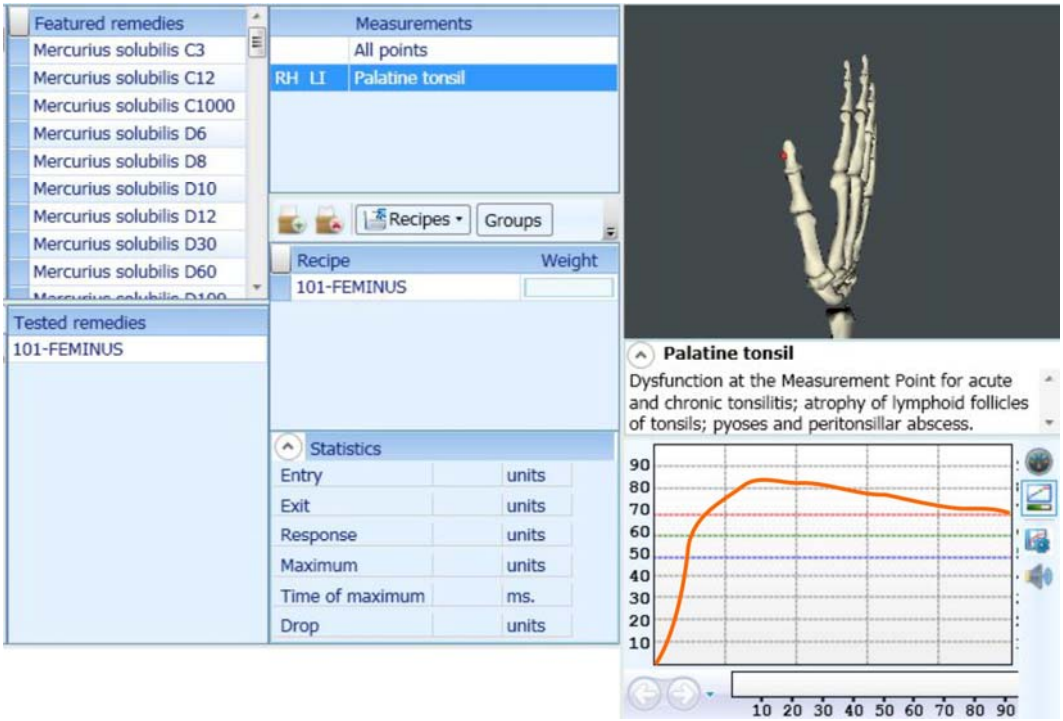
Click the **Start reception** button at the top left:

BAP selection for the testing

Click the **Select a point** button under the extremity image to select a BAP for measurements. Usually for medicine testing the worst end BAPs or control BAPs are selected.

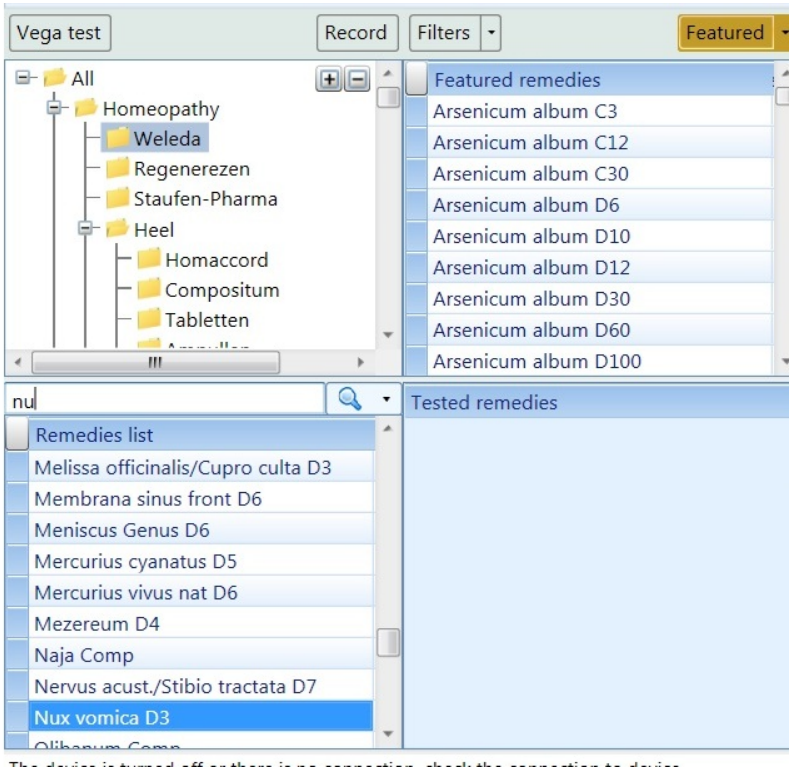


Press the electrode to the BAP and make an initial testing of the point. Further the results of this measurement will be compared with measurements when medicines are included. The graph for an initial (no-load) measurement is marked **orange** color after the measurement. It is possible to test several BAPs on which subsequently a medicine testing will be carried out.

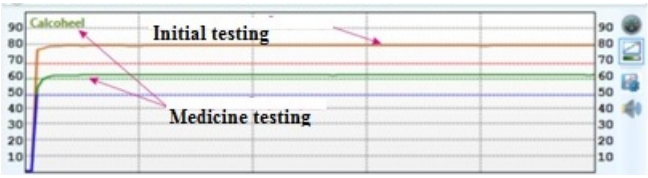


Medicines selection and testing procedure

Select the needed section of medicines for testing in the medicine groups tree. For example, “Homeopathy” is selected. Medicines of the section are displayed on the list under the tree of groups. Select the needed medicine from the list. If you need to search by name, enter the first letters of a desirable medicine name in the box above the list of medicines. When clicking the magnifying icon, the advanced search (by occurrence) is available.

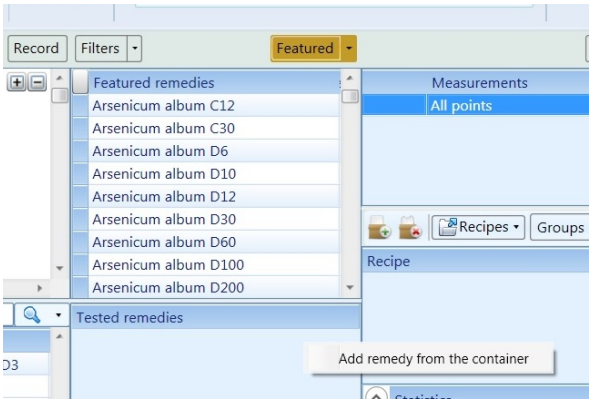


The selected medicine is immediately given to *Medscanner* selector output and you can test it by means of pressing of the electrode probe to the BAP. The name of that medicine is displayed in the box above the graph of testing.



If it is necessary to add a random substance (a piece of jewellery, cosmetics, perfume product, etc.) to the list of testing medicines, follow the steps below:

- put a medicine into the cup,
- click an empty box in the **Featured remedies** menu with the right mouse button,
- select **Add remedy from the container** in the menu.

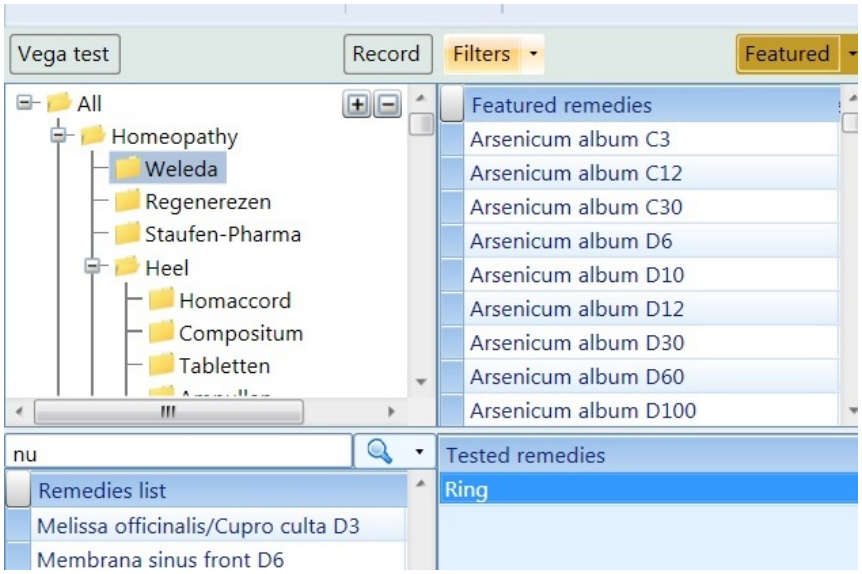


In the appeared box on the medicine list enter the name of a substance in the container. In such a manner you can add several different objects.

Substances must be put in the cup in the same order as they were added to the list of testing medicines.

How to make complex medicines (filter formation)

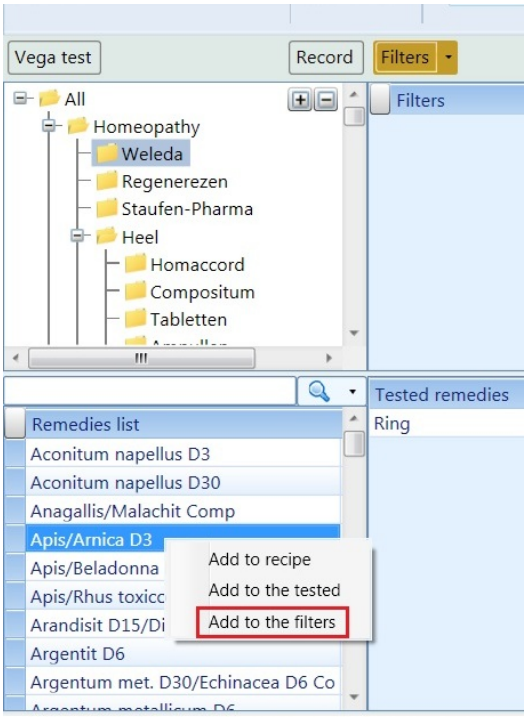
Only one medicine is sequentially given to output from the **Tested remedies** list. If it is necessary to include several medicines simultaneously (in order to make a so-called complex medicine), click the **Filters** button. Add to the list the medicines that will be permanently given to output during testing.



If there are several medicines on the **Tested remedies** list, the filter medicines are given to output together with each of them during the test.

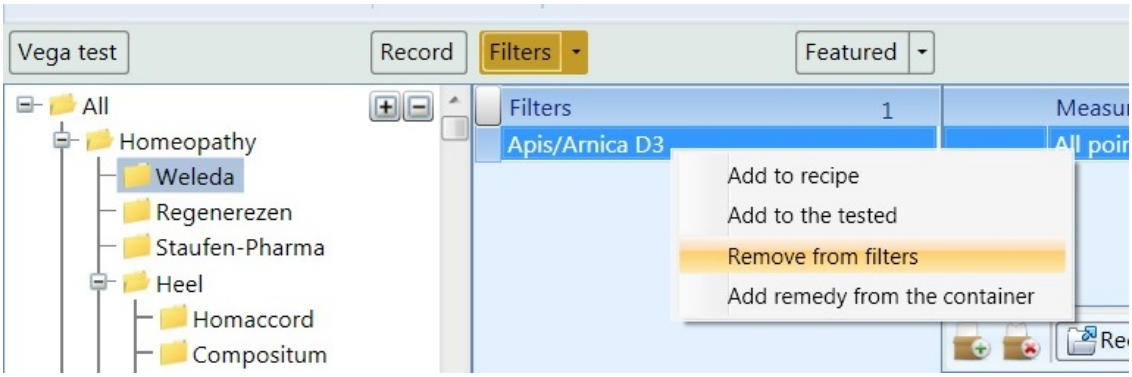
It is possible to add no more than **31** filter medicine. You can do this in several ways:

a) Click the needed medicine on the list with the right mouse button and select **Add to the filters** in the appeared menu.

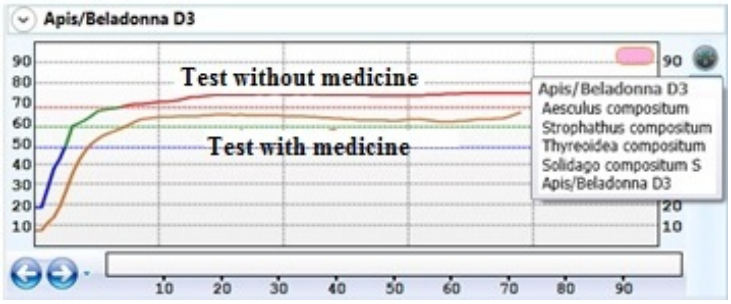


b) Click the needed medicine on the list with the left mouse button and holding the button down, drag the medicine to the filter list (*Drag-and-drop* function).

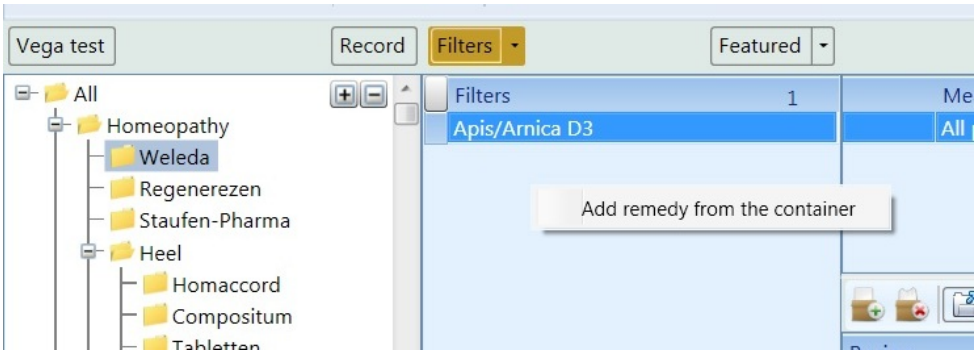
To delete any medicine from the filter list, click it with the right mouse button and select **Remove from filters** in the menu.



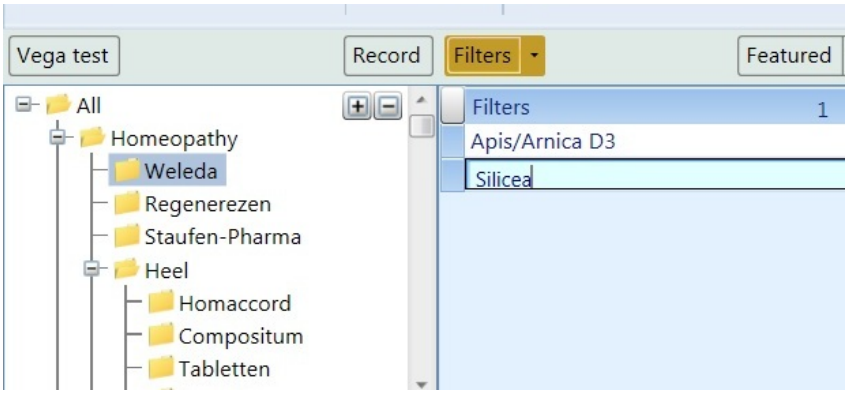
Therefore, for example, if there are 5 medicines in the filter list, then 6 medicines are sequentially given to *Medscanner* output: 5 medicines from the filter list and one from the general list. If a medicine name is not shown above the measurement graph, but the BAP name only, it means no one medicine is given to *Medscanner* output.



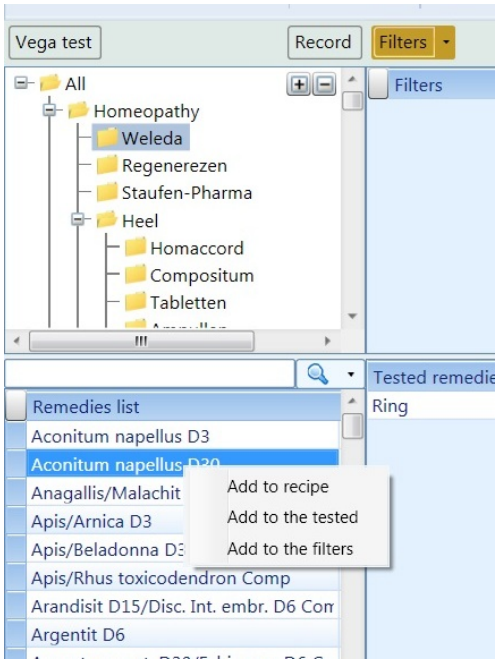
If you need to add a medicine from the cup to the filter list, follow the steps below: put a medicine into the cup, click the filter list with the right mouse button and select **Add remedy from the container** in the menu.



In the appeared box on the medicine list enter the name of a remedy in the container. In such a manner you can add several different medicines.



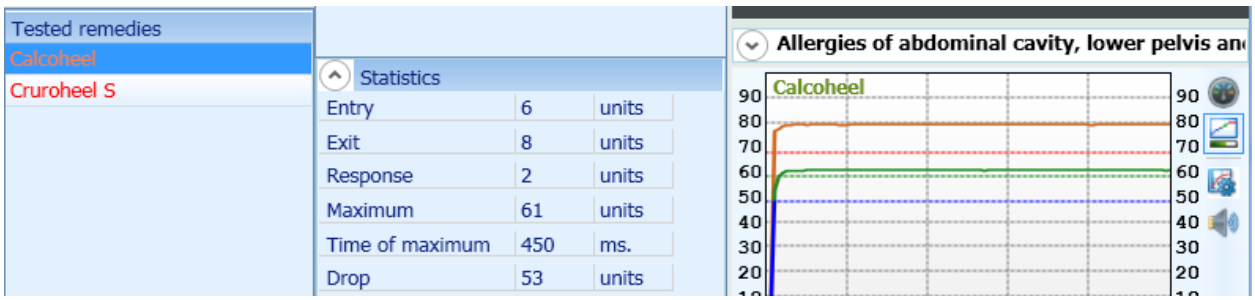
To reduce the testing time and test many medicines one by one, all necessary medicines should be added to the **Tested remedies** list.



You can add them similar to that of adding medicines to the filter list (from the menu by clicking the right mouse button or via *Drag-and-drop* holding the left mouse button down). Add medicines to the **Tested remedies** list. Select the first medicine and test it. The program goes to the next medicine from the list using the way selected in the **Settings** dialog box (automatically by default). Color of the tested medicine name for the selected BAP is changed to **green**. If you need to add a medicine from the cup to the list of testing medicines, you can do it similar to that of adding medicine in the cup to the filter list (click the list of testing medicines with the right mouse button and select **Add remedy from the container** in the menu). Ensure that the certain medicine from the list is placed into the container during testing. At the end of test remove the medicine from the cup to avoid confusion.

Quantitative result of testing

Quantitative result of testing is displayed under the medicines from **Recipe**:



Entry — a value at the end of the graph of point measurement without medicine (initial measurement).
Exit — a value at the end of the graph of point measurement with medicine.
Reaction — a difference between entry and exit values.
Maximum — the highest point on graphs: the maximum value from two graphs (initial or with a medicine) is selected.
Time of maximum — holding time of maximum value on the graph.
"**Indicator drop**" — a difference between maximum and minimum measurement values (on the graph of a measurement with a medicine).

On these data and graph data it is possible to assess the degree of patient's body response to medicine.

The body **response** can be:
(+) — stimulatory (medicine or infection increases body energy level);
(–) — dissipative (dispersion), i. e. medicine or infection decreases body energy level.

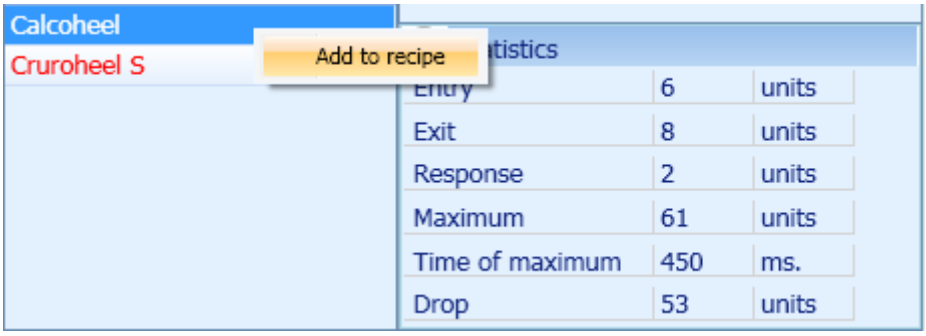
The greater the number, the more intense a response is. It is also necessary to assess in the graph the time of response, "indicator drop", time of maximum duration, etc. The more intensive and clearer findings, the more suitable the medicine is.

Stimulatory or dissipative body response depends on the energy and impact level. Medicines having dissipative effect are applicable in acute cases but they increase load upon immune system, so in severe chronic conditions medicines having stimulatory effect should be used.

Working with a prescription

If a medicine is suitable for a patient, it can be added to the recipe list. It is possible to add to prescription the medicines from the *Medscanner* selector only. You can do this in several ways:

a) Click the needed medicine on the list with the right mouse button and select **Add to recipe** in the appeared menu.
b) Click the needed medicine on the list with the left mouse button and holding the button down, drag a medicine to the prescription list (*Drag-and-drop* function).
c) Press **Ins** key on the keyboard.
d) Click the **Add to recipe** button above the recipe list.
Color of the medicine name after adding it to the recipe is changed to **red**.



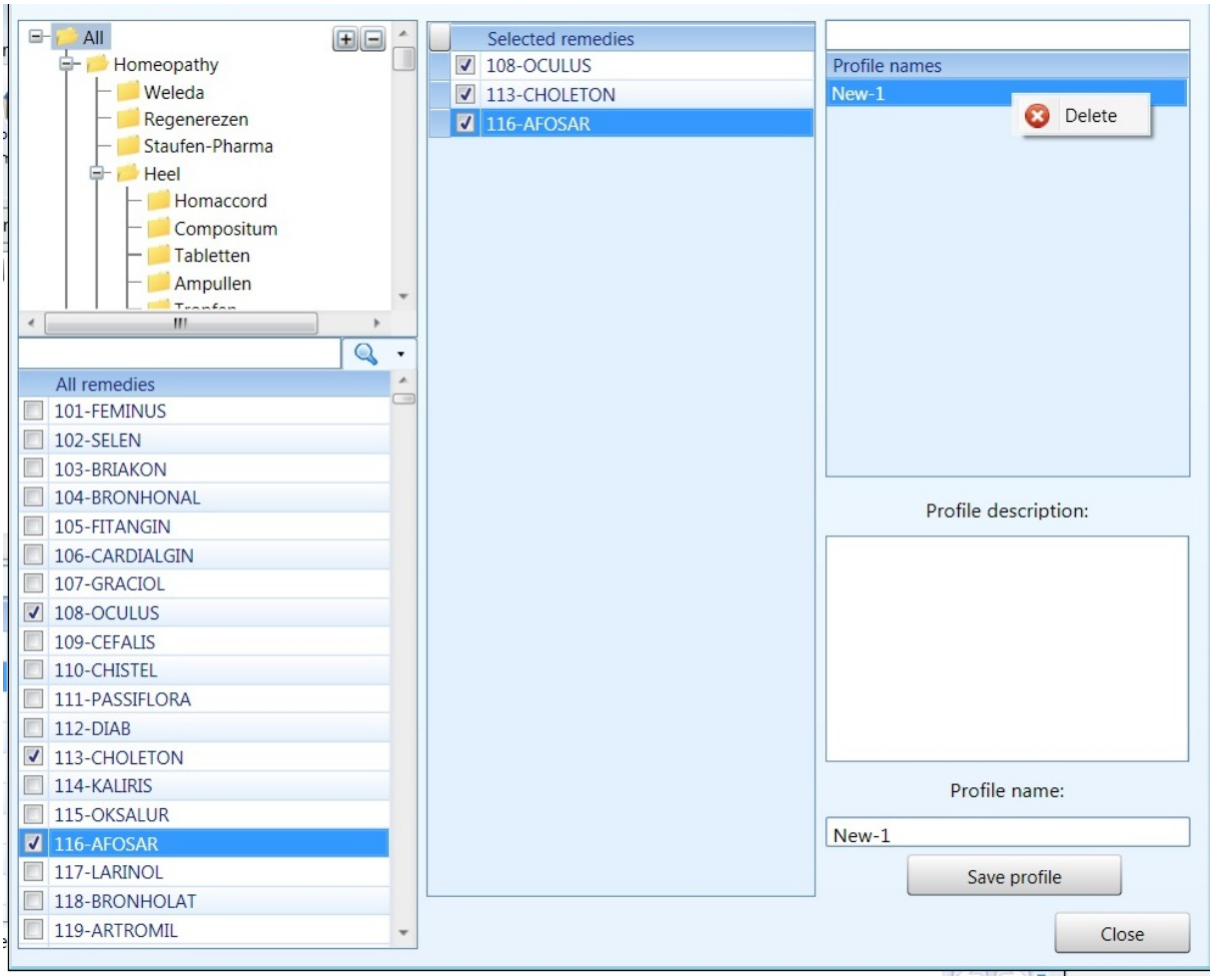
To delete a medicine from the recipe, you can use following ways:
a) Click the needed medicine on the list with the right mouse button and select **Remove from recipe** in the appeared menu.
b) Click the needed medicine with the left mouse button and holding the button down, drag a medicine to the list of testing medicines (*Drag-and-drop* function).
c) Press **Del** key on the keyboard.
d) Click the **Remove from recipe** button above the recipe list.

There is an additional **Weight** column in the recipe list. It reflects how many times a certain medicine was added to the recipe for different BAPs. The more weight is, the more often a certain medicine was added to recipe (therefore, it is suitable for more testing BAPs).

Recipe profiles compilation

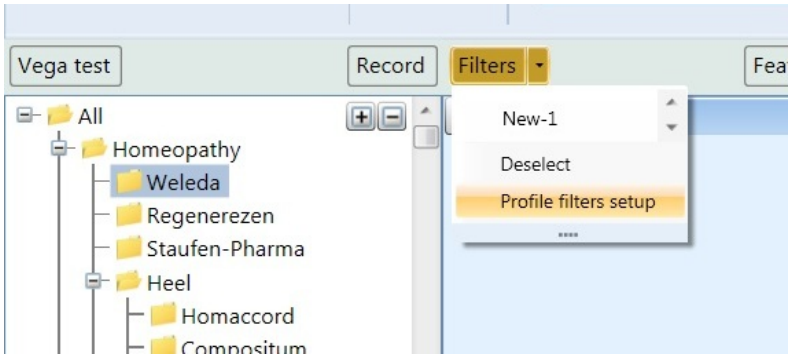
The program makes it possible to compile universally applicable recipes for different cases and save them in the database. Click the **Recipes** button and select the **Configuring of recipe profiles** in the appeared menu:

In the appeared dialog box tick medicines you want in the recipe. Enter recipe name into the **Profile name** box. Enter description of the recipe into the **Profile description** box, if necessary. Click the **Save profile** button. You can select the saved recipe in the **Recipes** menu. To delete the recipe created in such a way, select it on the **Profile names** list by clicking it with the right mouse button, and select **Delete** item in the appeared menu.

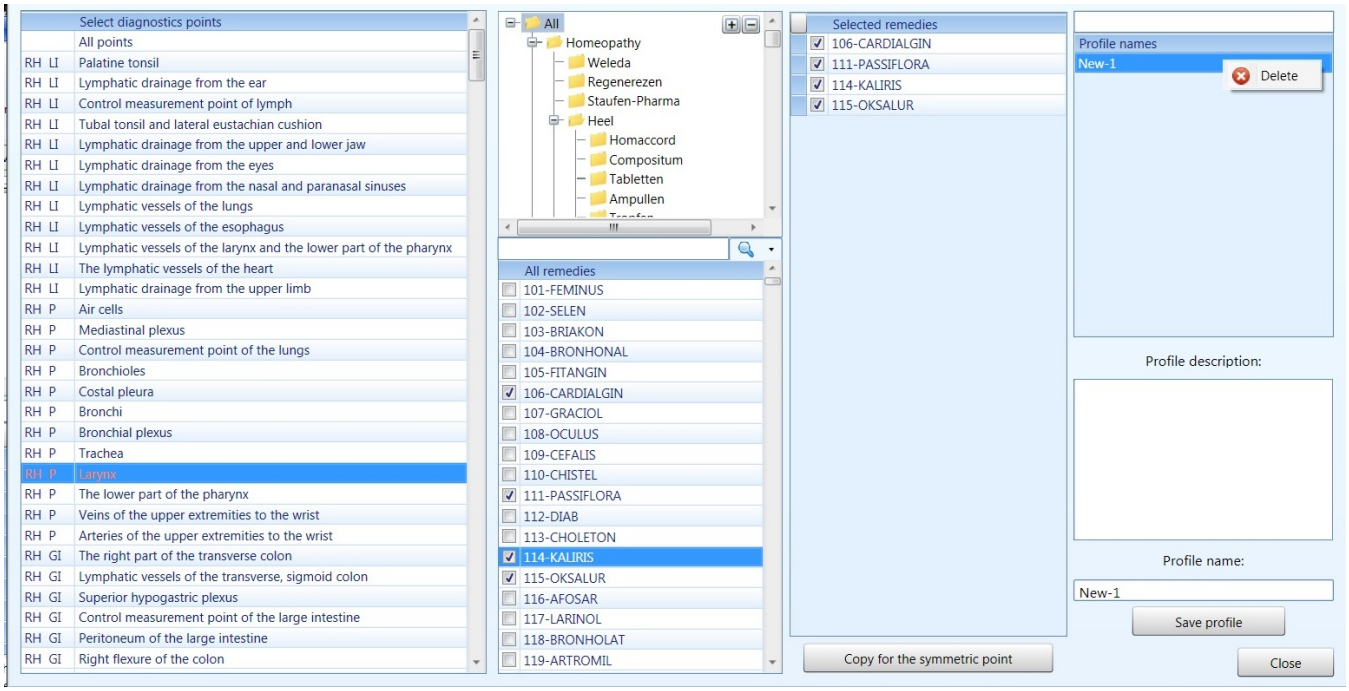


Filter profiles compilation

To compile profiles of filter medicines for different cases, click the **Filters** button. Click the **Profile filters setup** item in the menu.

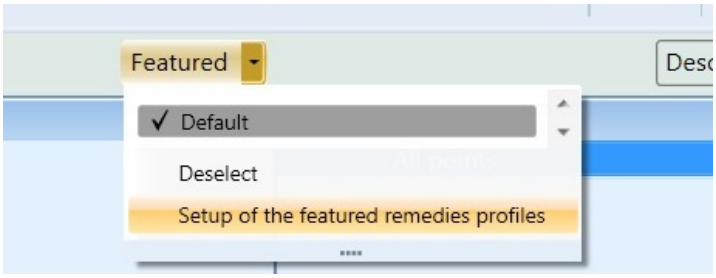


In the appeared dialog box select the needed BAP for which you intend to make a list of medicines or all points if you use any BAP. Tick the necessary filter medicines. Enter profile name into the **Profile name** box. Enter description of the profile into the **Profile description** box, if necessary. Click the **Save profile** button. You can select the saved profile in the **Filters** menu. To delete the filter list created in such a way, select it in the **Profile names** list by clicking it with the right mouse button, and select **Delete** in the appeared menu.



Compilation of recommended medicines profiles

To make profiles of medicines recommended for testing on BAP, click the **Featured** button and select **Setup of the featured remedies profiles** item in the menu:

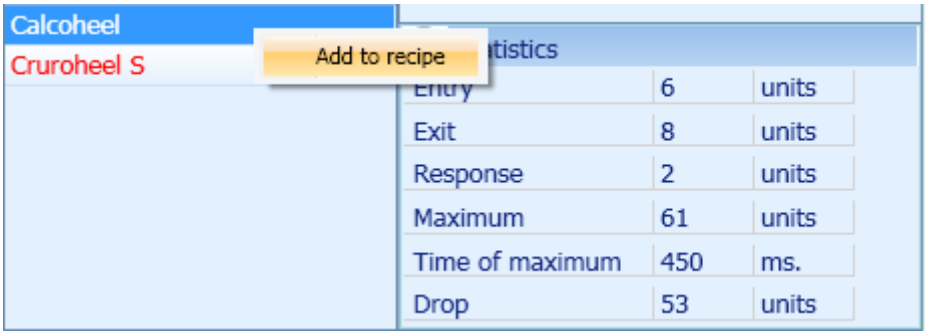


Further actions are similar to that of filter profiles compilation. In the appeared dialog box select the needed BAP for which you intend to make a list of medicines or all points if you use any BAP. Tick the necessary filter medicines for the selected BAP. Enter profile name into the **Profile name** box. Enter description of the profile into the **Profile description** box, if necessary. Click the **Save profile** button. The saved profile can be selected in **Featured** menu. To delete the recommended medicines list created in such a way, select it in the **Profile names** list by clicking it with the right mouse button, and select **Delete** in the appeared menu.

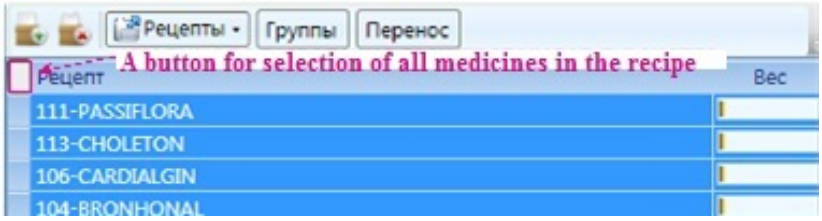
Recording of medicines to carrier and creating the medicine electronic copies (bioenergetic transference)

During the bioenergetic transference of medicine electronic copies to water, sugar granules, wax, etc., the maximum weight of carriers should not exceed 30 grams (or 100 sugar granules of average size). The input and output of *Medscanner* “Reprinter” should be wired to the container that contains a carrier (if a medicine is transferred to water, a glass with water is placed into the container).

To transfer medicines from the *Medscanner* selector, add them to the recipe list. You can add them from the tested medicines list or from the whole list of medicine database by clicking the medicine with the right mouse button. Then select **Add to recipe** item. Color of medicines names added to the recipe are indicated by the **red** color.

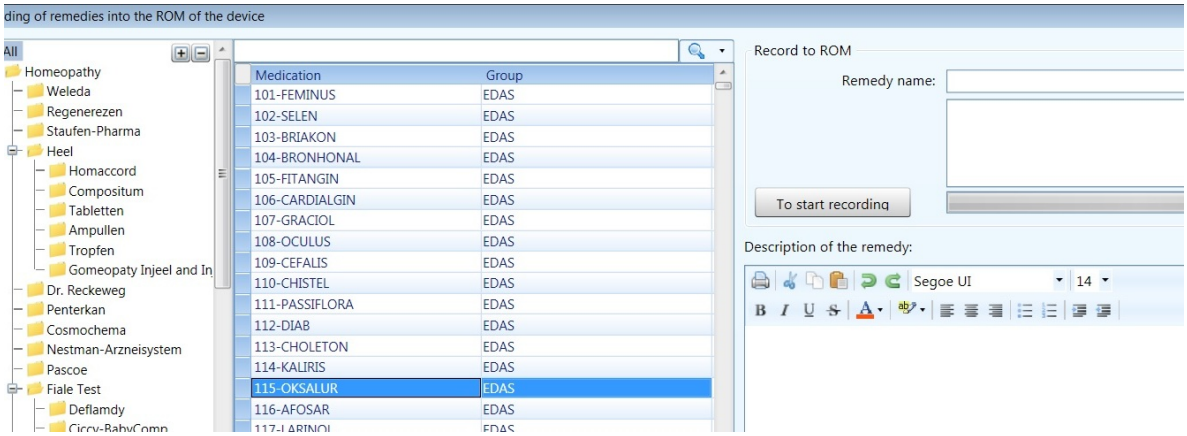


Select in the list medicines that needed to be transferred to the carrier. If you want to select all medicines, click the button before the **Recipe**button:



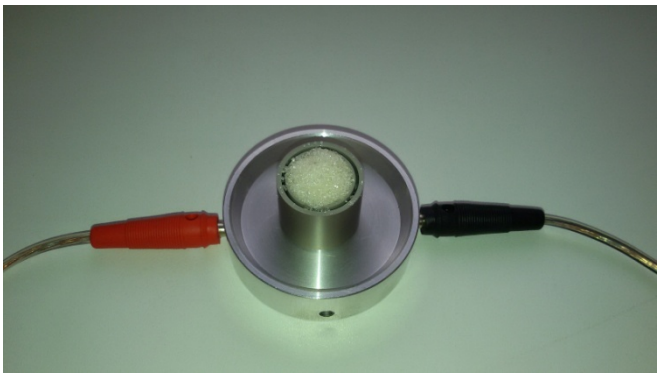
Multiple selection is possible if you click the **Ctrl** key on the keyboard and holding it down, select necessary items. To select a block, press the **Shift** key and holding it down, click with a left mouse button the initial and final lines of the list.

Click the **Transfer** button. In the opened dialog box the list of medicines for biotransference and its settings is displayed.



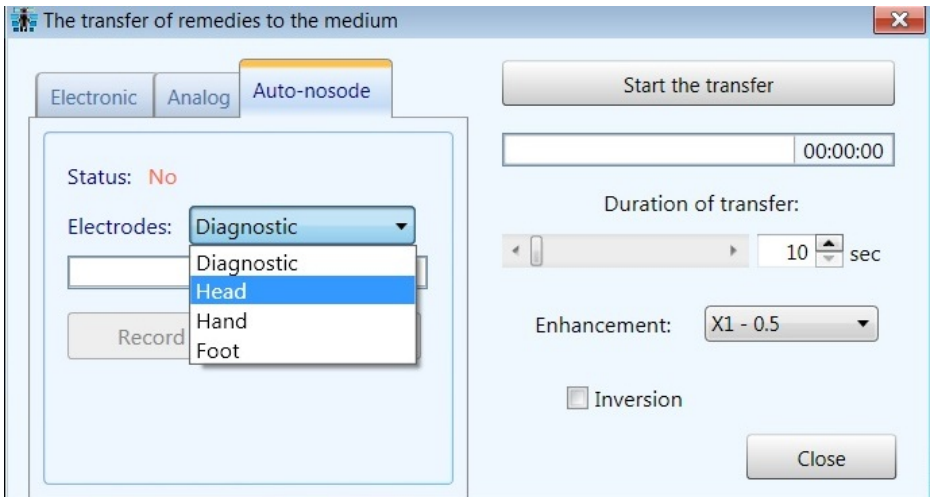
All medicines on the list are simultaneously given to the cup that contains a carrier. To delete some medicines from the list, select them using a mouse, press the right mouse button and select the **Delete** item.

Select the period of exposure in the menu (transference to water takes 10 s, to sugar nibs is about 3-4 min, to paraffine or wax is about 10 min, etc.). Set the potentiation value (if you need to transfer a medicine from the database using the same potency that was recorded, select **x2-1** potentiation). Tick an inversion, if necessary (homeopathic remedies are usually transferred as“exact” copy and nosodes as “inverted” copy). Click the **Start the transfer** button. Upon completion of transference, a carrier from the cup can be used for its intended purpose.

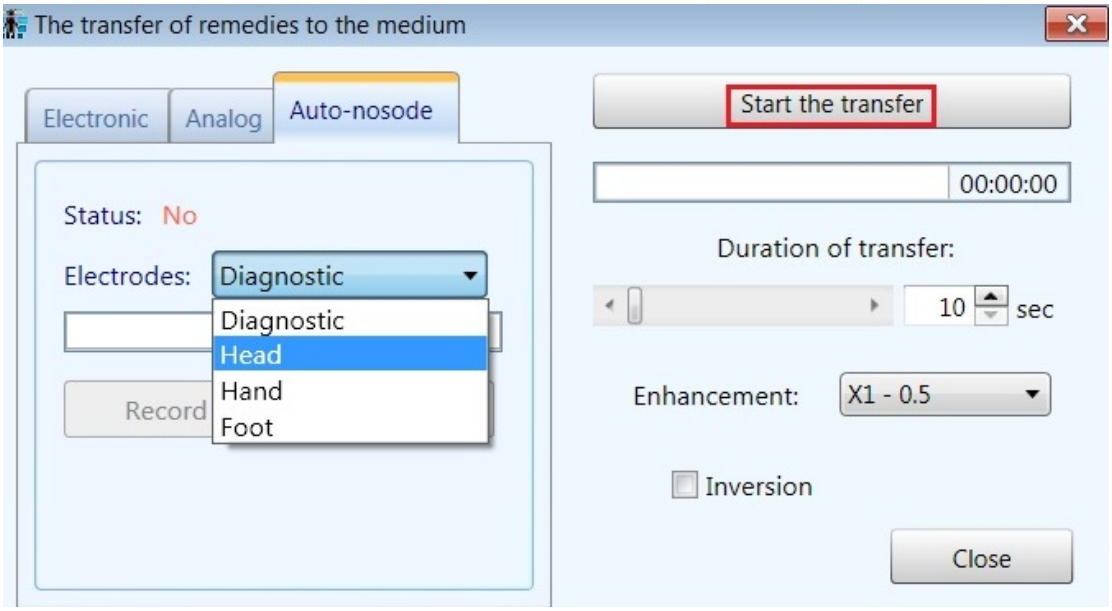


Autonosode making

To transfer a patient autonosode to a carrier, select the **Autonosode** tab in the dialog box. Select electrodes for recording of patient autonosode (diagnostic, hand, head or foot electrodes) in the appeared dialog box. Place corresponding (selected) electrodes on a patient’s skin and click the **Record** button. If you select diagnostic electrodes, autonosode is prepared from BAP using the electrode probe.



After autonosode recording to the *Medscanner* internal memory, put into the cup a carrier (sugar nibs, wax, etc.) for the transference. Select in the dialog box a duration of transference, needed potentiation, inversion (if necessary) and click the **Start the transfer** button.

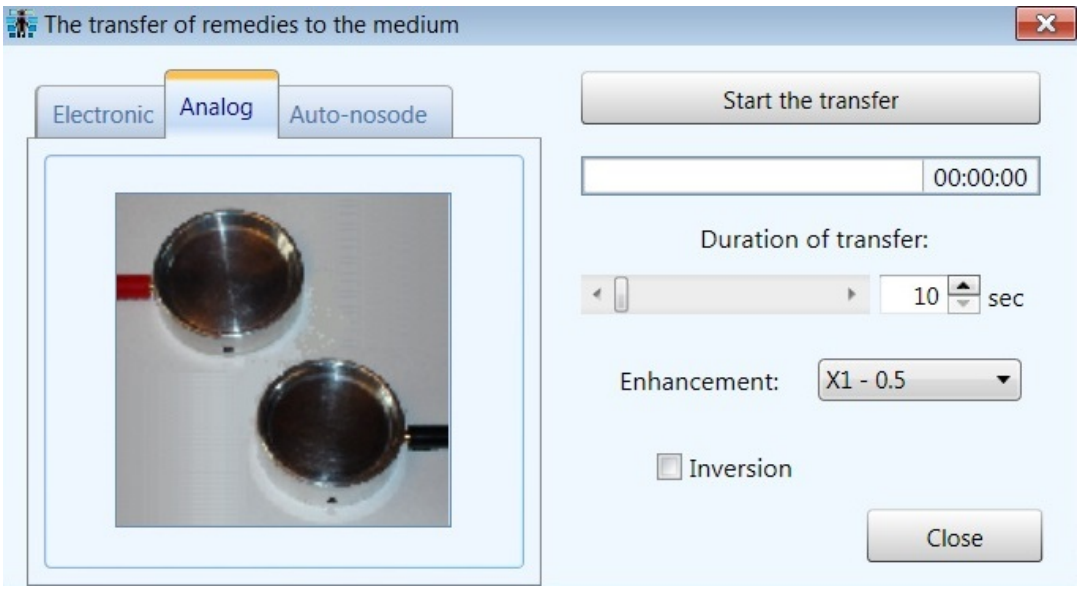


Upon completion of transference, a carrier from the cup can be used for its intended purpose. To delete an autonosode from the *Medscanner* internal storage, click the **Delete** button.

If you need to transfer an autonosode together with medicines from selector, first it is necessary to record the autonosode, then select **Electronic** tab and transfer the medicine list in a similar way as described above. In that case an autonosode is recorded to the carrier together with selected medicines.

Making a physical copy of a native medicine

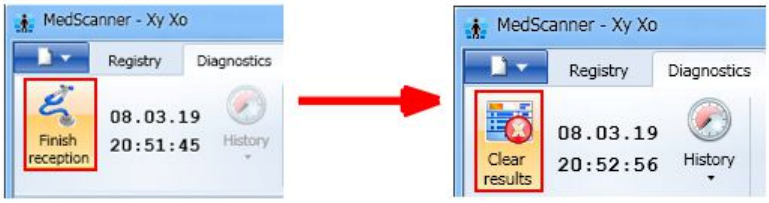
If you need to make a copy of available medicine without recording it to the selector database, select **Analog** type of transference in the dialog box.



Connect one cup by conductor to the input socket of “Reprinter”. Put into that cup an initial substance intended for taking of information. Connect second cup by other conductor to the output socket of “Reprinter”. Put into that cup a carrier (a substance intended for recording: it can be sugar nibs, water, alcohol, wax, etc.).

Ensure that cups do not contact with metal objects and each other. The rest of the transference process is similar to the procedure described above.

Upon completion of testing/biotransference sequentially click the **Finish reception** and **Clear results** buttons.

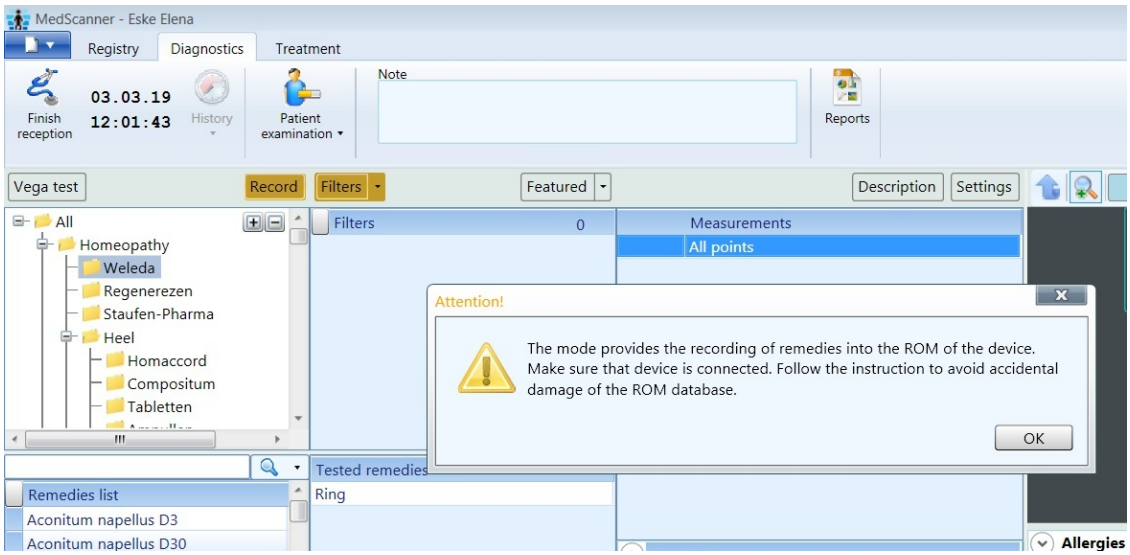


Medicine electronic copies recording to the *Medscanner* database

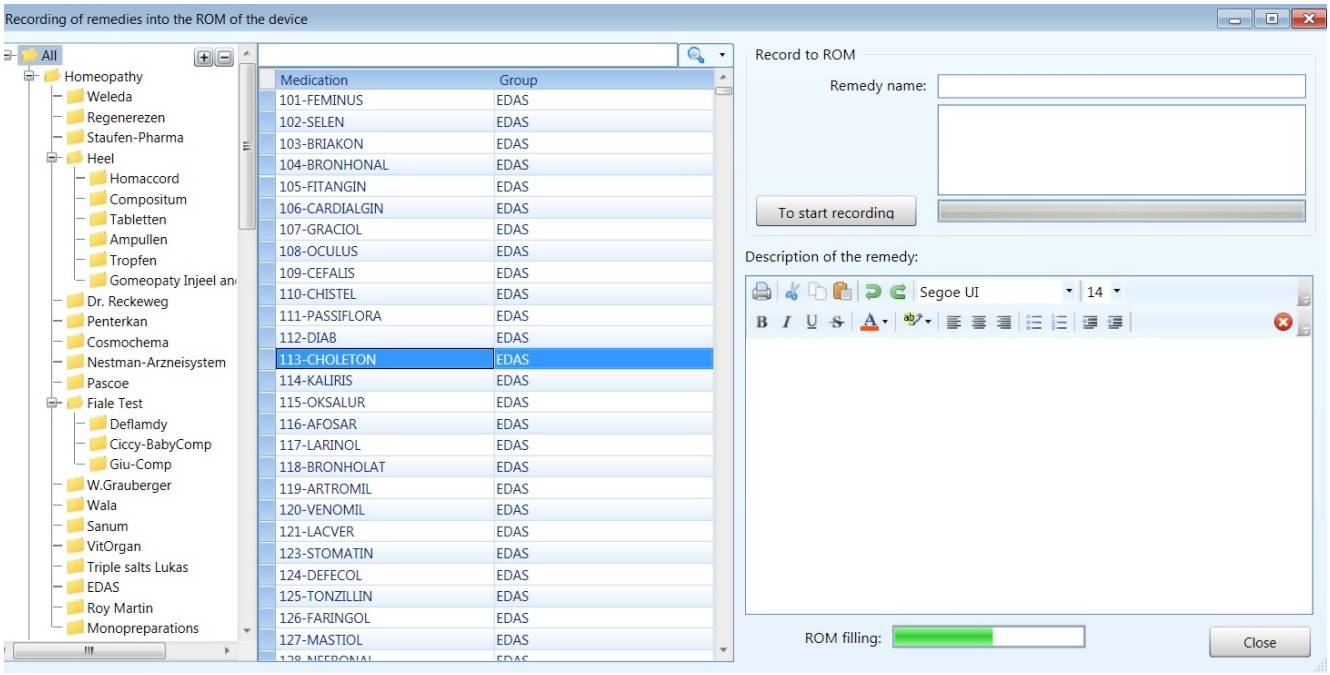
The recording is carried out to the *Medscanner* built-in read-only memory (ROM). To record a medicine electronic copy to the database it is desirable to put into container more native medicine (to get more reliable data). It is recommended to unpack a medicine. *Medscanner* outputs ("Reprinter": input and output) are connected by wires to the metal container and a medicine (homeopathic nibs, ampoule, cream from a tube, etc.) is placed into the container.

Click the **Record** button and then click **OK** in a warning window. In this mode it is possible to add, rename, delete medicines from the database, edit descriptions of medicines. The ROM capacity is enough for recording another 15 000 medicine electronic copies. However, in case of incorrect record and its further removal, a ROM cell does not become available again, but is only marked as deleted.

Attention! The deletion of a medicine from the database is irreversible.



The catalog and medicine lists are on the left in the opened window, the menu of medicine recording and description box are on the right. In the right bottom part of the window the device ROM filling level is shown (the total number of cells in the ROM is 32,000). A medicine description can be entered or edited at any time.

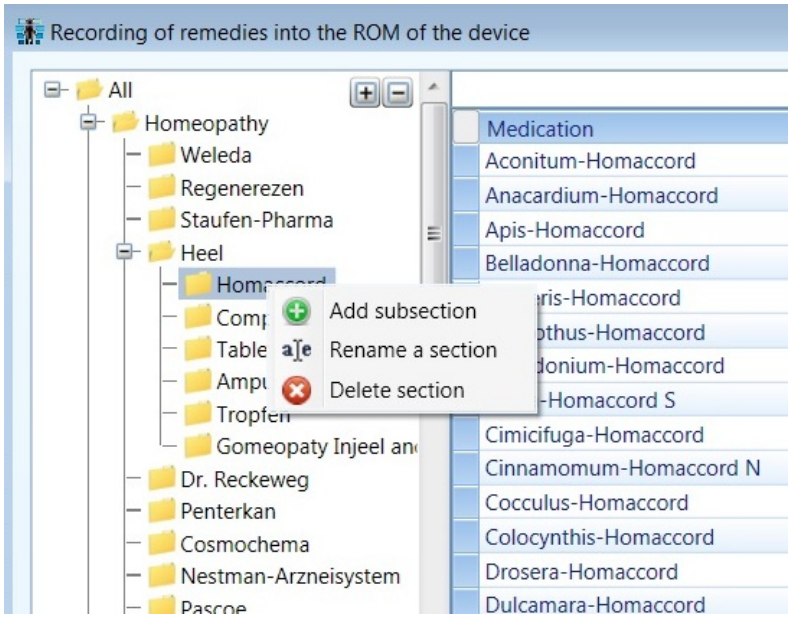


To record a medicine, enter a medicine name into the window on the right and type its description below, if necessary. Click the **To start recording** button. The program shows a warning message with a brief instruction, click the **OK** button.

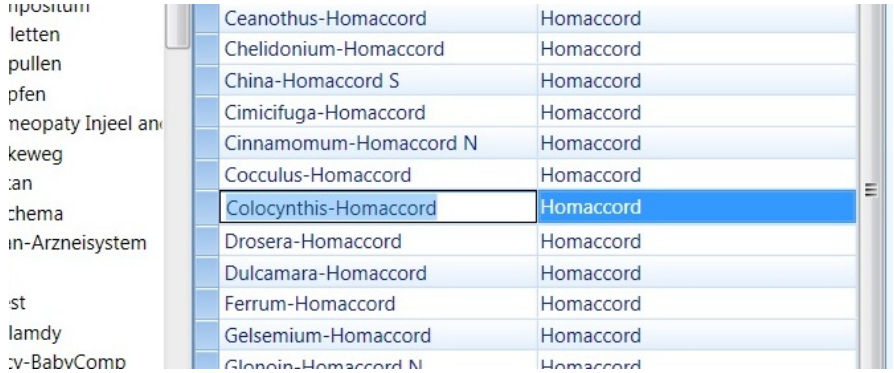
Remove the medicine from the cup after recording. Before recording of the next medicine, the cup must be washed using clean water and cleaned with alcohol.

Editing of medicines in the database

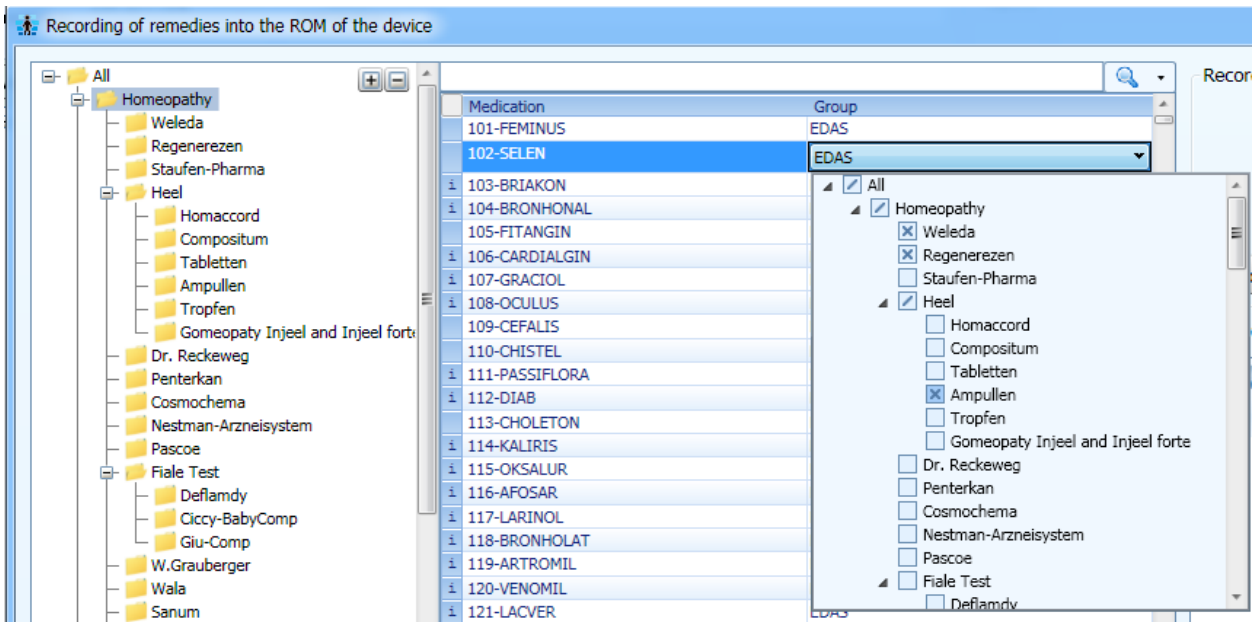
Creation, editing and deletion of medicines groups. To add a new section, click the **All** section with the right mouse button. To add a subsection to an existing section, select the needed section in the catalog list and click its name with the right mouse button. Select a desirable action in the appeared menu.



Medicine renaming. To do that, put the mouse cursor in the selected medicine name and click it twice with the left mouse button. After that edit the name:



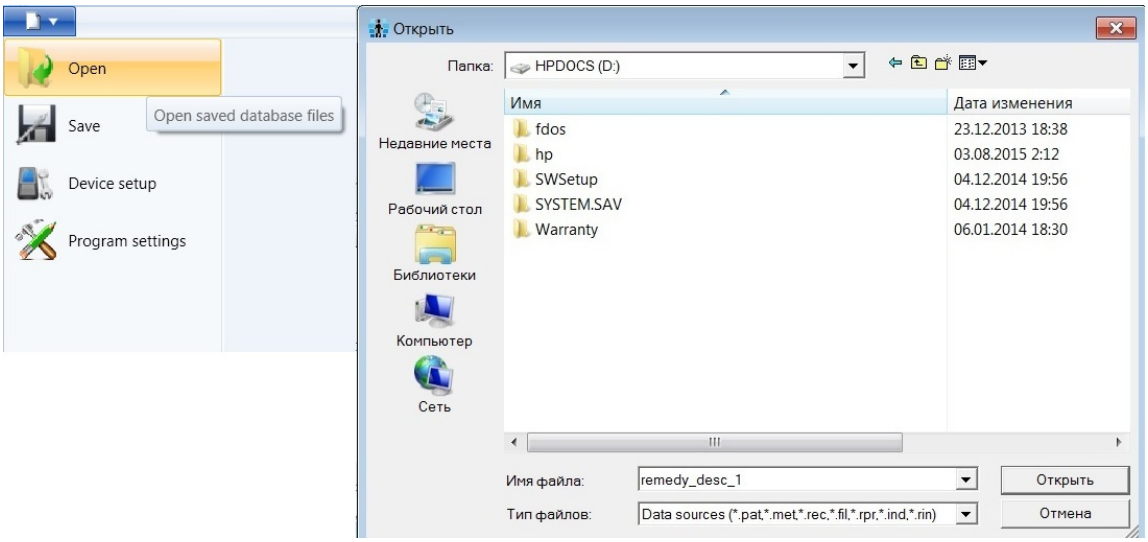
Medicine moving to other section. To do that, select a medicine and click its section name twice with the left mouse button. Select the needed section or subsection in the drop-down menu.



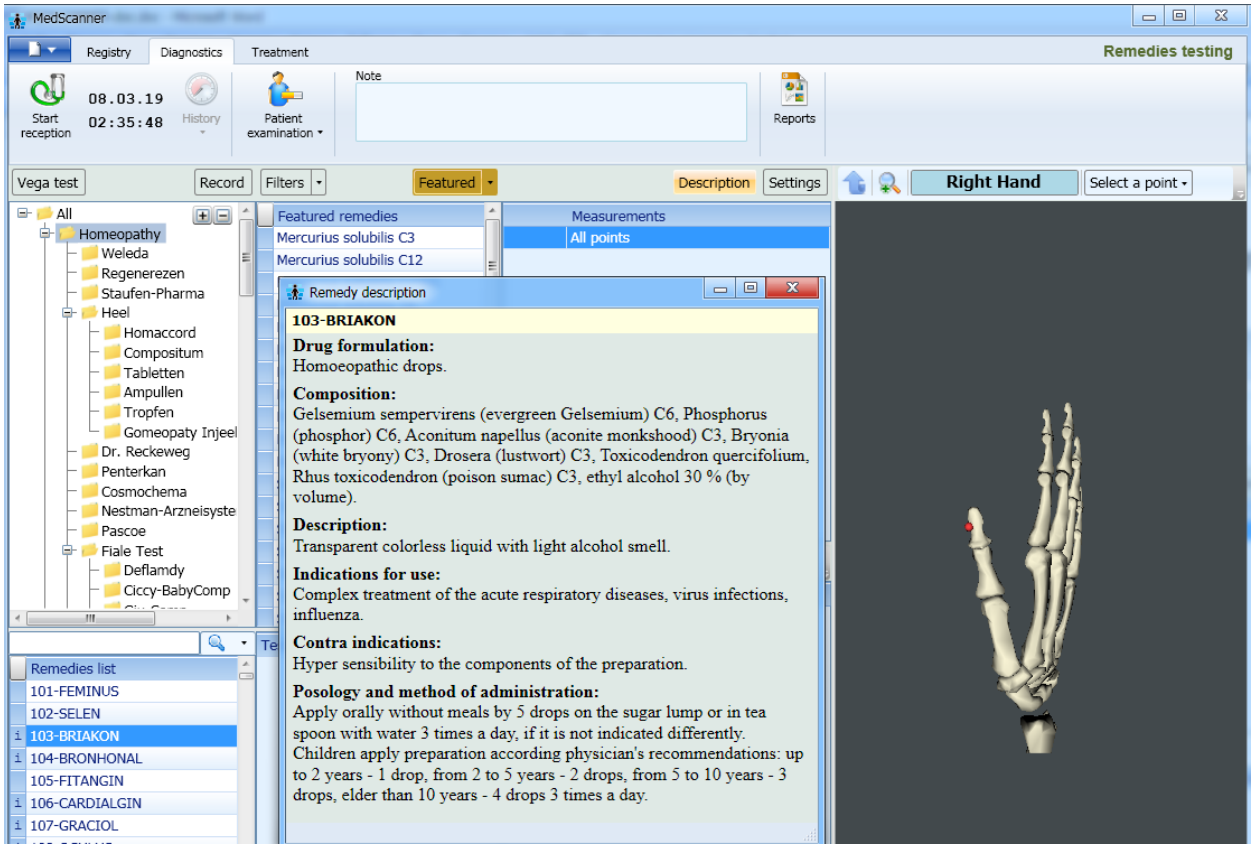
Note. It is possible to place (associate) a medicine name in more than one of catalog sections.

Medicine help

To facilitate the work, you can upload a file of a medicine description and use it. To do that, click **Open** in the top left pop-up program menu and select a medicine file (with the *.rin extension). Medicines are uploaded **only** when the *Medscanner* device is turned on!

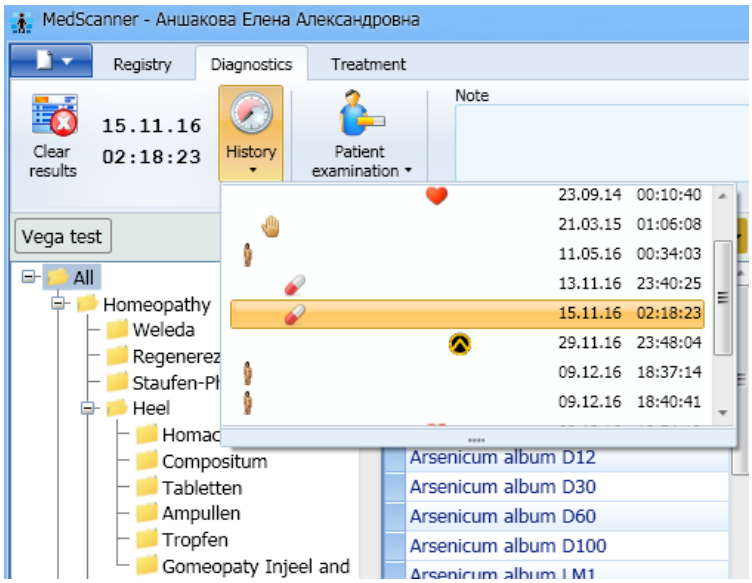


A description of the medicine selected on the list appears when you click the **Description** button:



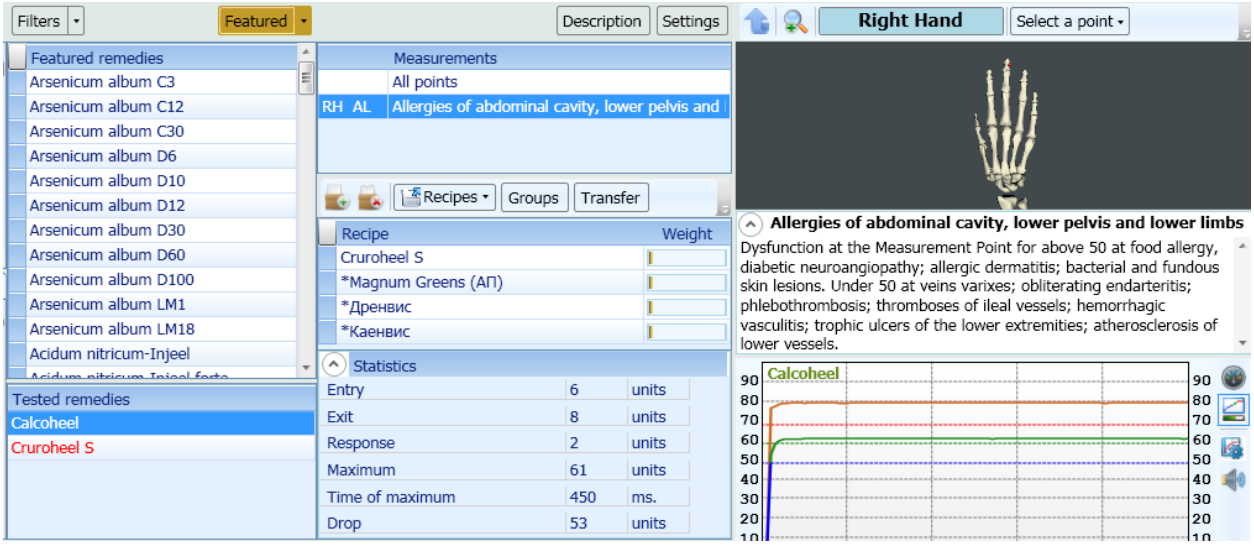
Medicine testing results

To view measurement results (without following **Reports** button), you can click **Reports** button on the right and select corresponding examinations in the drop-down menu.



After that you can view testing results for every BAP:

- By clicking the **Filters** button, in a corresponding window the information about medicines that were given to the selector output together with the tested medicine is shown.
- In the **Measurements** window you can view all tested BAPs using a mouse. The graph of a measurement without medicine is on the bottom right.
- In the **Tested remedies** window you can view a testing graph in the bottom right window by clicking every medicine with a mouse. When selecting BAP, you can view measurements and overlap graphs.
- Besides, in the **Recipe** window you can create a medicine list in order to transfer them to a carrier.



SCHIMMEL DIAGNOSTICS (VEGA TEST) (FOR *MEDSCANNER BIORS*; *MEDSCANNER BIORS-01*; *MEDSCANNER BIORS-02*; *MEDSCANNER BIORS-03*; *MEDSCANNER BIORS-04* EMBODIMENTS)

Development of the Voll method for BAP diagnostics have led to the emergence of vegetative resonance test (VRT). This method is based on the measurement of electric conductivity of the point when a testing medicine is included into the measuring circuit. The method was developed in Germany by a Dr. H. Schimmel in 1978. It is based on electropuncture diagnostics and medicine testing according to R. Voll and V. Schmidt and H. Pflaum bioelectronic functional diagnostics. However, if for Voll's method 250–500 biologically active points (BAP) are used to meet the challenges of diagnostics and medicine testing, during VRT only one reproducible point is used.

For over more than 15 years of studies of Dr. Schimmel and his followers, this method has become one of the most effective diagnostic tool, primarily by development and use of special medicines and frequencies for testing, as well as very low measuring currents.

As the method is very similar to Voll diagnostics, it has the same indications, contraindications, as well as a doctor, patient and work place requirements.

There are several options for carrying out the Vega test, but generally the test procedure is performed in 2 stages:

1 stage. So-called reproducible BAP is identified for measurements. Usually the BAP of allergy meridian AL1, the BAP of connective tissue degeneration meridian STD1, the BAP of endocrine system meridian TR1 are used. A point is considered reproducible if during three-time pressure with a probe on that BAP with the same intensity the device pointer of the *Medscanner* shows the same value. Let's assume that BAP conductivity after measurement is 50. Then you should reduce the pressure on the BAP slightly (do not take off the probe from the point). The indicator drops to the value of between 10–20 cu and you should smoothly increase the pressure again. The pointer returns to 50. This is repeated three times. If the pointer does not return to the initial value, it means that the organ or system associated to the point has some functional disorders. Therefore, the point is not considered representative and you should find another suitable BAP. Once the same value is reached three times, the device switches to the Vega testing mode, and that initial measured value is normalized to 80. The *Medscanner* scale changes its view.

2 stage. The Vega test itself. Measure the conductivity of the found representative point, sequentially introducing different homeopathic remedies in the measuring circuit. If device readings reach 80 (an initial value), it is estimated that the medicine has no effect (it is not suitable). If the pointer does not reach 80, the medicine influences the body (it is suitable). In that case you can use the medicine for the treatment of diseases with similar symptoms. Very rarely so-called "positive indicator drop" occurs during Vega test. In such cases *Medscanner* values exceed 80. In that case an interpretation of the results is similar to that of the ordinary "indicator drop".

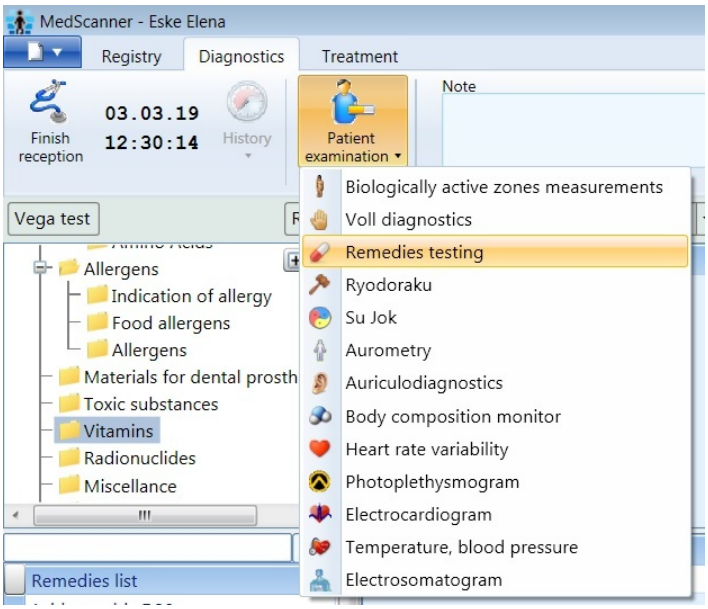
In any case, the final decision is left to a doctor.

Note. Sometimes before Vega test measurements the provocation test (the functional load) is carried out: the current with frequency of 13 Hz is sent for 15–30 s either by main leads or on the end points of lymphatic system meridian (LI1 on the right and on the left). However,

currently that procedure is considered affecting the initial body state before testing and not carried out. If you do need to carry out the provocation test, you can do it via the **Frequency therapy** menu. The procedure is described in the "**Frequency therapy (Exogenous BRT)**" section of the present Manual.

Working with the program

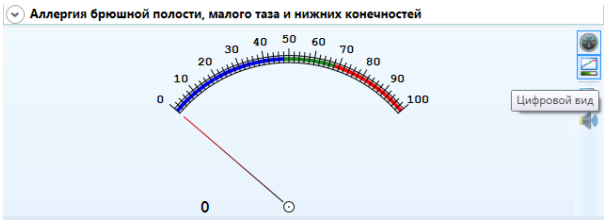
The procedure is carried out similar to medicine testing. Select a patient or register him/her in the **Registry** menu. Select the **Diagnostics** tab. Select **Remedies testing** in the **Examination** menu.



Connect a patient cable to the "BAP" socket on the front panel of the *Medscanner*. Connect the black plug of a patient cable to the passive cylindrical electrode that a patient holds in his/her hand (opposite to the side of measurements). Connect the red plug to the probe that is set on BAP. If you intend to use a probe with a touch sensitive button, connect it to the "Sensor" socket (in that case the red plug of a patient cable is not used; it is desirable to avoid its contact with the *Medscanner* or a patient). A 3 mm or 4 mm attachment should be on the probe.

For easy-to-interpret visualization it is recommended to change the indicator display, making its view more modern and digital:

Pointer indicator

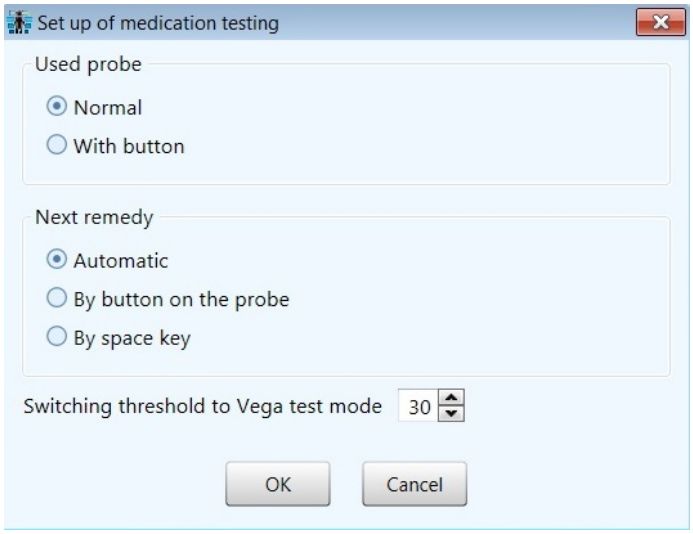


Digital (sliding) indicator

Click the **Settings** button. In the appeared dialog box select desirable probe type: traditional or having a touch sensitive button. Besides, select the way how the program goes to

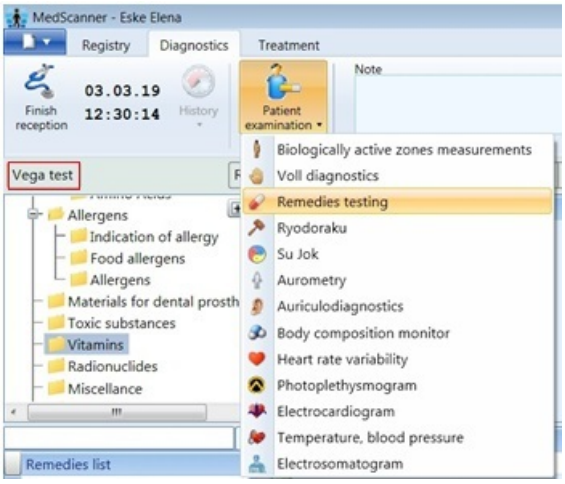
the next BAP during measurements: automatically after measuring is completed and the probe is taken off a BAP, by pressing of a touch sensitive button on a probe or by pressing of the Space key on the keyboard.

Besides, you can set the lower threshold for switching to the vegetoresonance testing mode: by pressing of a button on the probe or by pressing of the **Space** key (in order to expedite the completion of the "build-up"). This setting is done to prevent an accidental button push and, as a consequence, a wrong countdown on the Vega test scale.

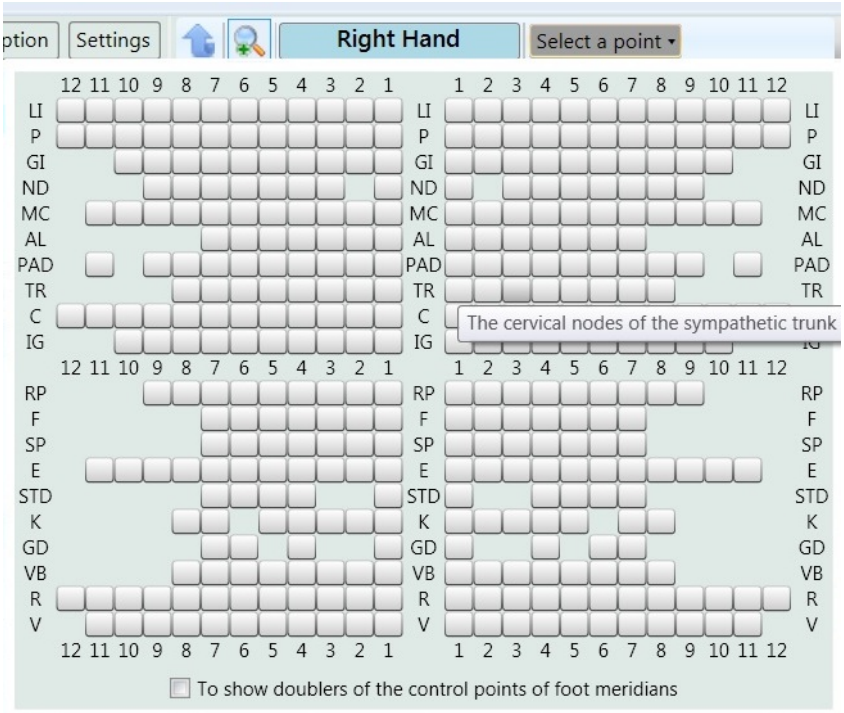


Click the **Start reception** button at the top left of the window:

To carry out a Vega test, click the **Vega test** button in the left program menu below the **Start reception** button.

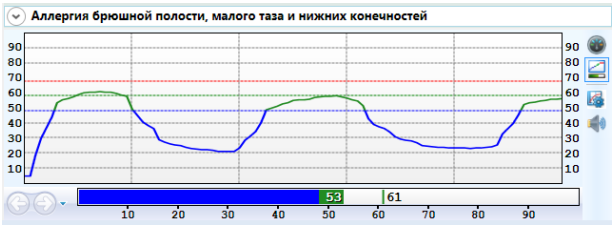


The program switches to the waiting of a BAP build-up mode. During the build-up a so-called reproducible BAP is identified for further measurements. Usually the BAP of allergy meridian AL1, the BAP of connective tissue degeneration meridian STD1, the BAP of endocrine system meridian TR1 are used. To select several presumably reproducible BAPs, use the **Select a point** menu above the atlas:

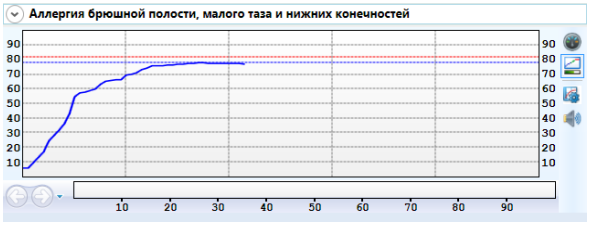


A point is considered reproducible if during three-time pressure with a probe on that BAP with the same intensity the device pointer of the *Medscanner* shows the same value. Let's assume that BAP conductivity after measurement is 50. After measurement you should reduce the pressure on the BAP slightly (do not take off the probe from the point). The indicator drops (not to zero). The pointer returns to 50. It is repeated three times. If the pointer does not return to the initial value, it means that the organ or system associated to the point has some functional disorders. Therefore, the point is not considered representative and you should find another suitable BAP. Once the same value is reached three times, the device switches to the Vega testing mode, and that initial measured value is normalized to 80. The *Medscanner* scale changes its view.

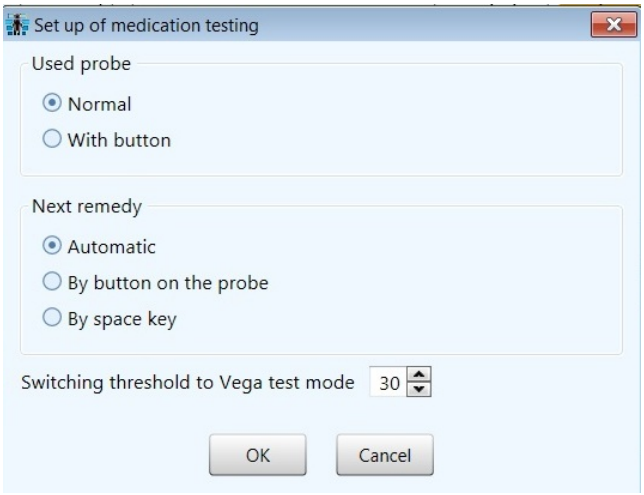
Build-up



Vega test scale



The build-up process depends on the probe type chosen in the **Settings** dialog box.



If the probe without button is selected, the triple BAP build-up must be carried out. If the graph changes its view, the point is suitable, and the *Medscanner* switches to the Vega testing mode.

If the probe with a button is chosen (it should be connected to the "Sensor" socket on the *Medscanner* front panel), during the build-up press the button on the probe when the *Medscanner* indicator reaches its peak (for example, 50). The *Medscanner* switches to the Vega testing mode immediately, without triple build-up. **It is <u>strongly advised</u> to use a touch sensitive button for switching to the Vega test mode <u>only</u> after mastery is achieved, when a user confidently carries out a triple build-up to find a reproducible BAP. For training a traditional probe should be used.**

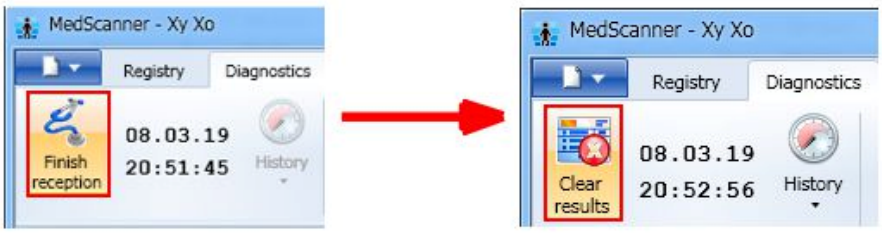
To prevent false positive (and, as a consequence, further incorrect measurements), it is advisable to set the lower threshold by default (not less than 30 cu) during build-up before switching to the vegetoresonance testing mode.

All further actions on selection of testing medicines, filters, recipes, etc. are the same as those during usual testing described above in the "Medicine testing" section of the present Manual. The only difference is modified graph view and a strategy of selection of suitable medicines by a doctor.

You can disable the Vega testing mode at any time by clicking the **Vega test** button. After that you can enable it again, if necessary, and make a build-up of the same BAP or other point.

At the moment of testing, in case a new reproducible BAP is selected, the program switches to the waiting of the BAP build-up mode again.

Upon completion of Vega testing sequentially click the **Finish reception** and **Clear results** buttons.



All further actions regarding to medicines (profiles compilation, medicine recording, etc.) are the same as those during medicine testing described above in the previous chapter.

NAKATANI DIAGNOSTICS

(for *Medscanner BIORS*; *Medscanner BIORS-01*; *Medscanner BIORS-02*; *Medscanner BIORS-03*; *Medscanner BIORS-04* embodiments)

Ryodoraku diagnostics

In the last two decades, the doctrine of Ryodoraku has become the most popular in Japan. In 1950, a doctor and researcher Nakatini found a line, resembling a meridian of kidneys. It contained a series of points which had a higher conductivity than the adjacent areas. This phenomenon was observed in patients with renal edemas, but not in healthy people. Nakatani named this line "ryodoraku" (or "redoraku"), i. e. the line of good electric conductivity. In Japanese, the word *ryodoraku* consists of several components: "ryo" means good, "do" means conductivity, and "raku" is a line.

Since meridian points have good electric conductivity and the lines with good electric conductivity (that resemble classical meridians) can be seen at various diseased conditions, Nakatani suggested that the meridian is a Ryodoraku phenomenon. Lately, it is believed that this phenomenon can be observed not only in connection with diseases of internal organs but also can reflect their physiological changes. There are pathological and physiological Ryodoraku.

Nakatani offered a simple way of meridian naming. He divided two groups of meridians: *Hand* (identified by the letter "H") and *Foot* (identified by the letter "F") meridians.

Conformity of biologically active points with organs:

H1 (LU9*, P9, tai-yuan)	Lungs
H2 (PC7*, MC7, da-ling)	Blood vessels, pericardium
H3 (HT7*, C7, shen-men)	Heart
H4 (SI4*, IG4, wan-gu)	Small intestine
H5 (TE4*, TR4, yang-chi)	Organs of lymphatic system
H6 (LI5*, GI5, yang-xi)	Large intestine
F1 (SP3*, RP3, tai-bai)	Spleen, pancreas
F2 (LR3*, F3, tai-chong)	Liver
F3 (KI3*, R3, tai-xi)	Kidneys
F4 (BL64*, V64, jing-gu)	Urinary bladder
F5 (GB40*, VB40, qiu-xu)	Gall bladder
F6 (ST42*, E42, chong-yang)	Stomach

The skin in the area of 12 representative points in a healthy person has a different degree of sensitivity to the testing Nakatani's signal, depending on relation to one or another dermatome (or more precisely, autonomic ganglia of the sympathetic trunk innervating one or another dermatome). Therefore, the degree of change in electrical conductivity of these skin areas varies during the testing process. When Nakatani detected such a feature, he developed scales for interpretation of conductivity values for each dermatome and created a so-called standard "Ryodoraku" chart (R-chart).

The results of conductivity measurements on representative BAPs are recorded to the R-chart. Each conductivity value in a representative BAP (the current magnitude is measured in

microamperes), is marked on a corresponding scale. Then the arithmetic mean value of all 24 values is calculated, which is marked on two end scales of the R-chart corresponding to the mean conductivity values (levels). Values on the end scales are connected with a horizontal line. Two another horizontal lines are drawn parallel to that line, above and below, at a distance of 7 mm each. In such a way a normal range is determined, and the horizontal lines are its upper and lower limits. It should be noted that indicated values of a normal range (14 mm) are valid if the height of the R-chart scale is 105 mm.

In the *Medscanner* program the standard voltage of 12,6 V and a short circuit current of 200 μA is used, as was offered by Nakatani. After every point measurement, the values of each point are averaged and corrected to the value that is marked on the R-chart in millimeters (maximum value is 105 mm). Besides, for every meridian the correction factors are applied. Therefore, the similar values of current intensity obtained from different meridians can have different height on the R-chart.

Nakatani electropuncture diagnostics procedure

Workplace requirements

The room for electropuncture diagnostics and therapy should be used only for these purposes. X-ray units, microwave devices, ungrounded electrical wires should not be located near the room. The floor in the room must be covered with nonstatic materials. The air humidity and the room temperature should be maintained within 70–80% and + 20°–22°C respectively. If for the artificial lighting the daylight fluorescent lamps are used, they should be placed at a distance of not less than 1.5 m to a patient (the distance between filament lamps and an examined person should be at least 0.5 m). If computer complexes are used, a processor and a monitor should be placed as far away as possible from the measurement location (at least 50 cm). Doctor's workplace must be so equipped that he can work in a comfortable, stress-free working posture. A doctor should operate with active electrode, operator control and computer equipment easily. The comfortable environment and physical rest conditions for a patient should be provided. It is advisable to ensure that no one enters the working room during the examination.

Requirements regarding a doctor

During examination a doctor should wear the clothes made of natural fabric to avoid effects of static electricity. Doctor's hand carrying out measurements and procedures, should be in a stable position, without tension. Before measurement a doctor should not press on a BAP (practice shows that search of a BAP for measuring should be done only according to corresponding anatomical landmarks). During measurements a doctor should not touch a patient's skin with his/her hand. A repeat measuring of a point is allowed in several hours only.

Requirements regarding a patient

A patient should take off shoes, socks (as well as stockings or pantyhose), and any bijouterie or jewellery made of any metal before the examination. All personal communication tools generating electromagnetic fields must be also put aside. Skin areas on which electrodes are placed must be clean, without skin damage, scars, papillomas and other skin lesions or birthmarks.

Examination should not be performed earlier than 1.5–2 hours after physical activity, meal or physiotherapeutic sessions. It must not be conducted earlier than three days after investigations related to powerful radiation (radiological methods, radioisotope diagnostics, nuclear magnetic resonance, etc.). An exception are cases when examination is carried out for the analysis of changes developing in the body under the influence of radiation.

If possible, one day prior to electropuncture diagnostics it is necessary to stop intake of medicines. The decision to stop the medicines intake before examination is taken by a doctor trained in electropuncture diagnostics.

Directly before the examination, a patient should have a rest for 10–15 minutes.

Preparation for the measurements

Just before the start of measurements, set a special hollow attachment of 15 mm in diameter on the tip of the active electrode probe. Put a cotton ball soaked in isotonic sodium chloride solution into the metal cavity of the hollow attachment.

The cotton ball should be moistened well, but not too much. The use of other materials such as felt is also allowed.

Measurement procedure

A patient is positioned on the couch or in the armchair in a comfortable relaxed posture. Before measurements it is necessary to explain to a patient the purpose of examination. Diagnostics is carried out by measurement of electric conductivity in representative BAPs.

Following the sequence of measurements, sequentially put the active electrode to testing points. Measurements are carried out in the following order: H1-H6 on the right hand, H1-H6 on the left hand, F1-F6 on the right foot, F1-F6 on the left foot. During examination a patient holds the indifferent (passive) cylindrical electrode in his/her hand (on the side that is opposite to the side of measurements). I. e. during the measurements on the left side, a patient holds the electrode in his/her right hand; during the measurements on the right side he/she holds it in his/her left hand). A patient should hold a passive electrode tight, but not clench it too hard. During measurements, a doctor should not touch a cup of active electrode or a patient's skin with his/her hand. During the measurement, the active electrode should touch a surface of patient's skin in the area of a representative point with wet cotton only, at a right angle, with constant level of pressure. Metal parts of the active electrode probe should not touch patient's skin. Recording of the *Medscanner* readings should be started at 3rd second from the beginning of electric conductivity measurement on each of 24 measuring points. The obtained results are recorded to special R-chart.

Method of repeated electropuncture measurements

It is important to note that according to Nakatani, a meridian has a state of "excess of energy" or hyperfunction if a value of electrical conductivity in corresponding representative point is above an upper limit of the normal range. Similarly, a meridian has a state of "deficiency of energy" or hypofunction, if a corresponding value of electrical conductivity on the representative point is below a lower limit of the normal range. According to Nakatani, meridians with electrical conductivity values in representative points within the normal range are considered as "normal". A conclusion about a functional state of meridians is drawn on the basis of results of only one examination.

Long-term investigations have shown that many factors very often influence on the results of one examination. These factors are not related to steady deviations of meridians state and can include the following:

– psychoemotional state of a patient at the time of examination;
– interrupted eating patterns and sleep problems the day before examination;
– excessive physical activity before examination;
– intake of medicines, etc.

Therefore, an interpretation of a functional state of acupunctural meridians according to the results of one examination has preliminary, stochastic nature. To improve the reliability of diagnostics and eliminate the errors caused by circumstantial factors, it is advised carrying out the repeated electropuncture measurements: over 3 days in a row, once a day, preferably at the same time. Based on results of every examination, the meridians that are not within the normal range are detected. Then on the majority principle (two out of three), the steady deflected (SD) meridians are detected, i. e. the meridians which state is the same, not within the normal range according to results of two or more examinations. The SD meridians are used for further determination of electropuncture profile for the main and concomitant diseases, for making of individual treatment regimen and for the treatment efficiency control.

Interpretation of Nakatani electropuncture diagnostics results

According to Nakatani, the meridian state that are not within the normal range should be confirmed by symptoms identified during patient interview and physical examination. If symptoms consistent with the meridian state are absent, it is possible to suppose a latent stage of a disease or preexisting disease. Offered by Nakatani a list of symptoms is limited and not differentiated; making it difficult to interpret the diagnostics results.

According to classical view, an acupuncture meridian is a multifunctional system. Consequently, the meridian state (hypo- or hyperfunction) depends on a number of factors, that should be considered and differentiated. The main factors influencing on the state of a meridian include the following.

1. The meridian state depends on a functional state of the associated internal organ or body system.

The hyperfunction of a meridian can indicate the following:
– acute inflammatory processes of the corresponding internal organ;
– severe exacerbation of a chronic inflammatory process of the associated internal organ;
– functional disorders (excess type) of the associated internal organ or body system (e. g., hyperfunction of stomach meridian can point to hyperacidity);
– malignant tumor at an early stage (e. g. stable pronounced hyperfunction of the stomach meridian together with stable low average level of electrical conductivity can indicate the development of a malignant process in the stomach area).

The hypofunction of a meridian can indicate the following:
– chronic inflammatory process of the associated internal organ (a subacute stage);
– functional disorders (insufficiency type) of the associated internal organ or body system (e. g., hypofunction of the gallbladder meridian can indicate a hypotonic biliary dyskinesia);
– benign tumors (e. g., hypofunction of the lung meridian can indicate vocal cord papillomas).

2. The meridian state depends on a functional state of a certain tissue type. For example, hyperfunction of the liver meridian can indicate the hypertonicity of muscular tissue, and hypofunction of the liver meridian can point to a muscular hypotonia.

3. A meridian state can change if abnormal focus is located on the external course of a meridian, or in case of pain syndrome with pain irradiation along the external course of a meridian. For

example, in dorsopathy of the cervical and thoracic spine column with plexitis signs, a hyperfunction of the small intestine meridian and three heaters is observed.

4. The meridian state corresponds to a functional state of an associated organ of senses. For example, diseases of visual organ are observed in corresponding changes of the liver meridian.

5. The meridian state depends on a psychoemotional state of a patient. For example, simultaneous hypofunction of the liver, heart and stomach meridians can indicate a depressed state in a patient.

To identify pathology through Nakatani electropuncture diagnostics, the following parameters are used:

- combinations of meridians that are stable deviated from the normal range (on the R-chart), or meridians that are not within the normal range at the 4th examination during "energofunctional test".
- An average level of electrical conductivity considered as normal with values of 40–80 uA, low with values of less than 40 uA and high with values of more than 80 uA. If an average value is above 80 uA, a state of energy processes of regulation of compensatory-adaptive body mechanisms is considered as hyperergic. If an average value is lower than 25 uA, it is a hypoergic state or an energetic asthenia of the immunodefences.
- A significant asymmetry in electrical conductivity values on the left and right sides of the same meridian, indicating the vertobrogenic disorders.
- An electroconductivity ratio obtained during measurements on BAPs of the left and right (L/R) sides of a body. The normal range is 0.97–1.03. If L/R ratio is more than 1.1 or less than 0.9, it is possible to assume metabolism disorders and other systemic disturbance specific to gross changes of connective tissue, intervertebral cartilages, joint capsule, etc., i. e. involvement of musculoskeletal and locomotor system. Most often this index is analyzed together with the other parameters. If the L/R ratio is more than 1.03, it means that intracellular content has alkaline reaction, and a patient is prone to oncology diseases. It has been found that the most types of cancer are caused by microbes, which size is less than a cell size. The microbes is introduced into the cell and start to replicate inside actively. It is very difficult to kill them because they are protected by the cell defense system, therefore treatment destroys both cancer and body cells. If the L/R ratio is less than 0.97, it means that intracellular content has acid reaction, and foreign microorganisms cannot survive inside cells. However, this condition is harmful for body cells too.
- An electroconductivity ratio obtained during measurements on BAPs of Yin and Yang meridians. An electroconductivity ratio of Yin/Yang meridians in practically healthy persons is 0.815–1.15. In case of Yin organs prevalence over Yang organs, i. e. when Yin/Yang ratio is more than 1.15–1.2, it indicates an inactivity of metabolic processes (slowing down, intensity reduction of energy metabolism). This condition is typical for low-intensity chronic processes, hypodynamia, intoxication. Prevalence of Yang over Yin, i. e. Yin/Yang ratio is less than 0.8, indicates the accelerated energy metabolism. Inactivity of energy metabolic processes indicates the body state, when more energy is produced than spent. On the contrary, the increased energy metabolism indicates that more energy is spent than produced by a body.
- An electroconductivity ratio obtained during measurements on BAPs of upper and lower extremities, i. e. hands and feet (H/F) ratio. In practically healthy persons the H/F ratio is within 0.815–1.15. In psychoemotional stress or increased mental activity, the H/F ratio is above 1.2, and at psychasthenic condition it is less than 0.8. A normal H/F ratio in males is 0.9–1.15 and in females it is 0.8–1.0.

Electropunctural profile of a disease is a specific combination of SD (stable deviated) meridians (at a certain value of average level of electroconductivity) corresponding to the clinical picture of a certain pathology. Electropunctural disease profile consists of principal and additional meridians. Principal meridians characterize the pathogenesis of a disease. Dysfunction of additional meridians is related to symptomatic manifestations of that disease.

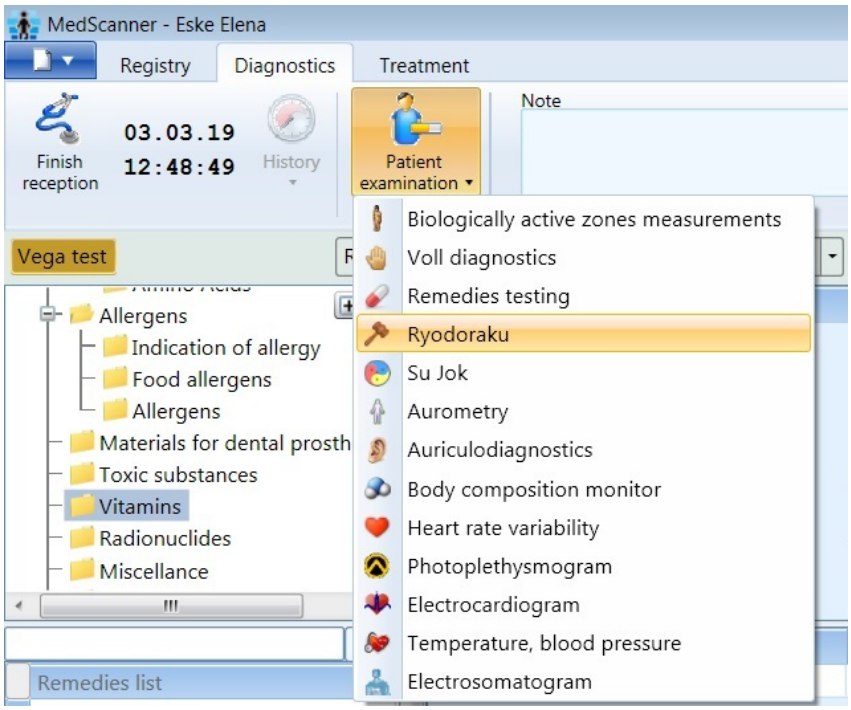
In traditional medicine, the evaluation of the parameters of electropunctural measurements on representative BAPs has unique significance for detection of disorders of health condition and for choice of a treatment scheme. However, electric conductivity changes on BAP are nosologically non-specific, i. e. different diseases can cause similar changes of electropunctural parameters. So this method cannot independently solve the complex clinical questions yet. Consequently, at the current time the electropuncture diagnostics can be used in medical practice by trained professionals as a provisional diagnostic technique and a monitoring method.

To conduct the examination optimally, the active participation of a patient is needed. Therefore, one of possible approaches is to explain to a patient the essence of the method and inform him or her about possible health disorders, additional diagnostic testing, the course of treatment and expected therapy results.

It is important not to give a patient a final diagnosis after procedure of electropuncture diagnostics. A diagnosis must be checked and reliably confirmed. Revealed electric conductivity changes on representative BAPs do not precisely indicate the medical condition. Until some time, it is only the unfavorable background, and against it a patient may or may not develop a particular disease. At the stage of electropunctural evaluation of organs and body systems, it is preferable to use such operational terms of diagnosis as “provisional”, “probable” or “possible”. It is important to choose words carefully to avoid iatrogeny.

Working with the program

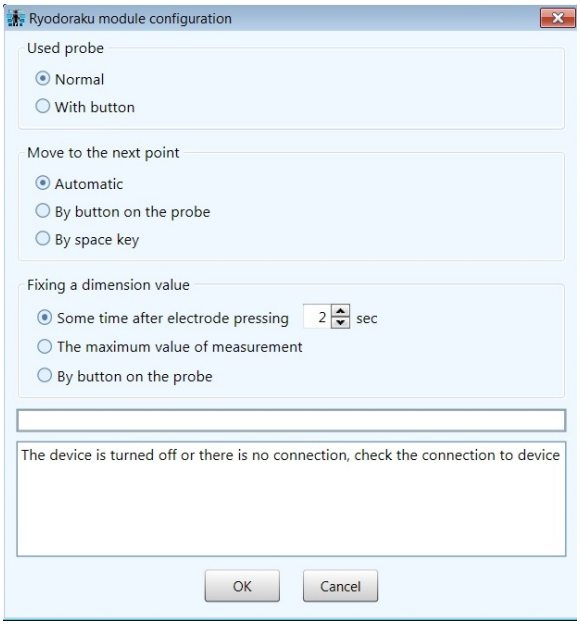
Select a patient or register him/her in the **Registry** menu. Select the **Diagnostics** tab. Select **Ryodoraku** in the **Examination** menu.



Connect a patient cable to the “BAP” socket on the front panel of the *Medscanner*. Connect the black plug of a patient cable to the passive cylindrical electrode that a patient holds in his/her hand (opposite to the side of measurements). Connect the red plug to the probe that is set on BAP. If you intend to use a probe with a touch sensitive button, connect it to the “Sensor” socket (in that case the red plug of a patient cable is not used; it is desirable to avoid its contact with the *Medscanner* or a patient). A hollow attachment should be on the probe.

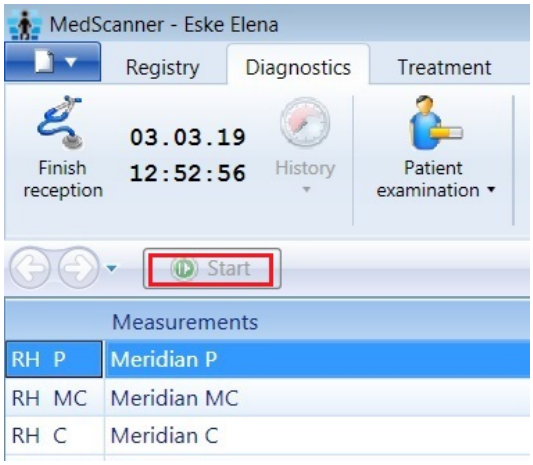
Click the **Settings** button on the right. In the appeared dialog box select a desirable probe type: traditional or having a touch sensitive button. Besides, select the way how the program goes to the next BAP during measurements: automatically after measuring is completed and the probe is taken off a BAP, by pressing of a touch sensitive button on a probe or by pressing of the **Space** key on the keyboard. You also should choose a desirable technique of a measurement registration. Some authors consider that it is necessary to register measurement data after a certain period of time from the moment of electrode pressing (usually 2 seconds). Others consider it more appropriate to register the maximum measurement value during the entire period of electrode pressing. Choose the one that is closer to you.

Roll a piece of cotton wool into a ball, moisten it slightly and put the ball into the cavity of the electrode probe attachment. By default, the *Medscanner* is adapted to measurements at zero cotton resistance value. However, if you need to adapt the *Medscanner* to resistance of cotton or other material (for example, felt), press the electrode with cotton to the passive cylindrical electrode (metal parts of the active electrode probe should not be in contact with the cylinder). The program adaptation in a customization dialog occurs and after that you are able to start working (you will see a corresponding program message). Those actions can be carried out during any stage of measurements (for water drying correction).

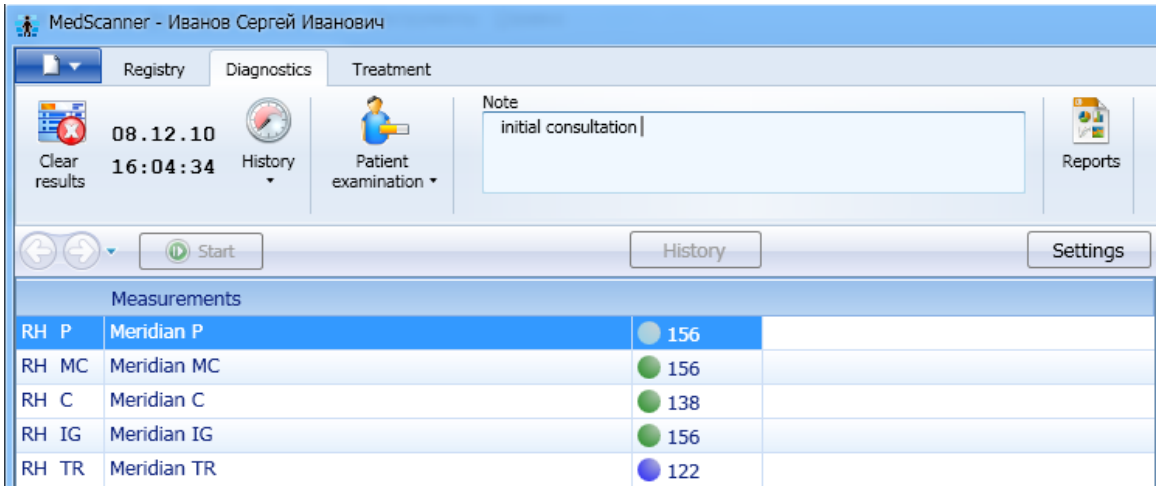


Click the **Start reception** button:

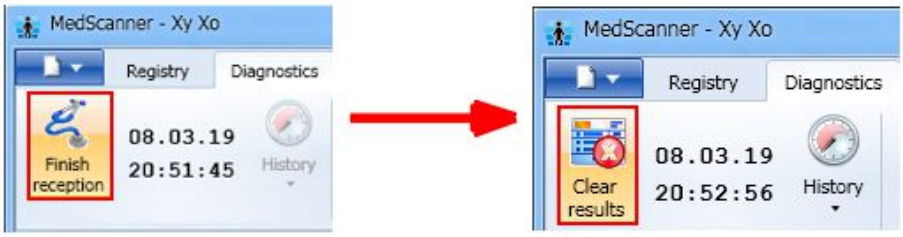
Click the **Start** button and go through the entire BAP list, sequentially pressing the electrode with cotton to every BAP from the list.



Make sure the metal parts of the electrode probe do not contact a patient's skin (only a cotton ball into the cavity of the electrode probe should contact the skin). The results are available after measurement on all BAPs. You can repeat measurements by clicking the **Start** button again. A note to the examination can be added in the **Note** box.

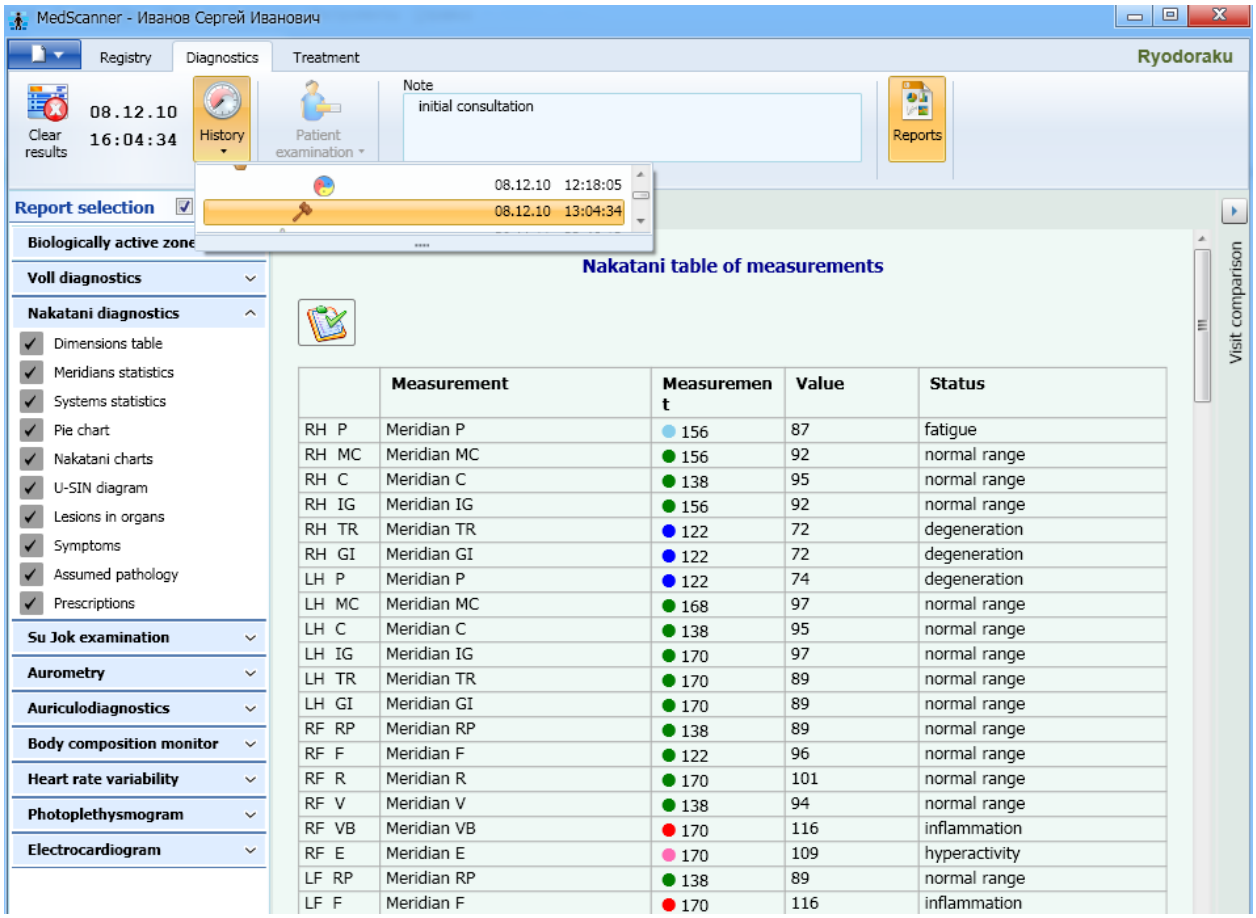


At the end of Nakatani diagnostics sequentially click **Stop**, **Finish reception** and **Clear results** buttons.



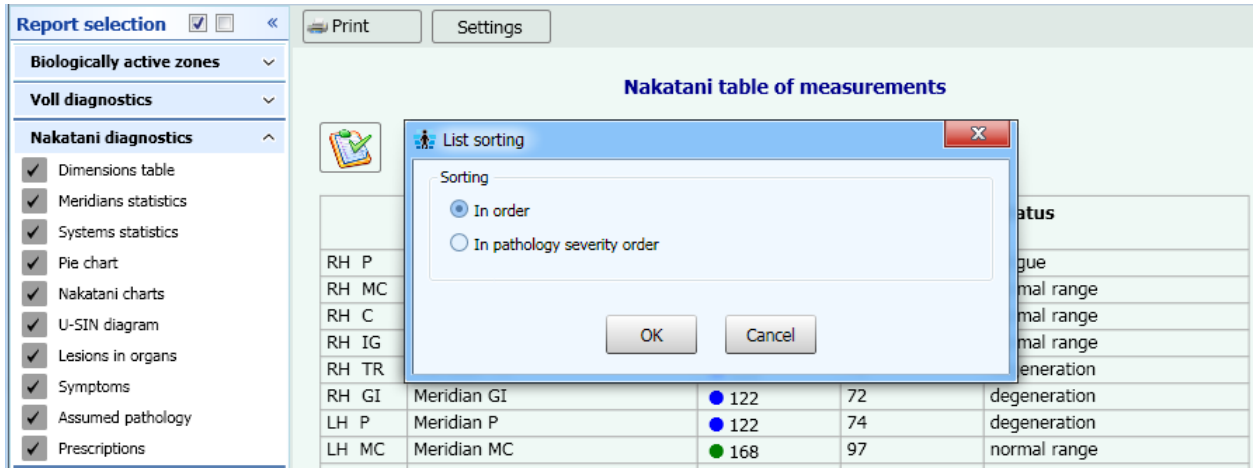
Nakatani diagnostics reports

To view measurement results, click the **Reports** button on the right and tick relevant reports on the left after the diagnostic procedure. To view a history of visits, click the **History** button on the left.



	Measurement	Measurement	Value	Status
RH P	Meridian P	156	87	fatigue
RH MC	Meridian MC	156	92	normal range
RH C	Meridian C	138	95	normal range
RH IG	Meridian IG	156	92	normal range
RH TR	Meridian TR	122	72	degeneration
RH GI	Meridian GI	122	72	degeneration
LH P	Meridian P	122	74	degeneration
LH MC	Meridian MC	168	97	normal range
LH C	Meridian C	138	95	normal range
LH IG	Meridian IG	170	97	normal range
LH TR	Meridian TR	170	89	normal range
LH GI	Meridian GI	170	89	normal range
RF RP	Meridian RP	138	89	normal range
RF F	Meridian F	122	96	normal range
RF R	Meridian R	170	101	normal range
RF V	Meridian V	138	94	normal range
RF VB	Meridian VB	170	116	inflammation
RF E	Meridian E	170	109	hyperactivity
LF RP	Meridian RP	138	89	normal range
LF F	Meridian F	170	116	inflammation

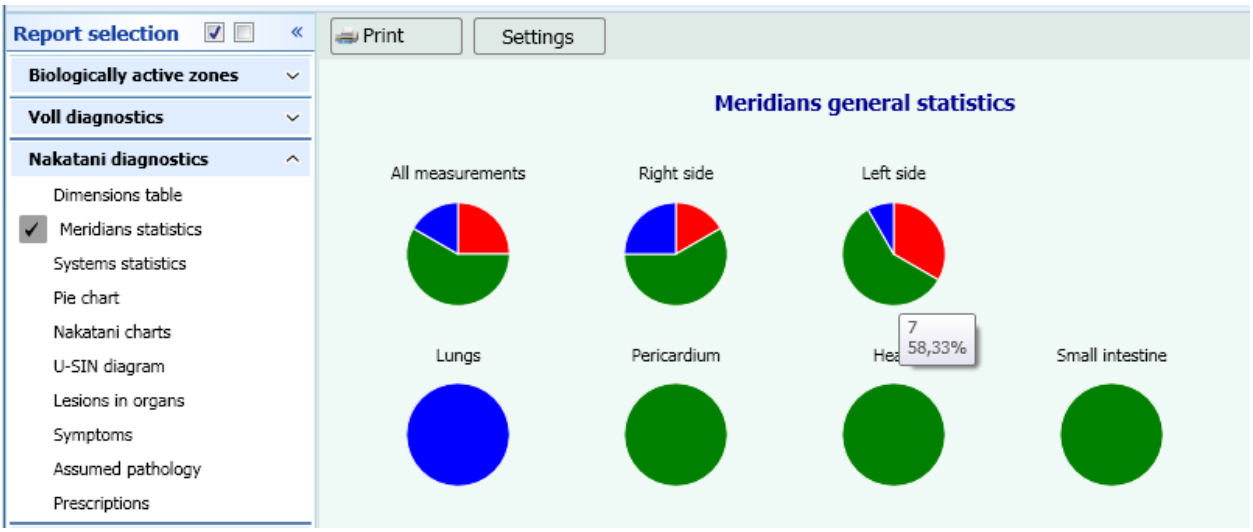
To sort data in tables, click the  button above and left of the table:



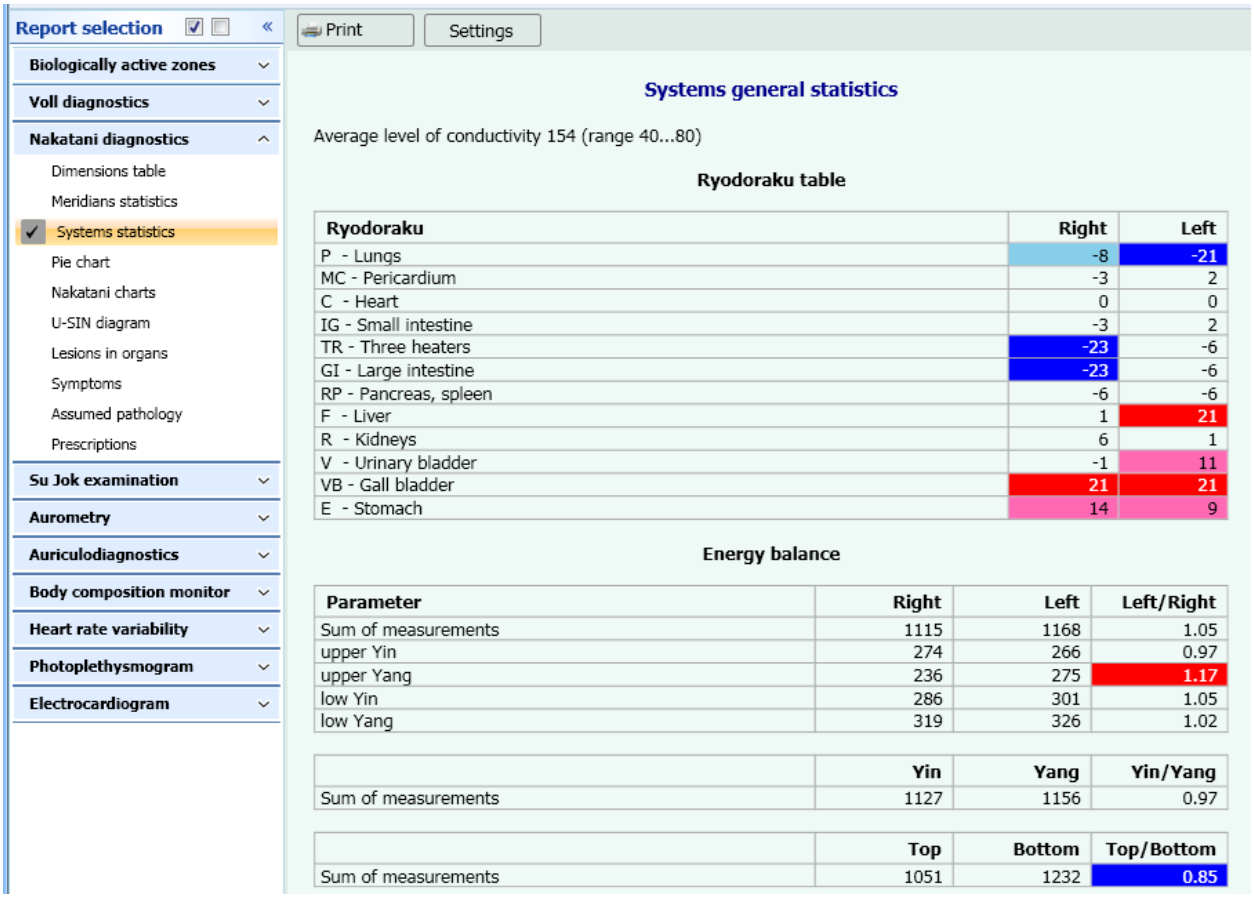
Statistics by meridians

The total number of measured meridian BAPs and the ratio of normal and pathologic BAPs on every meridian are presented in the form of pie charts. BAPs with increased level of energy are marked in **red**, BAPs with decreased level of energy are marked in **blue**. **Green** color indicates

normal level of energy. **Orange** color indicates BAPs on which the measurements were not carried out.

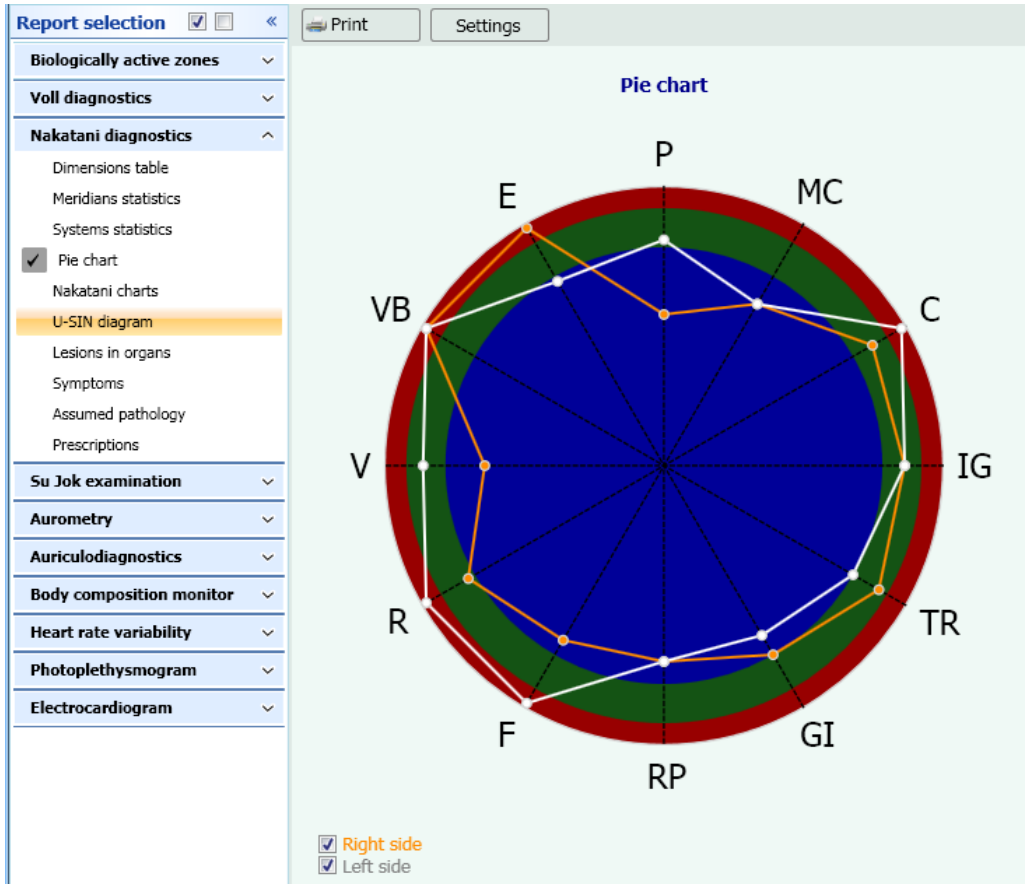


Statistics by systems



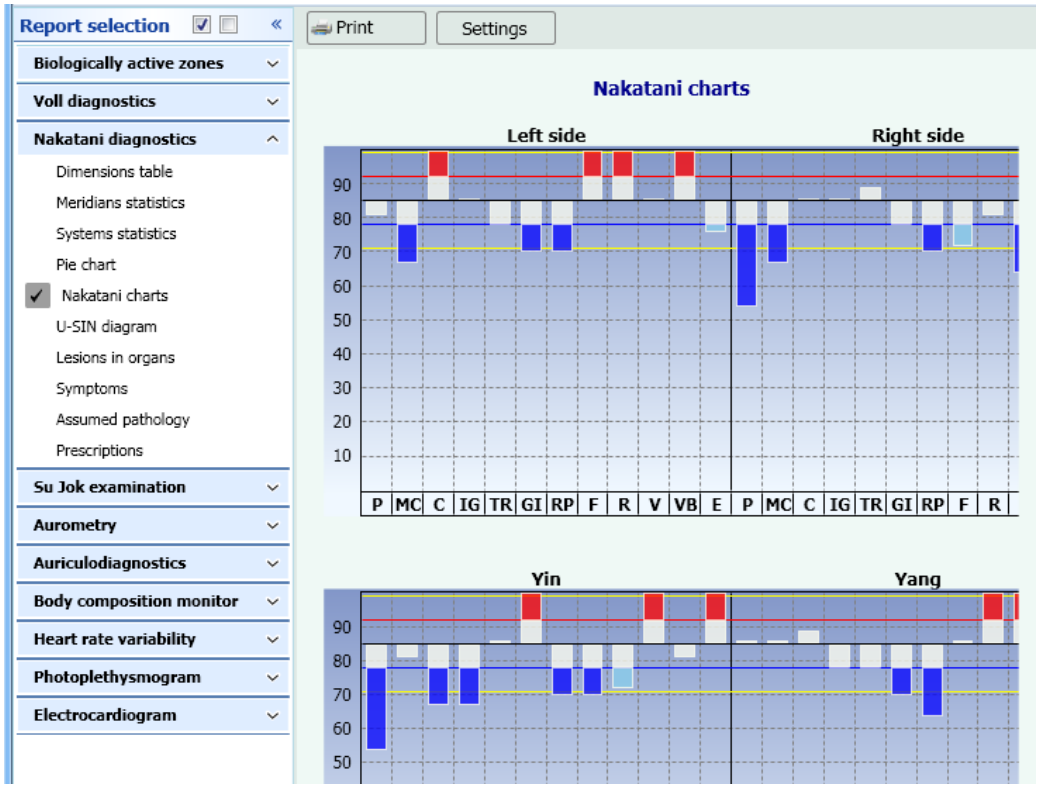
Pie charts

Values out of meridians BAPs normal range are shown. If you tick pie charts for the right and left side, they are shown on the graph.



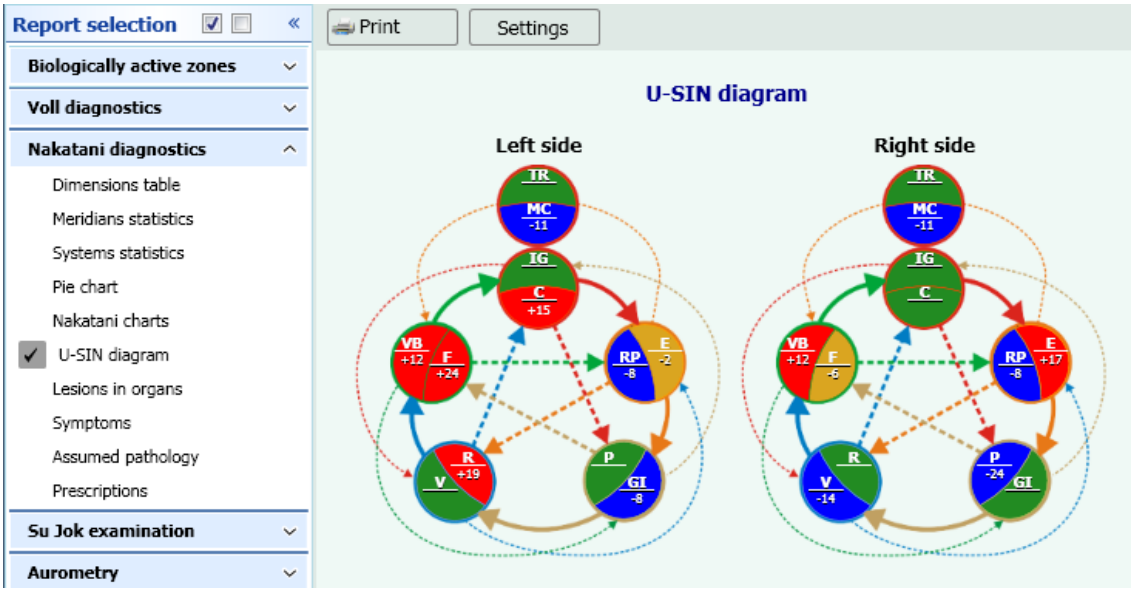
Nakatani diagrams (Ryodoraku charts)

The meridian BAPs deviation from the norm are presented indicating the numerical value for a BAP:



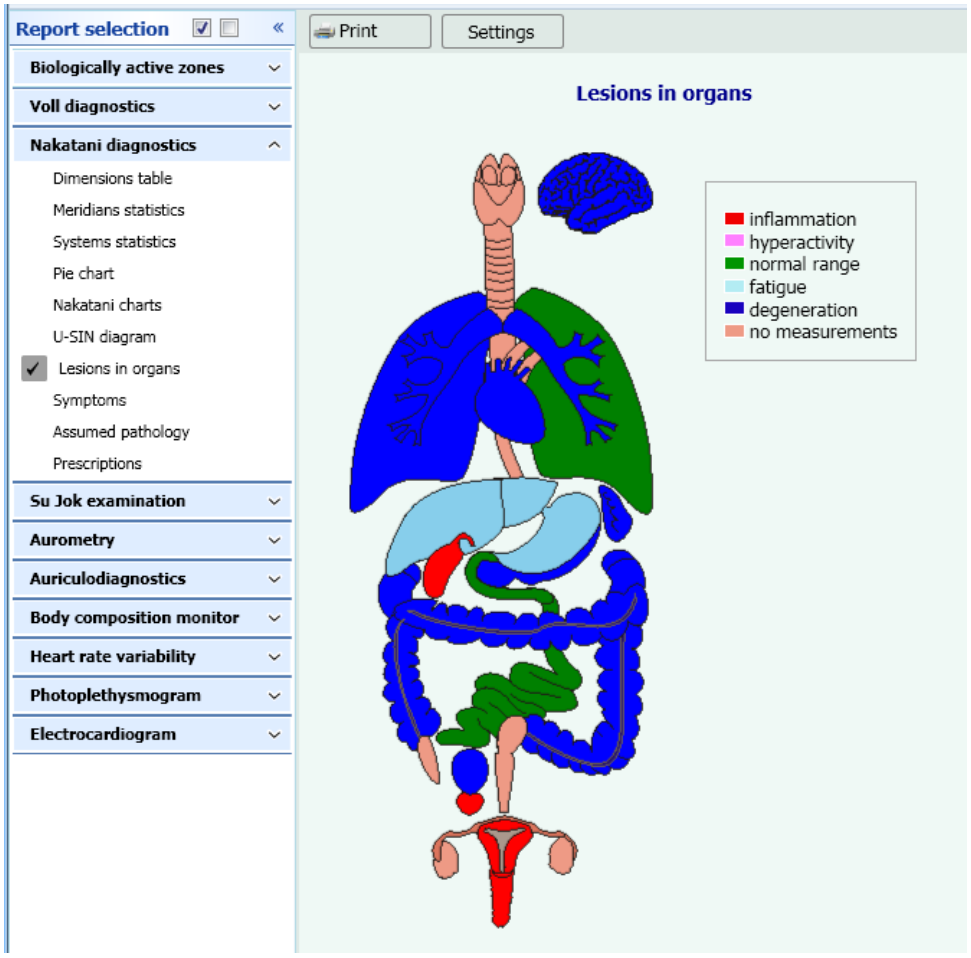
U-SIN (Wu Xing) diagram

Cycle of U-SIN (Wu Xing) Five Elements is shown:



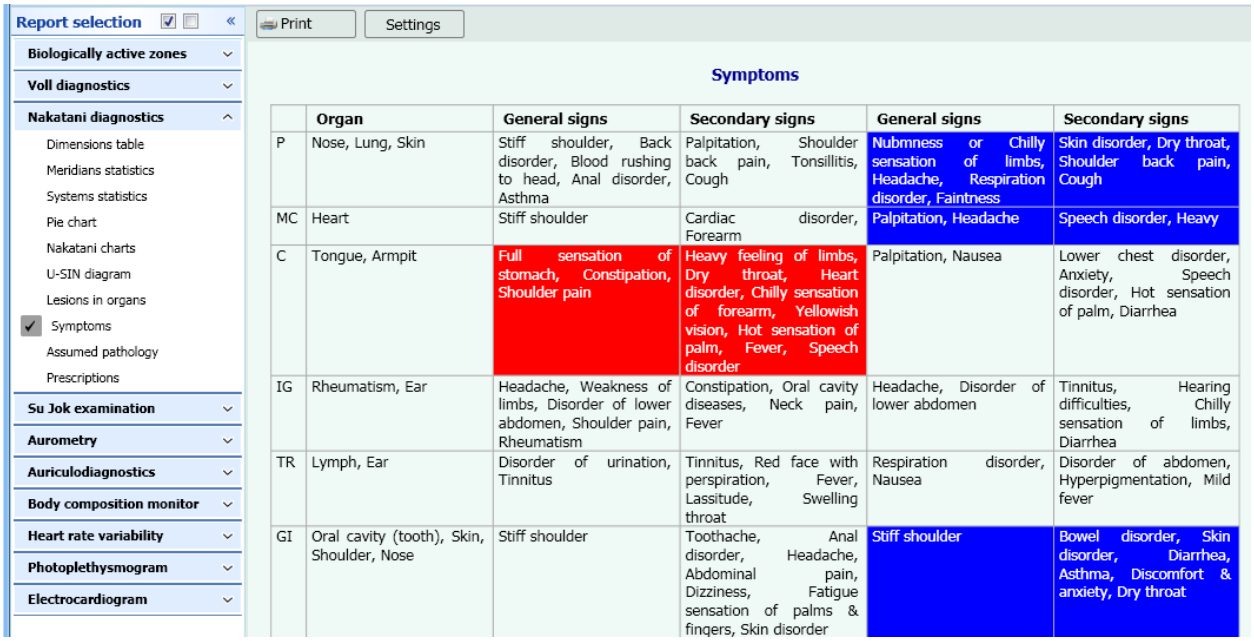
Report on organs

Illustrative visualization of a patient's general health status:



Symptoms

They are shown for comparison with pathologies identified during measurements. If identified abnormality corresponds to symptoms, it can indicate an organ disorder. A color background depends on a color in Nakatani diagram (Ryodoraku chart).



Symptoms

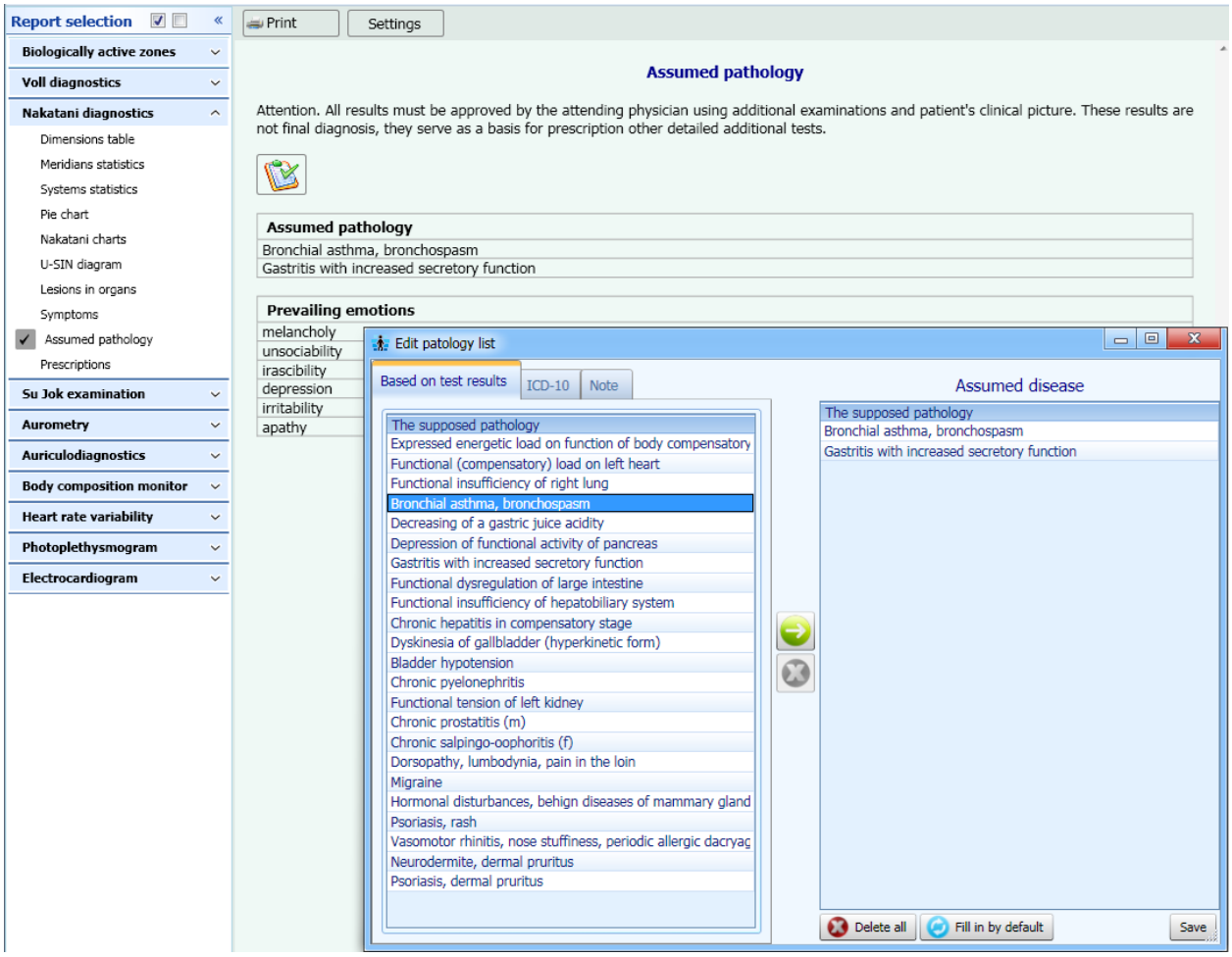
	Organ	General signs	Secondary signs	General signs	Secondary signs
P	Nose, Lung, Skin	Stiff shoulder, Back disorder, Blood rushing to head, Anal disorder, Asthma	Palpitation, Shoulder back pain, Tonsillitis, Cough	Nubmness or Chilly sensation of limbs, Headache, Respiration disorder, Faintness	Skin disorder, Dry throat, Shoulder back pain, Cough
MC	Heart	Stiff shoulder	Cardiac disorder, Forearm	Palpitation, Headache	Speech disorder, Heavy
C	Tongue, Armpit	Full sensation of stomach, Constipation, Shoulder pain	Heavy feeling of limbs, Dry throat, Heart disorder, Chilly sensation of forearm, Yellowish vision, Hot sensation of palm, Fever, Speech disorder	Palpitation, Nausea	Lower chest disorder, Anxiety, Speech disorder, Hot sensation of palm, Diarrhea
IG	Rheumatism, Ear	Headache, Weakness of limbs, Disorder of lower abdomen, Shoulder pain, Rheumatism	Constipation, Oral cavity diseases, Neck pain, Fever	Headache, Disorder of lower abdomen	Tinnitus, Hearing difficulties, Chilly sensation of limbs, Diarrhea
TR	Lymph, Ear	Disorder of urination, Tinnitus	Tinnitus, Red face with perspiration, Fever, Lassitude, Swelling throat	Respiration disorder, Nausea	Disorder of abdomen, Hyperpigmentation, Mild fever
GI	Oral cavity (tooth), Skin, Shoulder, Nose	Stiff shoulder	Toothache, Anal disorder, Headache, Abdominal pain, Dizziness, Fatigue sensation of palms & fingers, Skin disorder	Stiff shoulder	Bowel disorder, Skin disorder, Diarrhea, Asthma, Discomfort & anxiety, Dry throat

Editing of obtained results

After diagnostics the program issues estimated values for revealed pathologies, recommends prescriptions. These results can be edited by clicking the  button above and left of tables.

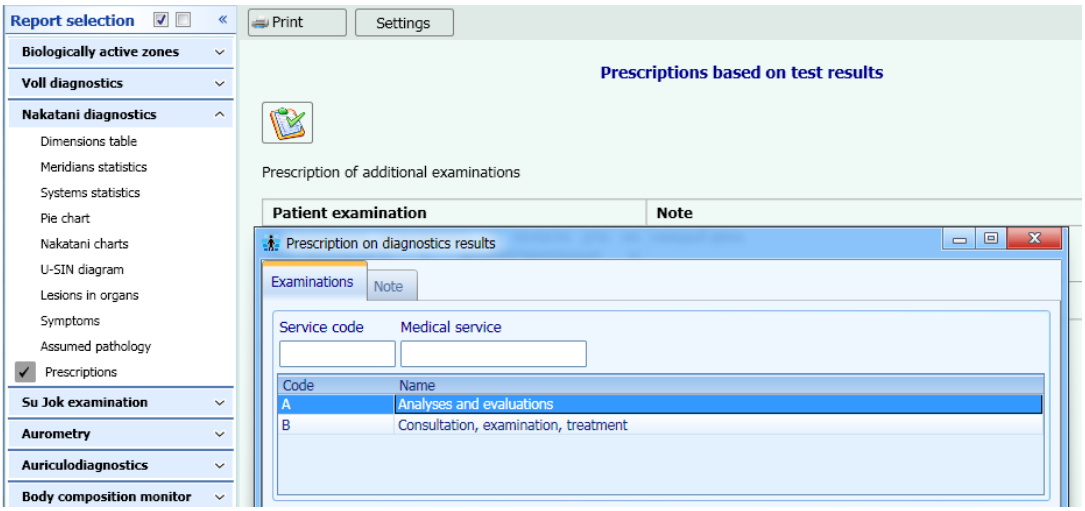
Editing of presumptive pathologies list

In this window you can edit presumptive stages of a disease, add diagnoses and pathologies from ICD 10 (then they will appear in separate table in a report) as well as add a comment to the certain examination by mouse double click. After changes are made, click the **Save** button at the bottom right of the window.



Prescriptions on the examination results

In tis window by double mouse clicking you can edit recommended examinations according to classification system of Ministry of Health of the Russian Federation. To do that, click the needed line with the right mouse button and select **Add** item. After the needed examinations are selected, click the **Save** button.

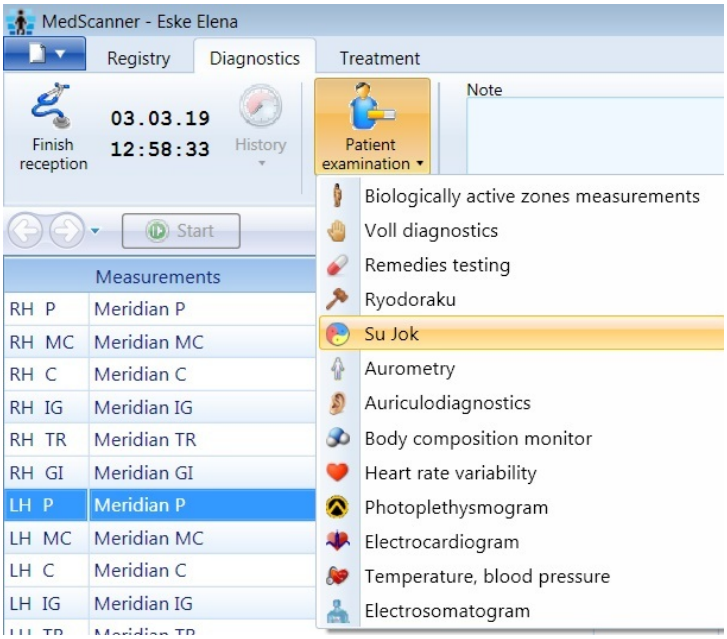


PARK JAE WOO (SU JOK) DIAGNOSTICS)

(for *Medscanner BIORS*; *Medscanner BIORS-01*; *Medscanner BIORS-02*; *Medscanner BIORS-03*; *Medscanner BIORS-04* embodiments)

Working with the program

Select a patient or register him/her in the **Registry** menu. Select the **Diagnostics** tab. Select **Su Jok** in the **Examination** menu.

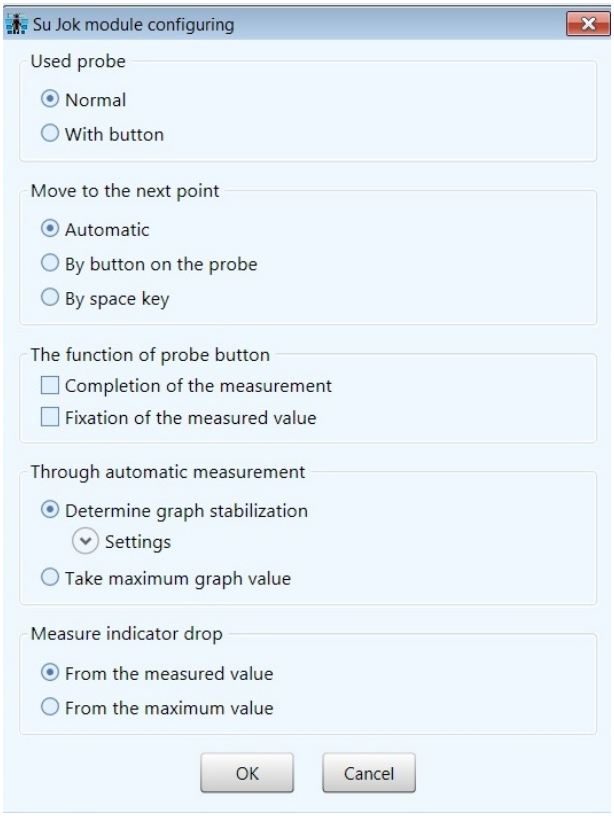


Connect a patient cable to the "BAP" socket on the front panel of the *Medscanner*. Connect the black plug of a patient cable to the passive cylindrical electrode that a patient holds in his/her hand (opposite to the side of measurements). Connect the red plug to the probe that is set on BAP. If you intend to use a probe with a touch sensitive button, connect it to the "Sensor" socket (in that case the red plug of a patient cable is not used; it is desirable to avoid its contact with the *Medscanner* or a patient). A special 2.5-mm ball-head attachment for Su-Jok diagnostics should be on the probe.

Click the **Settings** button. In the appeared dialog box select a desirable probe type: traditional or having a touch sensitive button. Besides, select the way how the program goes to the next BAP during measurements: automatically after measuring is completed and the probe is taken off a BAP, by pressing of a touch sensitive button on a probe or by pressing of the **Space** key on the keyboard.

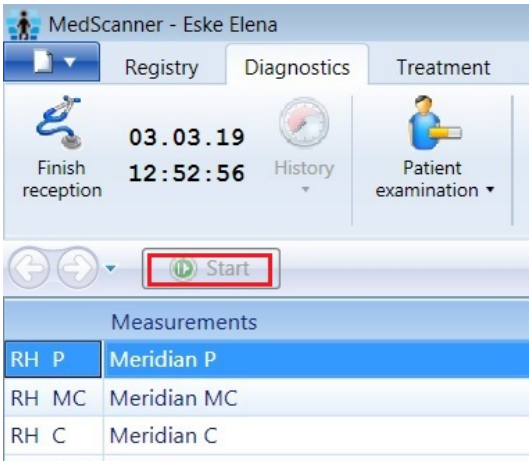
The *Through automatic measurement* setting allows selection of a measurement starting point. Either the program determines the beginning of a plateau (stabilization) on a graph and starts counting up from that value (by default the duration of stabilization is 1 s), or it is possible to set measurement counting up from the maximum value on a graph.

If a probe with a touch sensitive button is used, there is a possibility to set program actions when pressing a touch sensitive button: either completion of the measurement and automatic switching to the next BAP on a measurement route, or fixation of the measured value (the data reading is continued that allows estimation of "indicator drop" value).

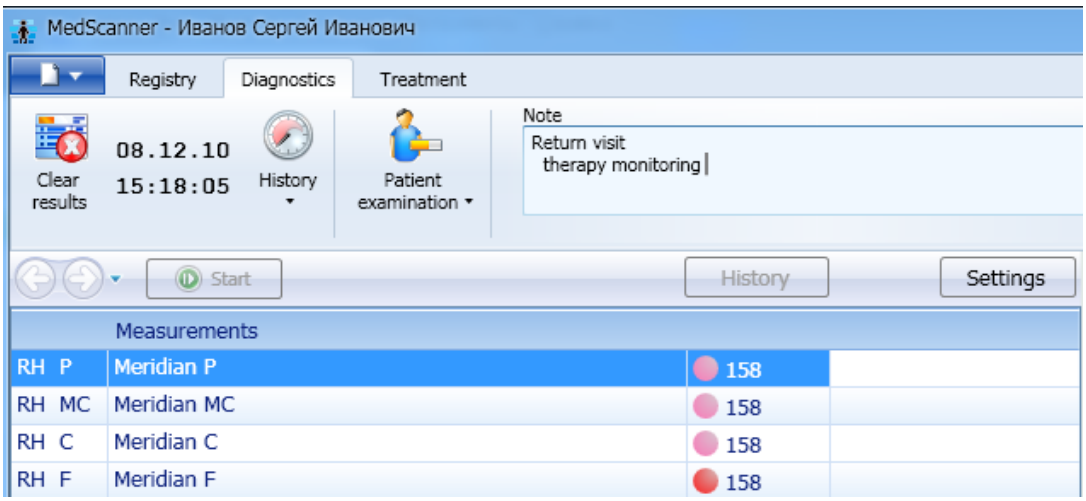


Click the **Start reception** button:

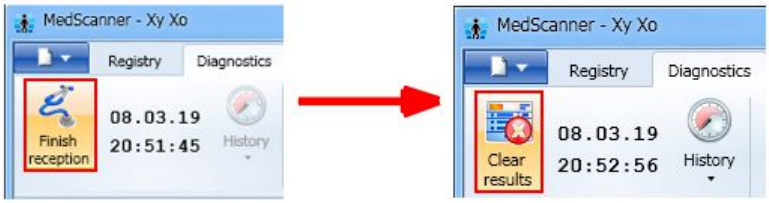
Click the **Start** button and go through the entire BAP list, sequentially pressing the electrode to every BAP from the list.



Click the **Start** button. The results are available after measurements on all BAPs. You can repeat the measurements by pressing the **Start** button again. A note to the examination can be added in the **Note** box.

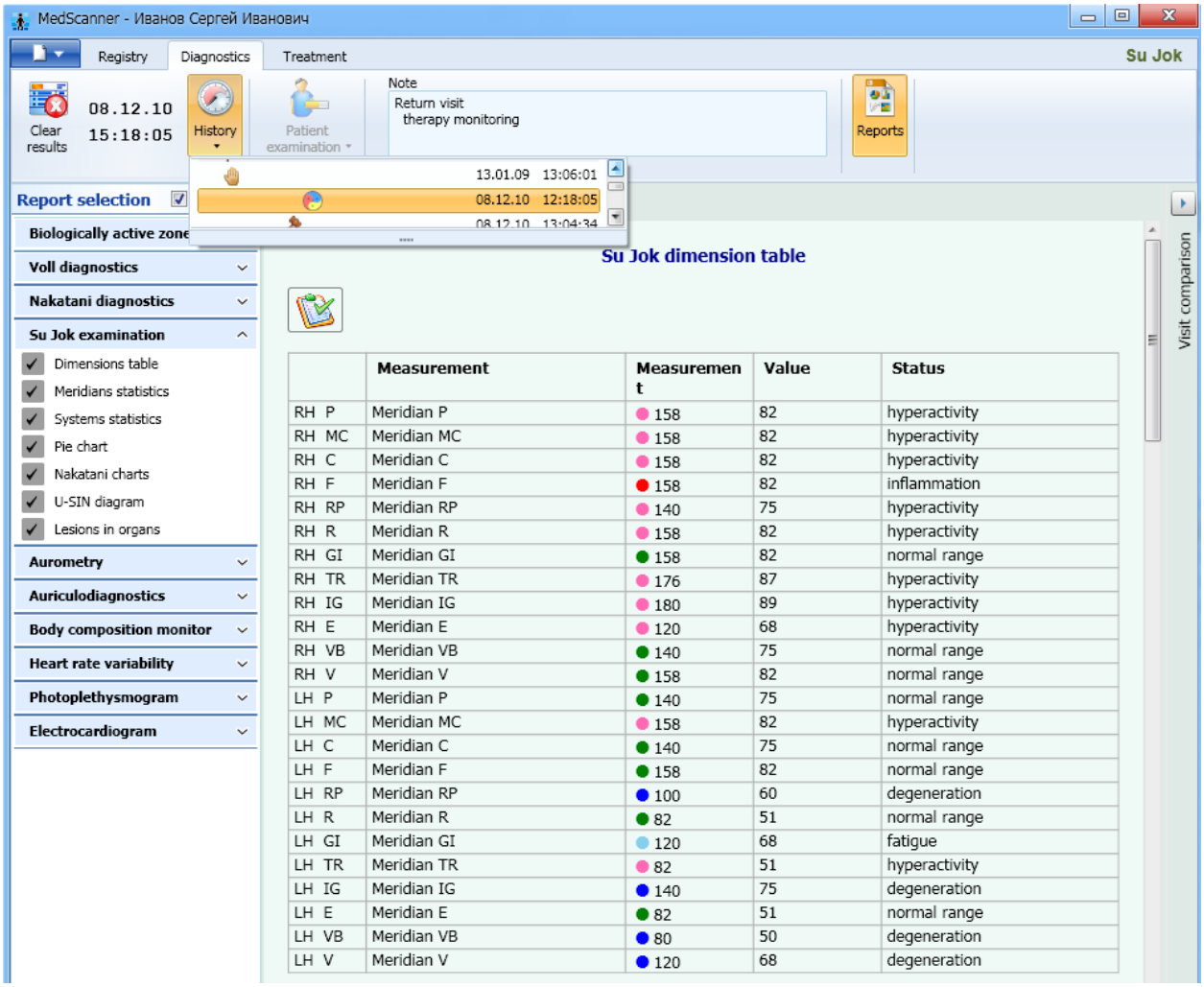


At the end of Su Jok diagnostics sequentially click **Finish reception** and **Clear results** buttons.



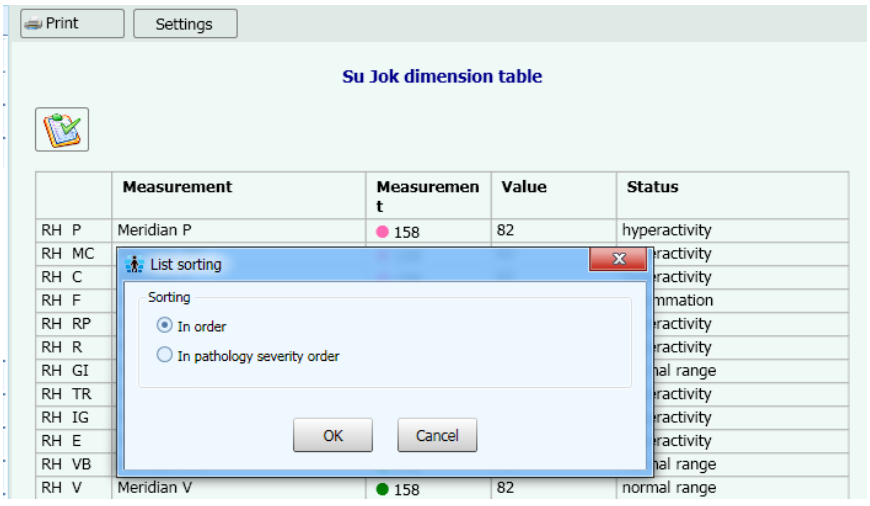
Su Jok diagnostics reports

To view measurement results, click the **Reports** button on the right and tick relevant reports on the left after the diagnostic procedure. To view a history of visits, click the **History** button on the left.

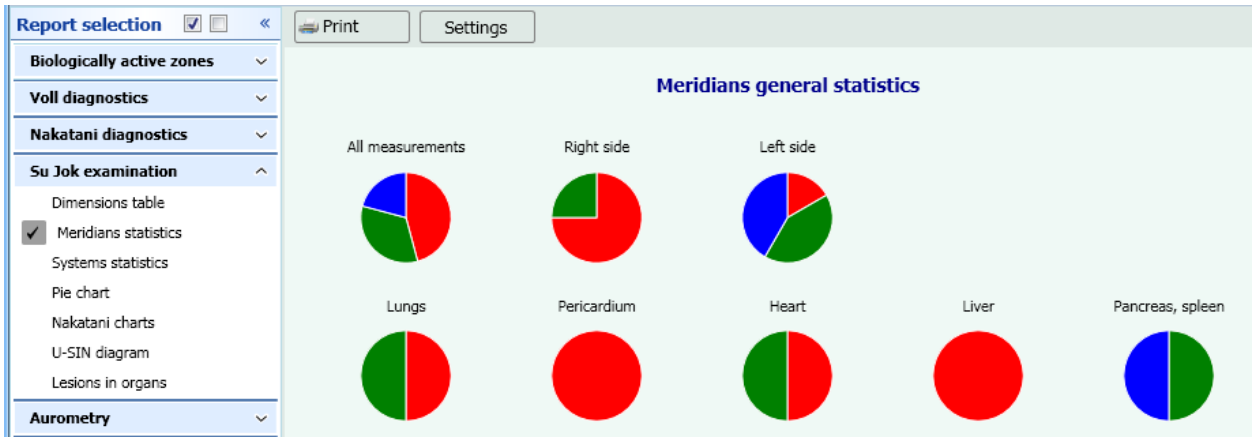


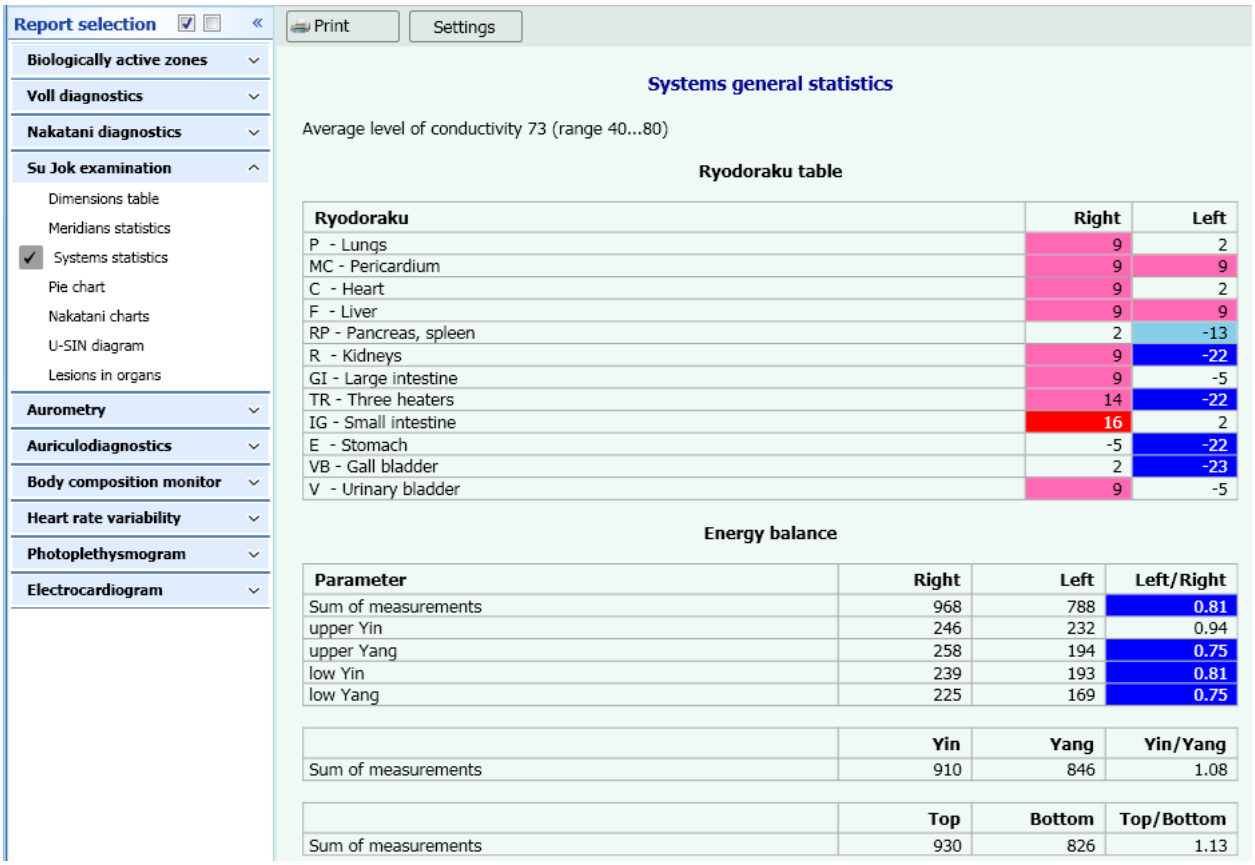
	Measurement	Measurement	Value	Status
RH P	Meridian P	158	82	hyperactivity
RH MC	Meridian MC	158	82	hyperactivity
RH C	Meridian C	158	82	hyperactivity
RH F	Meridian F	158	82	inflammation
RH RP	Meridian RP	140	75	hyperactivity
RH R	Meridian R	158	82	hyperactivity
RH GI	Meridian GI	158	82	normal range
RH TR	Meridian TR	176	87	hyperactivity
RH IG	Meridian IG	180	89	hyperactivity
RH E	Meridian E	120	68	hyperactivity
RH VB	Meridian VB	140	75	normal range
RH V	Meridian V	158	82	normal range
LH P	Meridian P	140	75	normal range
LH MC	Meridian MC	158	82	hyperactivity
LH C	Meridian C	140	75	normal range
LH F	Meridian F	158	82	normal range
LH RP	Meridian RP	100	60	degeneration
LH R	Meridian R	82	51	normal range
LH GI	Meridian GI	120	68	fatigue
LH TR	Meridian TR	82	51	hyperactivity
LH IG	Meridian IG	140	75	degeneration
LH E	Meridian E	82	51	normal range
LH VB	Meridian VB	80	50	degeneration
LH V	Meridian V	120	68	degeneration

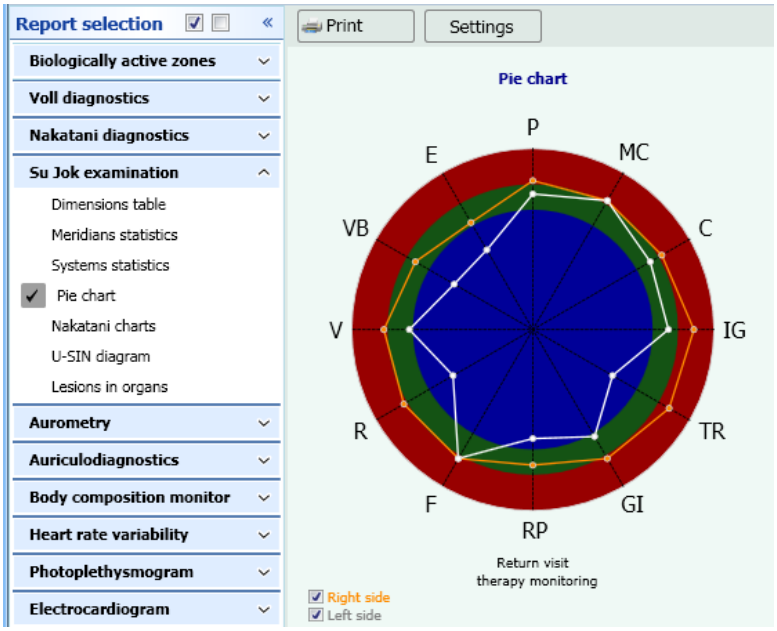
To sort data in tables, click the  button above and left of the table:

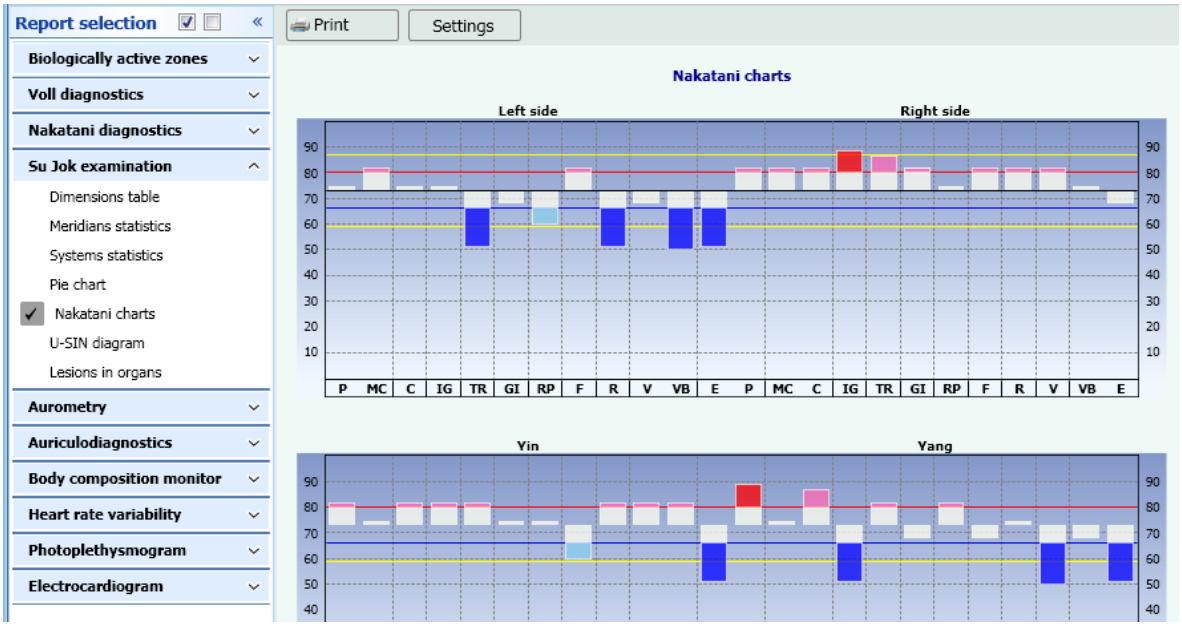


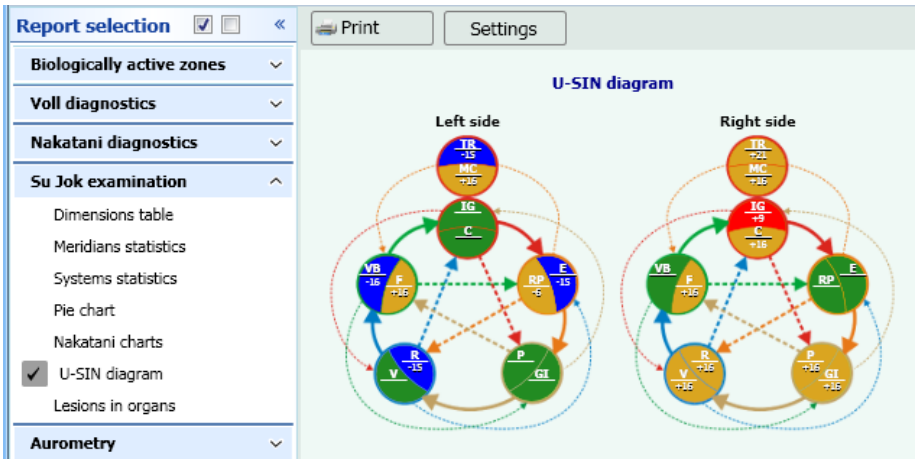
Reports are similar to those issued after Ryodoraku diagnostics (see the corresponding section). However, it should be taken into account that Su Jok method has low specificity and sensitivity, so it cannot be used for clinical diagnosis. Usually Su Jok diagnostics is used to monitor the therapy.

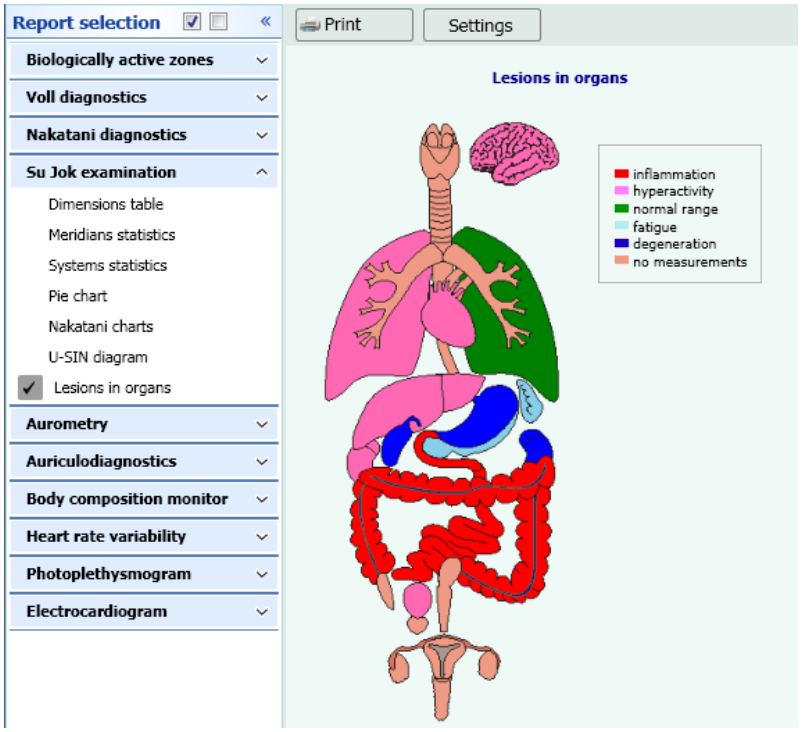





Report selection
Biologically active zones
Voll diagnostics
Nakatani diagnostics
Su Jok examination
Dimensions table
Meridians statistics
Systems statistics
Pie chart
Nakatani charts
U-SIN diagram
Lesions in organs
Aurometry
Auriculodiagnostics
Body composition monitor
Heart rate variability
Photoplethysmogram
Electrocardiogram
Print
Settings
Pie chart
P
MC
C
IG
TR
GI
RP
F
R
V
VB
E
Return visit
therapy monitoring
Right side
Left side


Report selection
Biologically active zones
Voll diagnostics
Nakatani diagnostics
Su Jok examination
Dimensions table
Meridians statistics
Systems statistics
Pie chart
Nakatani charts
U-SIN diagram
Lesions in organs
Aurometry
Auriculodiagnostics
Body composition monitor
Heart rate variability
Photoplethysmogram
Electrocardiogram
Print
Settings
Nakatani charts
Left side
Right side
P MC C IG TR GI RP F R V VB E P MC C IG TR GI RP F R V VB E
Yin
Yang


Report selection
Biologically active zones
Voll diagnostics
Nakatani diagnostics
Su Jok examination
Dimensions table
Meridians statistics
Systems statistics
Pie chart
Nakatani charts
U-SIN diagram
Lesions in organs
Aurometry
Print
Settings
U-SIN diagram
Left side
Right side


Report selection
Biologically active zones
Voll diagnostics
Nakatani diagnostics
Su Jok examination
Dimensions table
Meridians statistics
Systems statistics
Pie chart
Nakatani charts
U-SIN diagram
Lesions in organs
Aurometry
Auriculodiagnostics
Body composition monitor
Heart rate variability
Photoplethysmogram
Electrocardiogram
Print
Settings
Lesions in organs
inflammation
hyperactivity
normal range
fatigue
degeneration
no measurements

AURAMETRY

(for *Medscanner BIORS*; *Medscanner BIORS-01*; *Medscanner BIORS-02*; *Medscanner BIORS-03*; *Medscanner BIORS-04* embodiments)

Bioinformational adaptometry (aurametry) is a computer method of chakras and aura diagnostics, that makes it possible to detect processes invisible to the human eye. These processes in aura at the energoinformational level are long-term and they influence on person's vital activities, health, relationships, career, business, family and other areas of life.

Distinctive feature of the diagnostic method is the identification of the weakest link in the person's energoinformational field (aura) indicating the pathology focus.

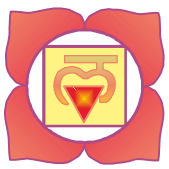
With regard to health, the method makes it possible to detect disorders long before the first clinical signs of a disease appear.

Aurametry diagnostics makes it possible to:

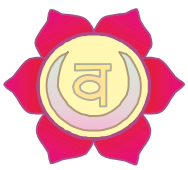
– detect dysfunctions or disorders in person's energy centers (chakras);
– define distortions and disruptions of energoinformational field (aura);
– define places of energy leakage;
– define energoinformational blocks;
– evaluate general energy state of a body;
– detect possible problem zones and confirm observed ones at the body physical level;
– monitor changes in the person's energoinformational field during treatment or spiritual practices, as well as watch progress in influence of spiritual healers, etc.

For today, the most widespread method of evaluation of chakra condition is Voll electroacupuncture diagnostics (EAV). Besides, biotensometry, biofunctional diagnostics (BFD), kinesiology tests or vegetative-resonant test (Vega test) can be successfully used. The issue is in interpretation of results and the exhaustiveness of examination. And still, in our opinion, the EAV and VEGA test are the most preferred methods. The EAV enables to obtain a "static sample" of a chakra condition, and the VEGA test shows, so to speak, a three-dimensional, dynamic picture. Also, the VEGA test makes it possible to construct virtual models of a response based on the principle "what will be, if …"

Topography of the main chakras

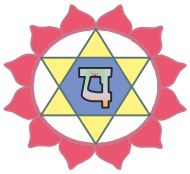


Muladhara is located above anus, behind the genitals. In male it is located in the base of the spine, in female it is between ovaries. Topographically, it is the first point of a posteromedian meridian. On the palm its location is 1 cun more proximal to the projection point of the second chakra, at the end of a "life line". It is absent on the back of the hand.

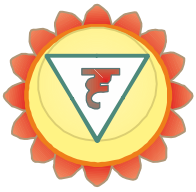


Svadhistana on the back is located between the 4th and 5th lumbar vertebra, and on the abdomen is 4–6 cm (4 cun) below umbilicus. Topographically, it is the fourth point of anterormedian meridian (an alarm point of small intestine, Lower Dan Tian). On the palm it is located 1 cun more proximal to the point of intersection of two lines: median line of the third finger and perpendicular from the tip of a proximally abducted thumb. On the back of the hand it is located opposite the palm point.

Manipura is located on the back between 2nd and 3rd lumbar vertebra, and on the abdomen it is 5–7 cm above the umbilicus. Topographically, it can be on the 10th point of spleen and pancreas energy (anterormedian meridian), or on the 12th alarm point of stomach, or on the 13th point of stomach and small intestine energy (the same meridian). On the palm it is located in the middle of a metacarpal bone of the third finger (the same location on the back of the hand).



Anahata is located on the back between the 4th and 5th thoracic vertebra; on the chest it is in its center. Topographically, it is 17th point of anterormedian meridian (Median Dan Tian), BAP of all associated EAV-vessels. On the palm it is located above metacarpophalangeal joint of the third finger (the same location on the back of the hand).



Vishudha is located on the back between the 6th and 7th cervical vertebra; on the front of the body it is at the base of a throat, in a sternal notch. Topographically, it is between the 22nd and 23rd points of anterormedian meridian (a point of thymus measurement and a point of concentration of kidneys energy). On the palm it is located in the middle of proximal phalanx of the third finger (the same location on the back of the hand).

Adzhna is located on the back of the neck (between the 2nd and 3rd cervical vertebra), on the forehead it is located between eyebrows. Topographically, it is the 23-1a point of a posterormedian meridian, in EAV it is a point of degenerative and psychosomatic disorders (Upper Dan Tian). On the palm it is located in the middle of median phalanx of the third finger (the same location on the back of the hand).

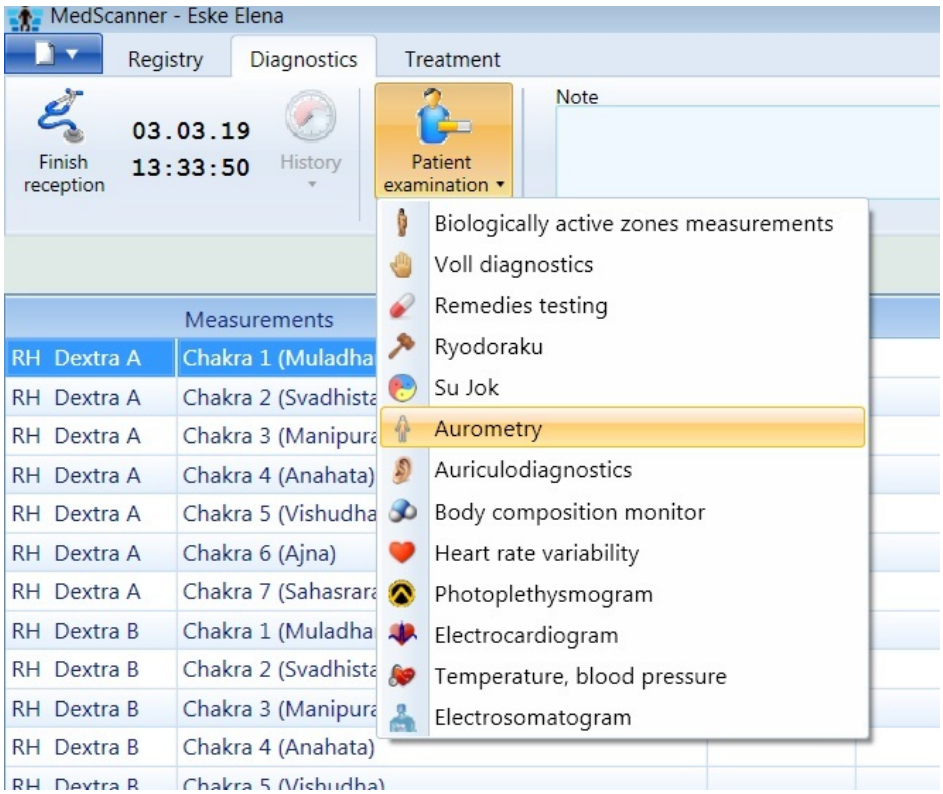
Sahasrara is located in the upper part of the skull, 1 cm anterior to the top of the head. Topographically, it is the 20th point of a posterormedian meridian (the highest point of the roof of scull), a point of energy concentration of Yang associated EAV-meridians. On the palm it is located in the middle of the distal phalanx of the third finger; it is absent on the back of the hand.

Most often chakras are quiet, “dormant”, even there is a full-scale clinical picture of a disease, so simple measurement of projective chakra points does nothing. There can be several reasons: intake of potent drugs (hormones, tranquilizers, stimulants, sleeping pills), intense psychoemotional or emotional-painful stress, severe oncology diseases, pregnancy, toxic conditions, distrust a doctor, etc. In such cases “medicine testing” can be applied, using either correctors of chakras condition, or inversion of medicines, or inversion of energoinformational patient’s condition.

It is also possible to select homeopathic remedies, testing them on “weak” chakras or using other ways of treatment. Besides, psychocorrection sessions can be carried out with monitoring the results by the same chakras. Diagnostics by chakras is a creative process, and its opportunities are practically limited only by skills and knowledge of a practician.

Working with the program

Select a patient or register him/her in the **Registry** menu. Select the **Diagnostics** tab. Select **Aurametry** in the **Patient examination** menu.

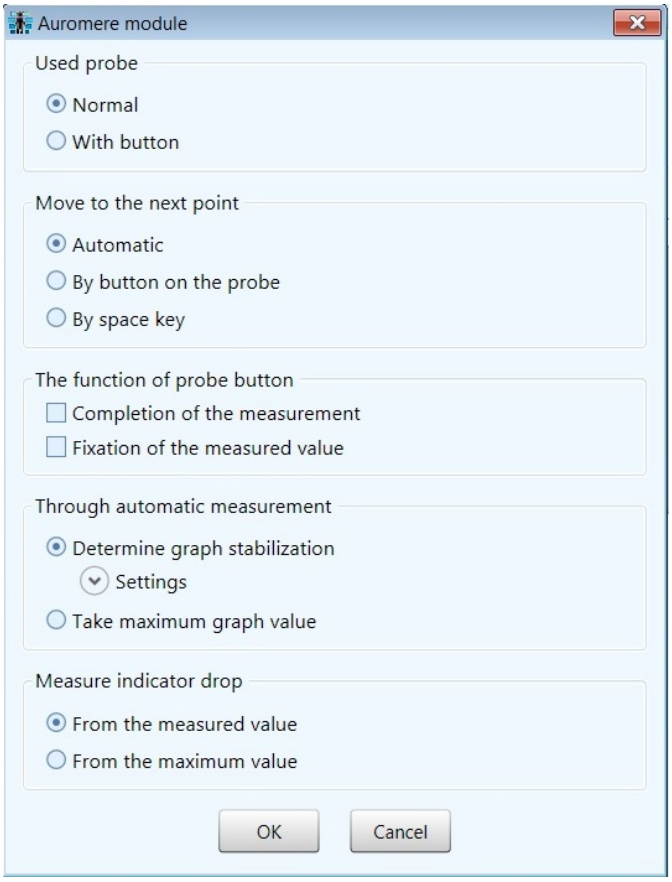


Connect a patient cable to the "BAP" socket on the front panel of the *Medscanner*. Connect the black plug of a patient cable to the passive cylindrical electrode that a patient holds in his/her hand (opposite to the side of measurements). Connect the red plug to the probe that is set on BAP. If you intend to use a probe with a touch sensitive button, connect it to the "Sensor" socket (in that case the red plug of a patient cable from the "BAP" socket is not used; it is desirable to avoid its contact with the *Medscanner* or a patient). A 3 mm or 4 mm attachment should be on the probe.

Click the **Settings** button. In the appeared dialog box select a desirable probe type: traditional or having a touch sensitive button. Besides, select the way how the program goes to the next BAP during measurements: automatically after measuring is completed and the probe is taken off a BAP, by pressing of a touch sensitive button on a probe or by pressing of the **Space** key on the keyboard.

The *Through automatic measurement* setting allows selection of a measurement starting point. Either the program determines the beginning of a plateau (stabilization) on a graph and starts counting up from that value (by default the duration of stabilization is 1 s), or it is possible to set measurement counting up from the maximum value on a graph.

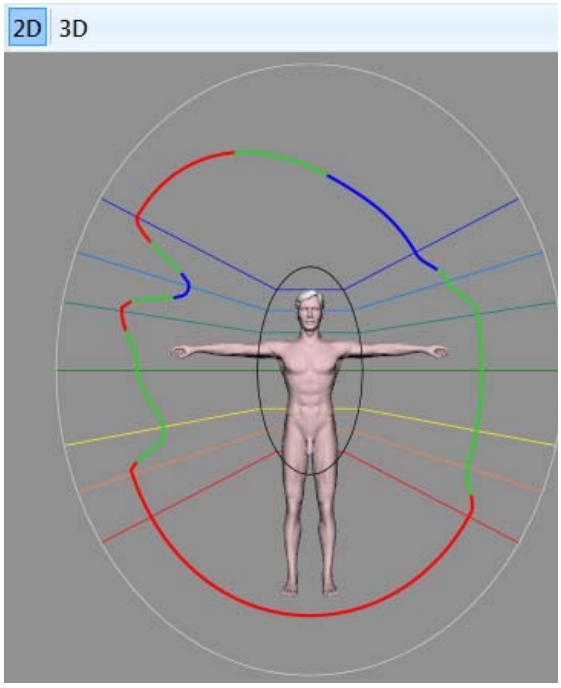
If the probe with a touch sensitive button is used, there is a possibility to set program actions when pressing a touch sensitive button on the probe: either completion of the measurement and automatic switching to the next BAP on a measurement route, or fixation of the measured value (the data reading is continued that allows estimation of "indicator drop" value).

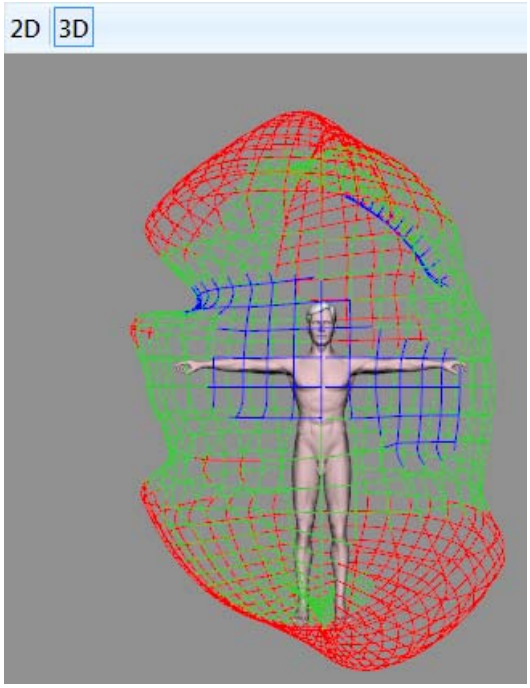


Click the **Start reception** button:

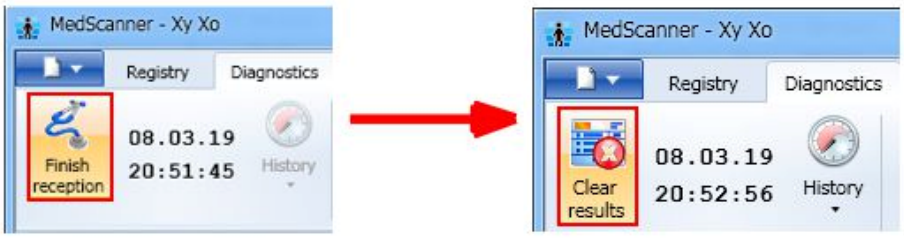
Sequentially measure all BAPs on the list. At the end of a measurement, a schematic representation of energoinformational matrix (aura) is shown in the right window above the arrow. The colorful lines indicate measurements of chakra BAPs. It is possible to view both two-dimensional and three-dimensional representations of chakra BAPs measurement.

Two-dimensional and three-dimensional aura representation



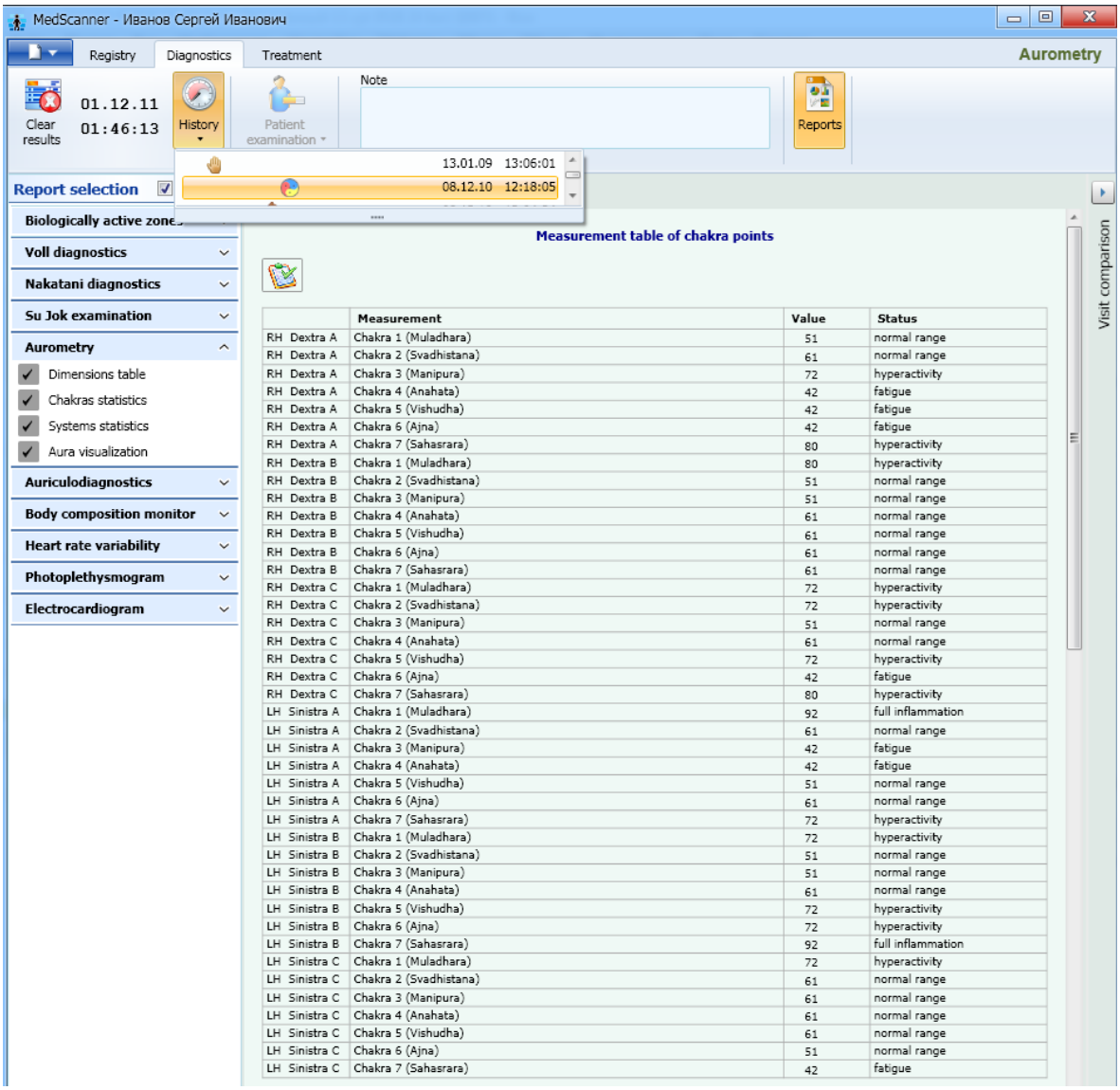


At the end of aurametry sequentially click **Finish reception** and **Clear results** buttons.



Aurametry reports

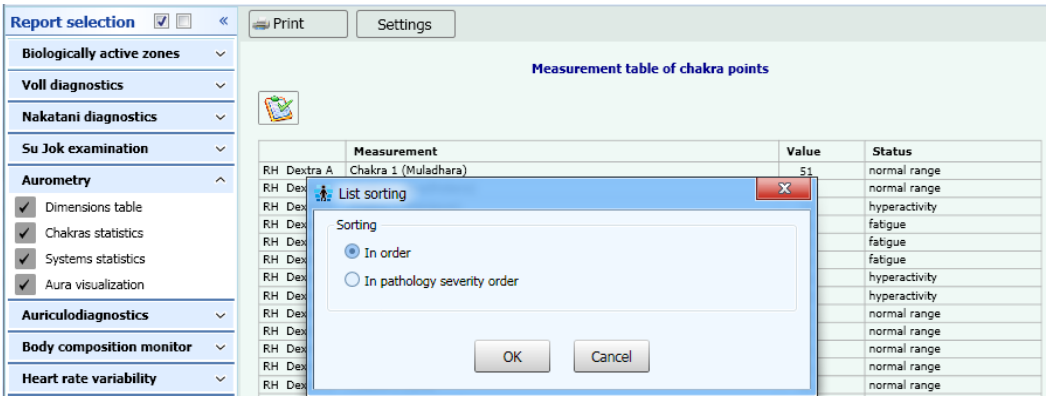
To view measurement results, click the **Reports** button on the right and tick relevant reports on the left after the diagnostic procedure. To view a history of visits, click the **History** button on the left.



	Measurement	Value	Status
RH Dextra A	Chakra 1 (Muladhara)	51	normal range
RH Dextra A	Chakra 2 (Svadhistana)	61	normal range
RH Dextra A	Chakra 3 (Manipura)	72	hyperactivity
RH Dextra A	Chakra 4 (Anahata)	42	fatigue
RH Dextra A	Chakra 5 (Vishudha)	42	fatigue
RH Dextra A	Chakra 6 (Ajna)	42	fatigue
RH Dextra A	Chakra 7 (Sahasrara)	80	hyperactivity
RH Dextra B	Chakra 1 (Muladhara)	80	hyperactivity
RH Dextra B	Chakra 2 (Svadhistana)	51	normal range
RH Dextra B	Chakra 3 (Manipura)	51	normal range
RH Dextra B	Chakra 4 (Anahata)	61	normal range
RH Dextra B	Chakra 5 (Vishudha)	61	normal range
RH Dextra B	Chakra 6 (Ajna)	61	normal range
RH Dextra B	Chakra 7 (Sahasrara)	61	normal range
RH Dextra C	Chakra 1 (Muladhara)	72	hyperactivity
RH Dextra C	Chakra 2 (Svadhistana)	72	hyperactivity
RH Dextra C	Chakra 3 (Manipura)	51	normal range
RH Dextra C	Chakra 4 (Anahata)	61	normal range
RH Dextra C	Chakra 5 (Vishudha)	72	hyperactivity
RH Dextra C	Chakra 6 (Ajna)	42	fatigue
RH Dextra C	Chakra 7 (Sahasrara)	80	hyperactivity
LH Sinistra A	Chakra 1 (Muladhara)	92	full inflammation
LH Sinistra A	Chakra 2 (Svadhistana)	61	normal range
LH Sinistra A	Chakra 3 (Manipura)	42	fatigue
LH Sinistra A	Chakra 4 (Anahata)	42	fatigue
LH Sinistra A	Chakra 5 (Vishudha)	51	normal range
LH Sinistra A	Chakra 6 (Ajna)	61	normal range
LH Sinistra A	Chakra 7 (Sahasrara)	72	hyperactivity
LH Sinistra B	Chakra 1 (Muladhara)	72	hyperactivity
LH Sinistra B	Chakra 2 (Svadhistana)	51	normal range
LH Sinistra B	Chakra 3 (Manipura)	51	normal range
LH Sinistra B	Chakra 4 (Anahata)	61	normal range
LH Sinistra B	Chakra 5 (Vishudha)	72	hyperactivity
LH Sinistra B	Chakra 6 (Ajna)	72	hyperactivity
LH Sinistra B	Chakra 7 (Sahasrara)	92	full inflammation
LH Sinistra C	Chakra 1 (Muladhara)	72	hyperactivity
LH Sinistra C	Chakra 2 (Svadhistana)	61	normal range
LH Sinistra C	Chakra 3 (Manipura)	61	normal range
LH Sinistra C	Chakra 4 (Anahata)	61	normal range
LH Sinistra C	Chakra 5 (Vishudha)	61	normal range
LH Sinistra C	Chakra 6 (Ajna)	51	normal range
LH Sinistra C	Chakra 7 (Sahasrara)	42	fatigue

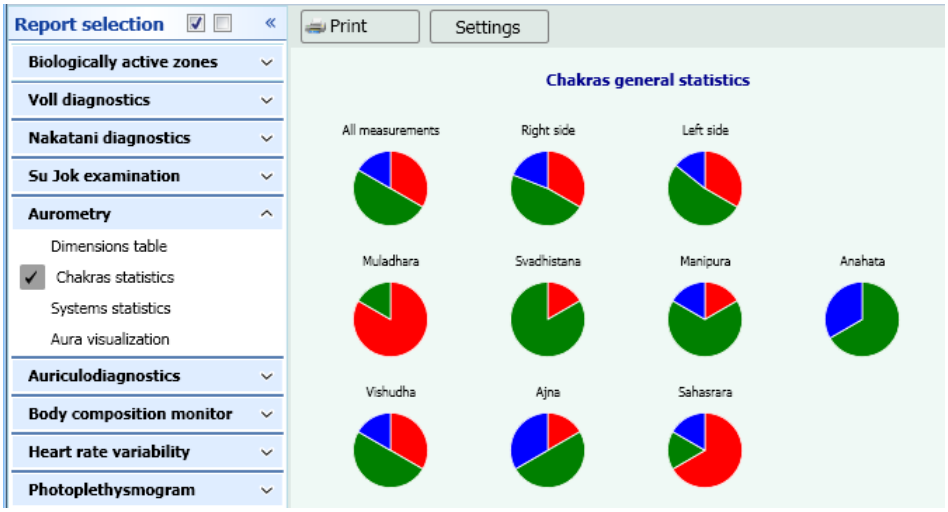
Table of chakra points measurements

To sort data in tables, click the  button above and left of the table:



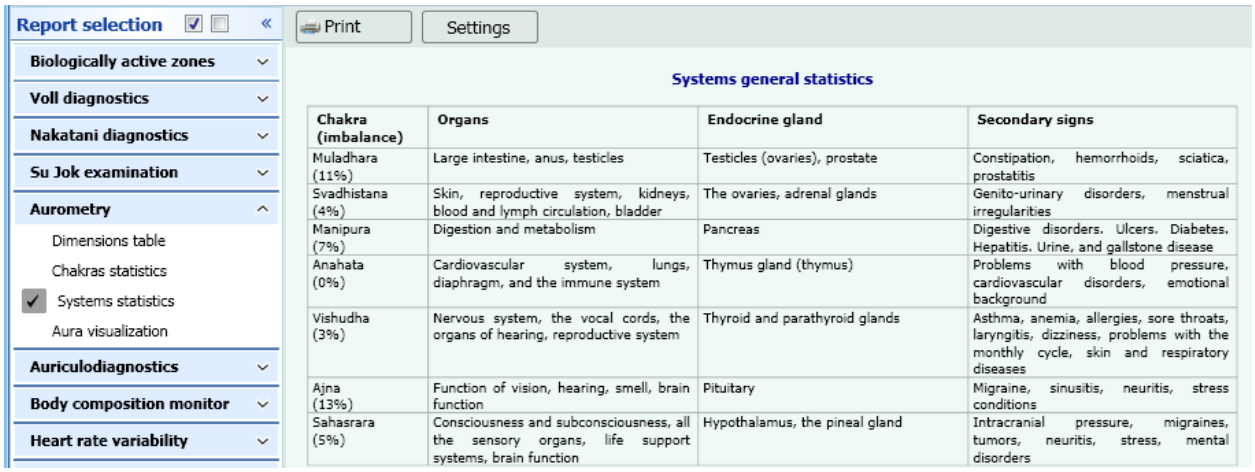
Chakra BAPs statistics

The total number of measured chacra BAPs and the ratio of normal and pathologic BAPs are presented in the form of pie charts. BAPs with increased level of energy are marked in **red**, BAPs with decreased level of energy are marked in **blue**. **Green** color indicates normal level of energy. **Orange** color indicates BAPs on which the measurements were not carried out.



General statistics by systems

It allows evaluation of organs and systems condition with detection of symptoms.



Chakra (imbalance)	Organs	Endocrine gland	Secondary signs
Muladhara (11%)	Large intestine, anus, testicles	Testicles (ovaries), prostate	Constipation, hemorrhoids, sciatica, prostatitis
Svadhistana (4%)	Skin, reproductive system, kidneys, blood and lymph circulation, bladder	The ovaries, adrenal glands	Genito-urinary disorders, menstrual irregularities
Manipura (7%)	Digestion and metabolism	Pancreas	Digestive disorders. Ulcers. Diabetes. Hepatitis. Urine, and gallstone disease
Anahata (0%)	Cardiovascular system, lungs, diaphragm, and the immune system	Thymus gland (thymus)	Problems with blood pressure, cardiovascular disorders, emotional background
Vishudha (3%)	Nervous system, the vocal cords, the organs of hearing, reproductive system	Thyroid and parathyroid glands	Asthma, anemia, allergies, sore throats, laryngitis, dizziness, problems with the monthly cycle, skin and respiratory diseases
Ajna (13%)	Function of vision, hearing, smell, brain function	Pituitary	Migraine, sinusitis, neuritis, stress conditions
Sahasrara (5%)	Consciousness and subconsciousness, all the sensory organs, life support systems, brain function	Hypothalamus, the pineal gland	Intracranial pressure, migraines, tumors, neuritis, stress, mental disorders

AURICULAR DIAGNOSTICS

(for *Medscanner BIORS*; *Medscanner BIORS-01*; *Medscanner BIORS-02*; *Medscanner BIORS-03*; *Medscanner BIORS-04* embodiments)

Auricular diagnostics and therapy are the components of clinical reflexotherapy.

The auricular examination, i. e. detection of the points and areas with altered sensitivity, should be combined with carefully taken medical history and general clinical examination of a patient.

The auricular examination is carried out as follows:

1) auricular examination is aimed at evaluation of the auricle relief and general comparison with the auricular cartography;

2) auricular skin examination by means of a magnifying glass (in good light) in order to detect the skin changes (e. g. hyperemia, desquamation, swelling, etc.) indicating the chronic disease of an organ projected on the particular auricular area;

3) searching for the points of altered sensitivity by means of the special diagnostic probe for the assessment of tactile and thermal sensitivity, and with the use of a device for the evaluation of difference of the skin electrical resistance in the point area.

The detection of auricular acupuncture points should start with the detailed visual inspection of auricles and examination of their individual characteristics. The shape and size of an auricle are prone to age-related changes. In young people an auricle is elastic; this characteristic deteriorates with age. The difference between the right and left auricle is usually significant even in apparently healthy persons. In each particular case special attention should be paid to assessment of distinctness of the auricle shape, that is crucial for the accurate localization of the acupuncture points and areas. In some cases, thorough inspection can be important for the diagnosis and detection of the reactive zones.

When a disease occurs, some painful points appear on the external ear surface. Sometimes they are imperceptible, but in most cases the auricular cartography provides the doctor with information about the patient's health status, acute and chronic diseases, traumas experienced based on changes of ear surface appearance or its relief. According to P. Nogier, "on the changes of projection areas it is possible to predict the imminent danger long before the clinical manifestation of the disease".

In case of the right-side pain syndrome, it is advisable to examine the right ear, and vice versa. Therefore, it is obvious that there is larger area of a liver and lung projection on the right auricle than on the left one. The projections of a gall bladder and appendix are only on the right auricle, while a pancreas and spleen projections are only on the left one.

The correct detection of auricular points is important both for diagnosis and for the treatment, that is why the points' search should be consecutive in order not to miss or confuse the necessary points.

The electrical devices used for searching for the active auricular points have been widespread. Their principle of action is based on the fact that the electrical resistance in the active point is usually higher than the electrical resistance of surrounding skin surface.

I. Bishko based his conclusions on the studies of the skin electrical conductivity in the point area. He states that if an auricular point has the low skin resistance (which means the energy decrease), in most cases this point should be stimulated. If the increased skin resistance is found (excess of energy), such points are to be sedated.

Auricular diagnostics order and stages

The diagnostics procedure consists of the following stages:

1) preparatory operations;

2) examination;

3) disease probability analysis (detection of the potential target organs);

4) drawing of conclusion including recommendations.

Preparatory operations include preparation of the patient for the examination, interview and filling in the corresponding medical forms by a physician.

Examination is carried out by means of medical inspection, measurement of skin electrical conductivity, pain sensitivity testing in signal acupuncture points, and palpation of auricles.

The examination is performed when a patient is in his seating or lying position. During auricular examination, a doctor should pay attention to the size of auricles, their symmetry, regularity of their shape, sharpness of antihelix and helix contours. Gross changes in the shape or size of auricles are usually seen in a number of congenital pathologies, such as oligophrenia, Down syndrome, and different congenital abnormalities. It is necessary to pay attention to the skin color, vascular pattern intensity, presence of morphological elements, excavations, and other local skin changes. In some cases the auricular palpation is carried out after the skin electrical conductivity measurement for the purpose of cartilage induration detection and assessment of the morphologic elements consistence.

The skin electrical conductivity measurement is carried out with the use of the cylindrical electrode and active probe. Before measurements the probe should be cleaned with 70% alcohol solution. It is not recommended to fix the probe on one point for more than 15 s, because in that case the blood circulation in the point is disturbed, which leads to the change of the parameters of no diagnostic value. The skin conductivity measurement and pain sensitivity testing in the acupuncture points is carried out with the use of a probe which has a spherical tip of 2–2.5 mm in diameter. It is essential to place the probe axis perpendicular to the skin surface of auricle. It helps the probe not to slide out. The pressings with a probe should be even and equal, and usually their intensity does not exceed 100–150 g. It is not necessary to moisten the probe with water during measurements. Before starting the examination, a patient is asked to tell the doctor about the nature of sensations that he is going to experience during the auricular points testing. The examination should be carried out slowly enough to allow patients to sort out in their sensations and react to every pressing. Do not press repeatedly on the same point in a short period of time, because it becomes painful in connection with manipulations.

The results of the interview, examination, measurements and testing are recorded to diagnostic file in which it is possible to register the skin color and morphological changes detected, pain gradation and the electroabnormality degree of auricular points. The obtained data can be used for the patient follow-up. Using of the computer applications considerably facilitates this work.

Particular features of the visual changes and their interpretation

According to results of clinical studies, in diseases of different internal organs the visual changes in certain areas of auricle are observed. It is necessary to differentiate between the pathological non-inflammatory changes in color and appearance of the inflammatory morphological elements. The skin discoloration includes redness, blanching, sallow tone, and

different pigment spots. The pathological changes may be seen also as movable or fixed subcutaneous cartilage induration, local swelling, dotted rash in the form of gooseflesh, or areas of thin parchment skin, spider veins, hyperkeratosis.

The morphological elements on the auricular skin should be classified into primary and secondary. The primary elements usually appear as the earliest skin reaction to the acute pathological process (stimulus). The secondary elements appear as a result of primary elements evolution. There are five types of primary elements: macule, papule, nodule, vesicle, and pustule.

Macule is an circumscribed alteration in skin color. Macules can be inflammatory, vascular, hemorrhagic, and pigment. The inflammatory macules occur as a result of vasodilation in superficial layer of dermis. They have pinkish-red colour, sometimes with cyanotic tint, and they may disappear under pressure. These macules are regressed completely, or they may leave desquamation. The vascular macules develop as a result of a persistent vasodilation in the superficial skin layer. They may have congenital or acquired nature. The vascular macules differ from inflammatory macules in their presence of sharp contours of dilated vessels in a form of red convoluted stripes. The hemorrhagic macules develop as a result of rupture of the skin blood vessels or their permeability increase. Subsequently, they gradually change their color and may at last fully disappear. However, they do not disappear under pressure, which is their main difference from the inflammatory macules.

Papule, or *papula*, is a non-cavitary (solid) lesion elevated above the skin surface. The color of papules can be pinkish and brownish, and the size of a pinhead. By shape, papules can be hemispheric or flat. Papules tend to leave desquamation after resolving, without a scar.

Nodule (tubercle) is a non-cavitary (solid) lesion elevated above the skin surface. The nodule has yellowish- or brownish-red color; its size is no more than the size of the lentil, its shape is hemispheric. In the course of the further development the central part of the nodule is necrotized with the subsequent ulceration and scar formation. The main difference between the nodule and papule consists in greater deepness of its location in the skin, and also in the evolution pattern.

Vesicle (vesicula) is a cavitary lesion. It contains the serous content, which is always of an acute inflammatory character. The vesicle size may be compared with the hempseed; its shape is hemispheric. During their further development, the vesicles shrink becoming covered with a scale, or open with the erosion formation, without a scar.

Pustule is a cavitary lesion elevated above the skin surface. It contains a purulent exudate which is usually of an acute inflammatory character. Pustule can be hemispheric or flat, the size of a pinhead. Pustule shrinks and a crustlike surface appears, or it opens without a scar.

The secondary morphological elements include scales, crusts, erosions, ulcers, scars, and secondary pigment spots.

Scales (squamae) are rejected cells of the stratum corneum. They occur at the sites of resolved macules, papules, sometimes nodules and other primary elements.

Crust (crusta) is formed by drying out the exudate at the site of vesicles, pustules, ulcers, or erosions.

Erosion (erosio) is a skin defect within the epidermis after the opening of a vesicle or pustule.

Ulcer (ulcus) is a deep dermal defect which develops after the necrosis of a nodule.

Scar (cicatricle) forms after the healing of a nodule.

Secondary pigment spots occur at the sites of resolved inflammatory macules, papules, pustules as a result of the increase or decrease in the content of pigment at sites of former primary elements.

During the examination the following features are noted: the color of auricular skin, its turgor, elasticity, hidropoiesis and sebum secretion. The general examination is followed by the analysis of morphological elements. The doctor note their localization and nature (inflammatory or not). In case of inflammatory signs, it is necessary to determine if they have acute of chronic character. The acute inflammation of the auricular skin is characterized by bright redness, swelling, and tenderness. The doctor identifies the primary and secondary morphological elements, determines their differential characteristics, size, color, contours (regular or irregular), shape (hemispheric or flat), surface (flaky or smooth), consistence (soft, dense, or hard).

Thus, for example, some hormonal or metabolic disorders are frequently accompanied by desquamation and/or hypersecretion areas. The areas of hyperkeratosis may indicate the endocrine dysfunction of an organ or system of organs. The presence of vesicles and nodules at a different stage of development can indicate an organic disease. Shiny or dull connective tissue cicatricles of white color indicate the chronic processes and previous diseases. The subcutaneous prominent hardened spots with sharp contours, which change their shape under pressure, or brownish-grey lumps with indistinct boundaries which do not change their shape under pressure may indicate the presence of benign or malignant tumours of organs corresponding to the auricular areas.

The analysis of the visible signs provides the indicative data regarding the stage and phase of pathological processes. It is considered that the progress and chronization of diseases become apparent in the auricular points first as functional changes and then as morphological ones. The onset of the disease may show itself first as redness (hyperaemia), and then as pallor (vascular spasm) of the corresponding auricular areas. An acute disease or exacerbation of a chronic process is accompanied by the development of such morphological elements as vesicles, papules and pustules. In case of chronic diseases, there are secondary pigment spots, desquamation or cicatricle at the site of former ulcer.

Acute process: redness (local hyperemia, inflammatory spots), papule, nodule, vesicle, pustule, erosions, ulcers.

Chronic process: pallor, mottled skin with sharp contours (local ischemia), areas of hypersecretion, apparent spider veins, excavations that look like needle indentation marks, elevations, scales, crusts, scars, secondary pigment spots.

Examples of the auricular changes in diseases of internal organs

Diseases	**Point areas**	**Signs**
Bronchitis	between the upper and lower points corresponding to lungs	whitish dotted lumps
Gastritis	stomach	whitish uneven area, poorly defined boundaries, sometimes sensation of thickened skin
Gastric ulcer	stomach	development of the circle formed by the dotted bulging, and poorly defined boundaries
Ulcer disease	stomach	small rounded nodule
Ulcer disease (after resection)	stomach	small crescent-shaped white or reddish scar

Duodenal ulcer	duodenum	sometimes the center becomes whitish or light-grey; there is a hyperemia of the margins with the glossy surface
Acute appendicitis	appendix	dotted congestive phenomena or 1–3 papules
Chronic appendicitis	appendix	dotted areas that look like needle indentation marks, whitish and starting to elevate above the skin surface as they turn light-grey
Menorrhagia	uterus	dotted and bulging areas of congestion that look like a gooseflesh, or several red papules
Leucorrhea	uterus	dotted bulging areas
Hypomenorrhea	uterus	whitish dotted bulging areas without gloss
Vertigo	subcortex, forehead	whitish and dotted areas with reddish crown and glossy surface
Arterial hypertension	heart, adrenal glands	dotted bulging hyperemic areas without gloss; besides, dotted congestive areas or capillary thickening
Pain in benign tumors	corresponding body region	subcutaneous bulges (prominences) changing their shape under pressure, with sharp contours
Pain in malignant tumors	corresponding body region	brownish-grey bulges not changing their shape under pressure, with poorly defined boundaries
Genital diseases, colitis, nephritis, cystitis	corresponding area	rash in acute disease, inflammation, dotted, lamellar, glossy coronae; in chronic disease the dull whitish dots are sunken
Pulmonary edema	lungs	whitish and scabrous lump or areas of dots aggregation
Hepatomegalia	liver	whitish and scabrous bulging (it is shaped like a half of a melon seed); right hepatic lobe corresponds to the right auricle, left hepatic lobe corresponds to the left auricle

There are the following symbols for visual changes (VC) of auricular points in the program:

\# — chronic changes
\## — acute changes
\### — acute and chronic changes

Pain sensitivity testing and interpretation algorithm

For the pain sensitivity testing the same probe can be used as for the electrical conductivity measurement. The patient informs the doctor if tenderness appears. Moreover, the

doctor is able to watch and estimate the patient's reactions by himself. It can be wrinkling, closing one or both eyes, wincing or moaning.

Three gradations are conditionally distinguished in the tenderness testing.

1. No tenderness under pressure (it is a normal response).
2. Low tenderness point. This includes cases which are characterized by the slight sensation of tensive, compressing or bursting pain under pressure of the probe upon the point. Besides, it includes cases when the tactile sensitivity in the point examined differs significantly from surrounding points.
3. Painful point. In that case the pressure of the probe upon the point causes significant pain in a patient, usually followed by a grimace (facial dolorosa) on the patient's face; or not so intensive but sharp stabbing pain occurs.

There are the following symbols for the pain sensitivity (**PS**) in auricular points in the program:

* — low tender point
** — high tender point

The interpretation algorithm for electrical resistance parameters

To exclude the influence of age-related and individual patient's features, the method of determination of individual normal range is applied in the program. It is estimated upon the readings of the auricular ZERO point. Even the ancient Chinese sources stated that this point was a kind of "generally stimulating" point in relation to other auricular points. It means, if auriculotherapy does not lead to any effect, the needle should be inserted into that area. Similar data were obtained by P. Nogier (he considered this point as the auricular "physiological center") and by his followers, that was reflected in the name of the AP 83 ZERO. According to the clinical findings, the electrical resistance value at the AP 83 ZERO point almost always represents a kind of basic level, or "reference point" for the "reflection areas" conductivity in a certain patient. Healthy people showed no difference in the electrical conductivity values, or it was minimal (1–2 μA). Such approach, as has been shown in practice, makes it possible to personalize the electrical resistance parameters in each case. For normal values in different auricular points the conductance of 2 μA difference is taken, in comparison with ZERO point value. That is why the electrical resistance measurement in this particular point must be performed very thoroughly. Accuracy of the total auriculogram depends on it.

Deviation from the normal value of 2–4 μA corresponds to low probability of the disease.
Deviation from the normal value of 4–6 μA corresponds to significant probability of the disease.
Deviation from the normal value of 6–8 μA corresponds to high probability of the disease.

It should be noted that not all changes found during the auricle examination have the same diagnostic value. The whole set of changes detected during diagnostic process is the total auricular point abnormality. It is expressed in the abnormality score; and the contribution of each diagnostic factor differs between the points. So the program uses the special algorithm for the point abnormality calculation, which takes visual changes, pain sensitivity, and point electrical resistance into account. Besides, weight coefficients of each change listed for each particular point are considered. That is, the same electrical resistance (electrical abnormality — **EA**) value of two different points does not obligatory mean the same aberration of these points. There is an accounting table for different diagnostic factors for different auricular points; values are expressed in percent (see below):

Signal points	EA	PS	VC
6, 8, 9, 10 ,21 ,44, 45, 51, 55, 56, 58, 59, 60, 87, 100, 101, 102, 103	40	30	30
19, 22 ,23, 13, 15, 16, 24, 31, 84, 85	40	50	10
34, 79, 82, 91, 92, 93, 94, 95, 96, 97, 98	30	40	30
33	30	50	20
64, 66, 67, 88, 89	30	30	40
37, 39, 40, 54	10	40	50
71	40	40	20
46, 47, 52, 57	10	40	50

Drawing Conclusions Guide

After the examination and analysis of detected changes, a doctor should make a conclusion that compactly reflects the abnormalities revealed. A conclusion must include the diagnostic summary and recommendations.

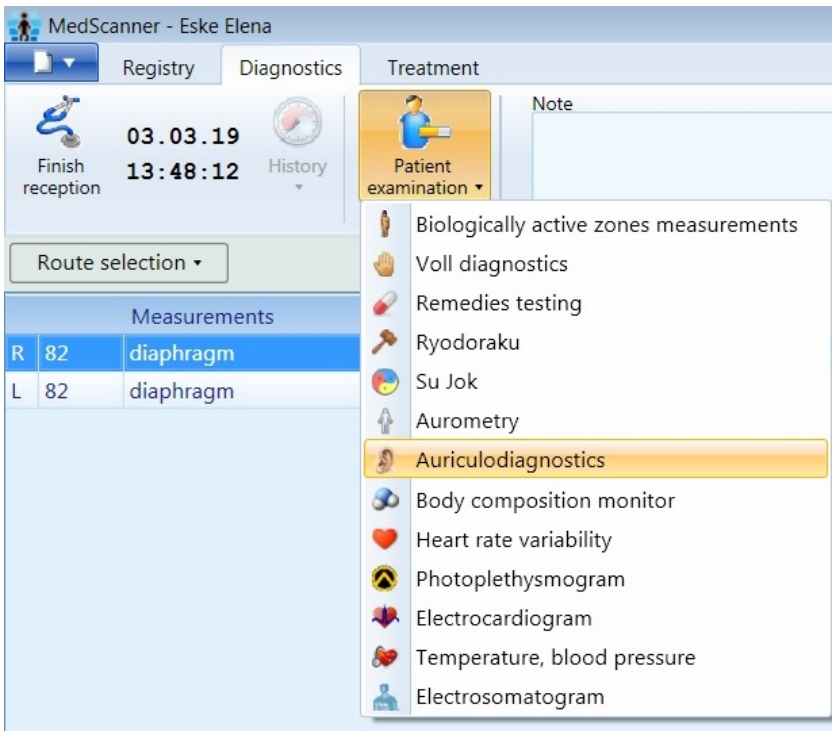
The conclusion consists of three parts:

1. General information about a patient and examination.
2. Summary of the main phenomena detected in signal auricular points.
3. Clinical interpretation of changes found during the examination; recommendations. It is crucial that this part contains medical terms and notions understandable to a doctor who did not received special training.

Every auricular examination conclusion must be typed (written) and signed by the doctor who carried out an examination.

Working with the program

Select a patient or register him/her in the **Registry** menu. Select the **Diagnostics** tab. Select the **Auriculodiagnostics** in the **Patient examination** menu.

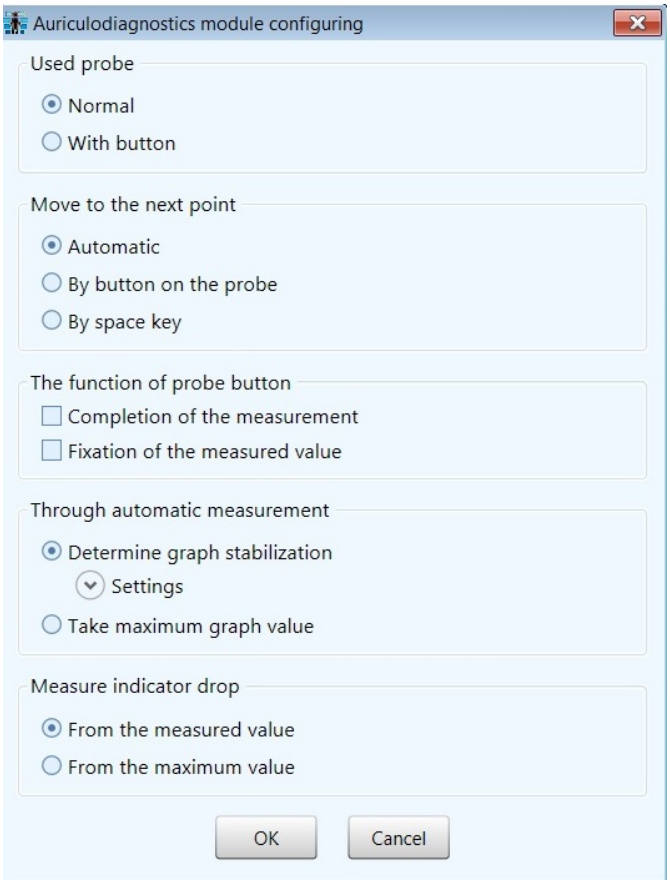


Connect a patient cable to the "BAP" socket on the front panel of the *Medscanner*. Connect the black plug of a patient cable to the passive cylindrical electrode that a patient holds in his/her hand (opposite to the side of measurements). Connect the red plug to the probe that is set on BAP. If you intend to use a probe with a touch sensitive button, connect it to the "Sensor" socket (in that case the red plug of a patient cable is not used; it is desirable to avoid its contact with the *Medscanner* or a patient). An attachment with a smallest tip diameter of 1.5 mm should be put on.

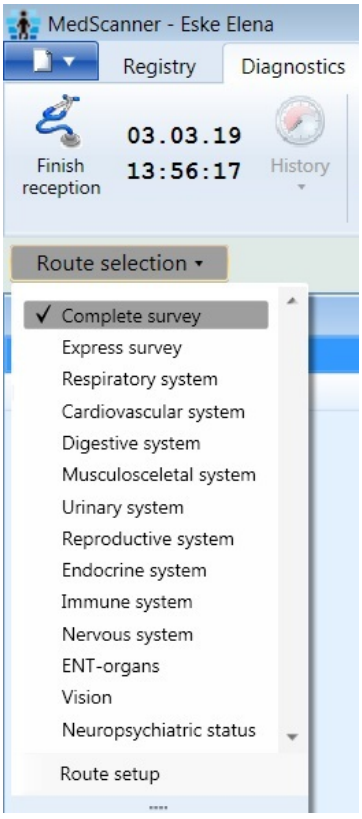
Click the **Settings** button. In the appeared dialog box select desirable probe type: traditional or having a touch sensitive button. Besides, select the way how the program goes to the next BAP during measurements: automatically after measuring is completed and the probe is taken off a BAP, by pressing of a touch sensitive button on a probe or by pressing of the **Space** key on the keyboard.

The *Through automatic measurement* setting allows selection of a measurement starting point. Either the program determines the beginning of a plateau (stabilization) on a graph and starts counting up from that value (by default the duration of stabilization is 1 s), or it is possible to set measurement counting up from the maximum value on a graph.

If the probe with a touch sensitive button is used, there is a possibility to set program actions when a touch sensitive button is pressed: either completion of the measurement and automatic switching to the next BAP on a measurement route, or fixation of the measured value (the data reading is continued that allows estimation of "indicator drop" value).



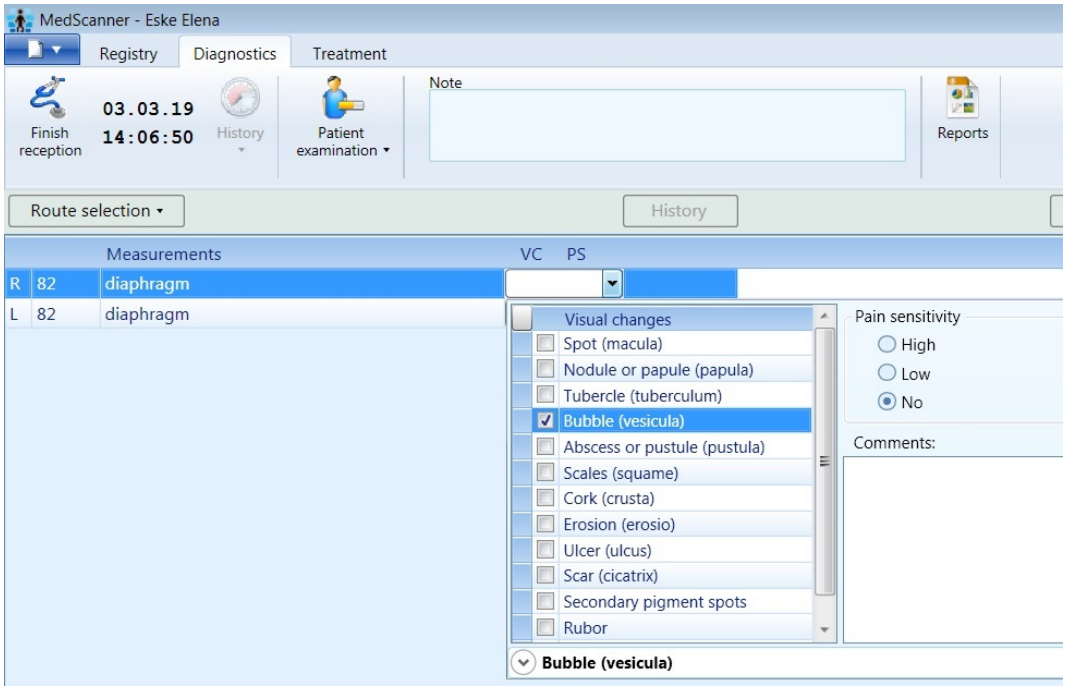
Select the needed diagnostics route in the **Route selection** menu.



Click the **Start reception** button:

Sequentially make measurements on all BAPs from the list. Before testing it is necessary to measure R82 or L82 point (zero point) on each side.

Information about visual changes or BAP pain sensitivity can be entered in a drop-down dialog box for every point.

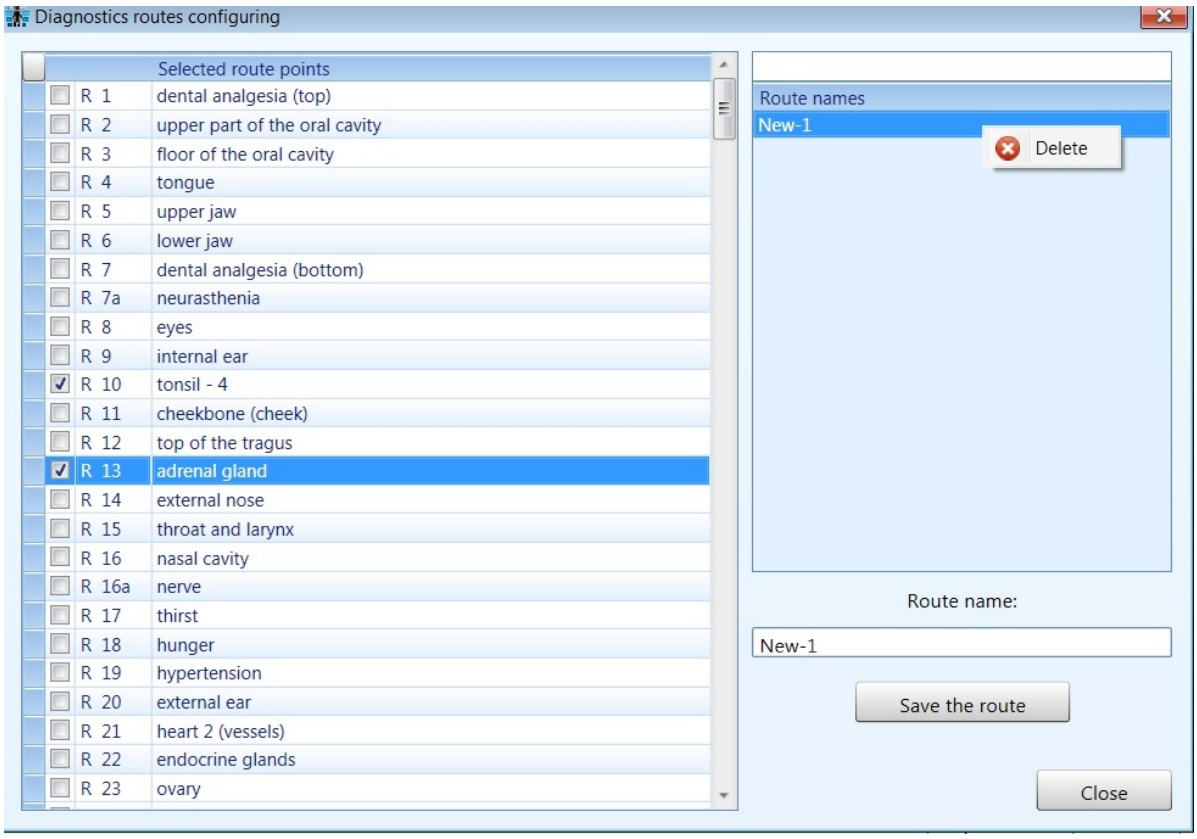


Auriculodiagnostics routes setup

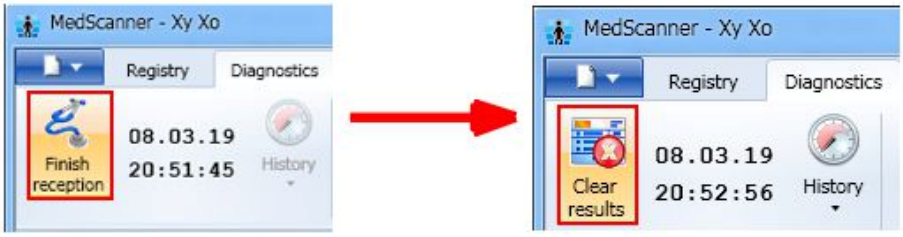
Select **Route setup** from the **Route selection** menu.

In the appeared dialog box tick needed points for diagnostics, enter the name of a new route in the **Route name** box and click the **Save the route** button.

To delete the route, select it in the list of diagnostics routes, click with the right mouse button and select **Delete** in the appeared menu.

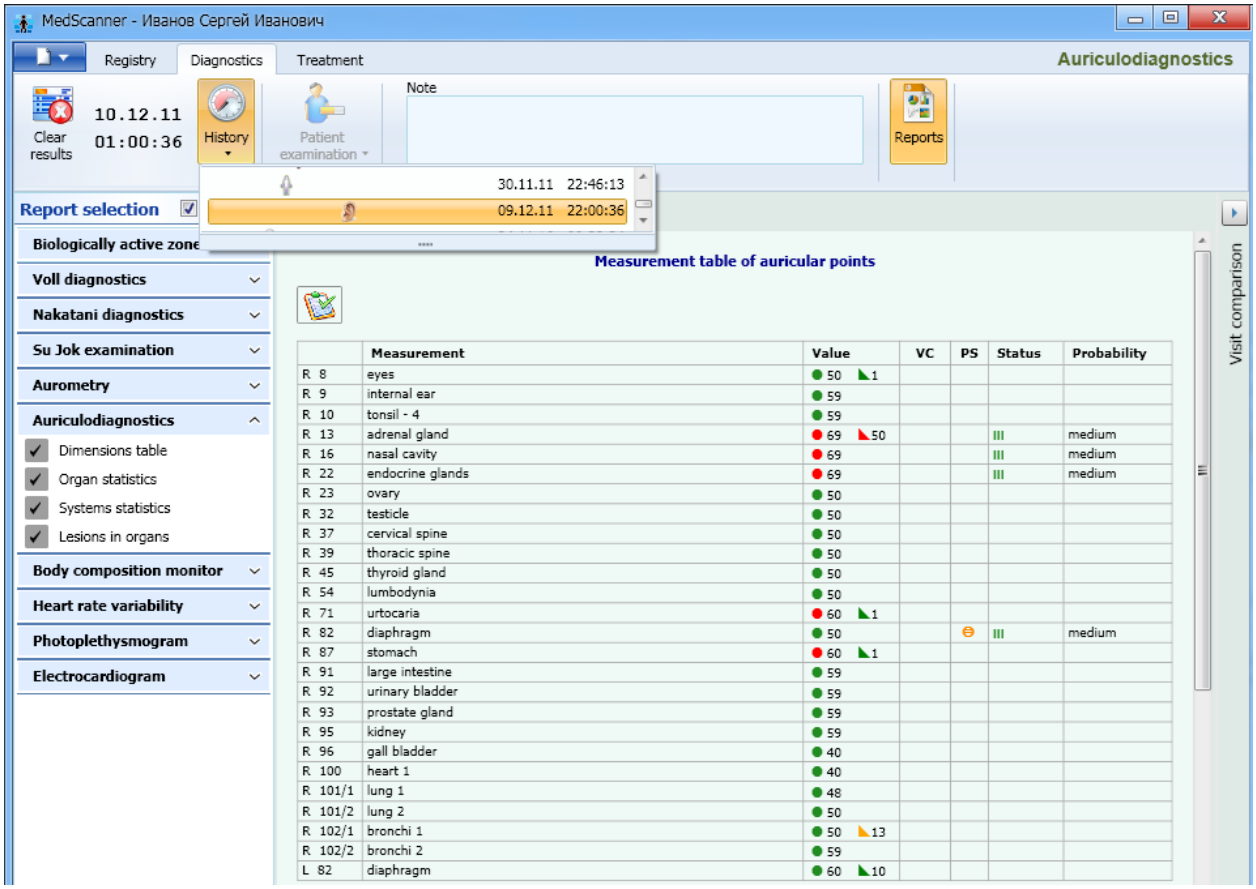


Upon completion of auriculodiagnostics sequentially click the **Finish reception** and **Clear results** buttons.



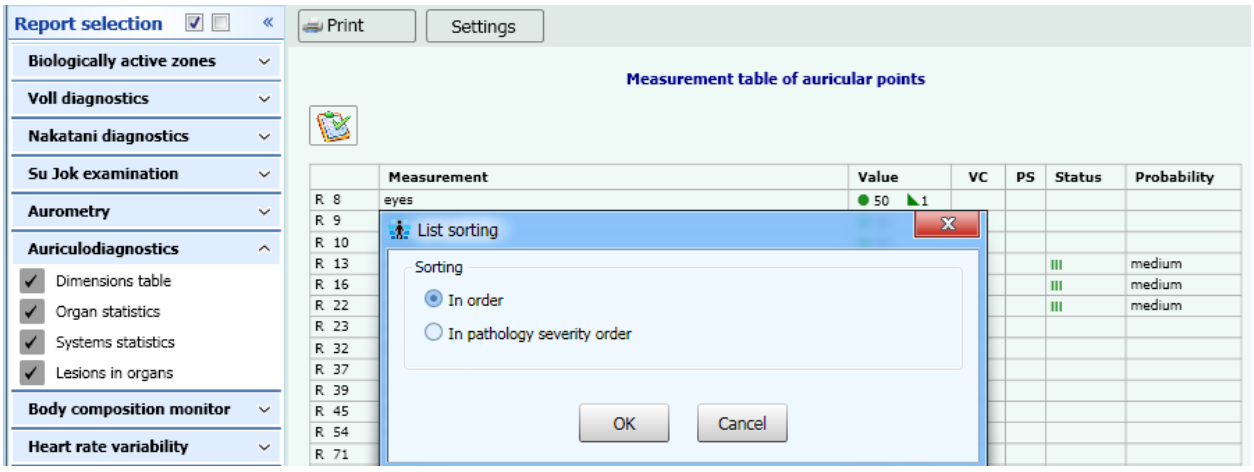
Auriculodiagnostics reports

To view measurement results, click the **Reports** button on the right and tick relevant reports on the left after the diagnostic procedure. To view a history of visits, click the **History** button on the left.



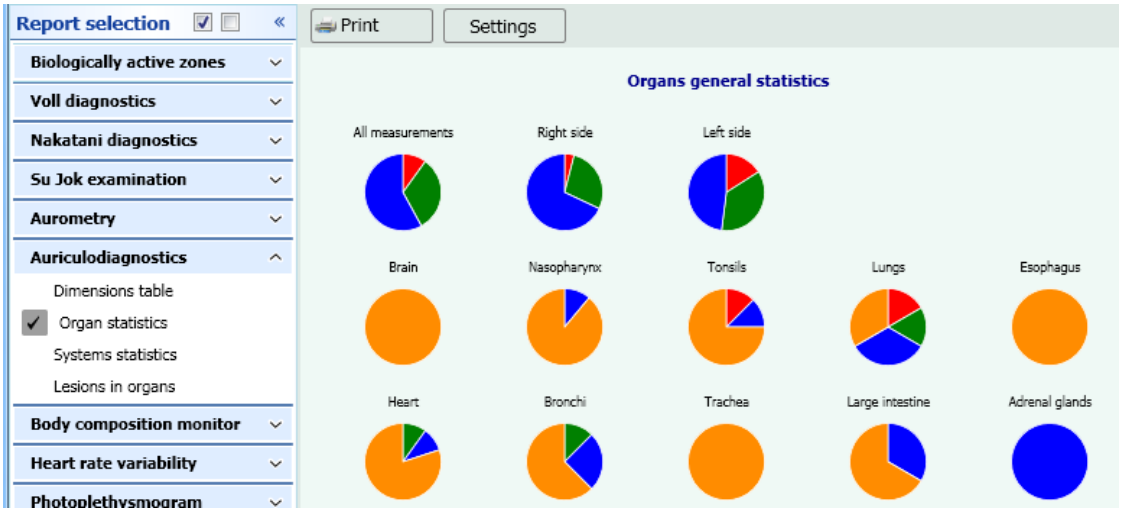
Auricular BAP measurement table

To sort data in tables, select the  button above and left of the table:



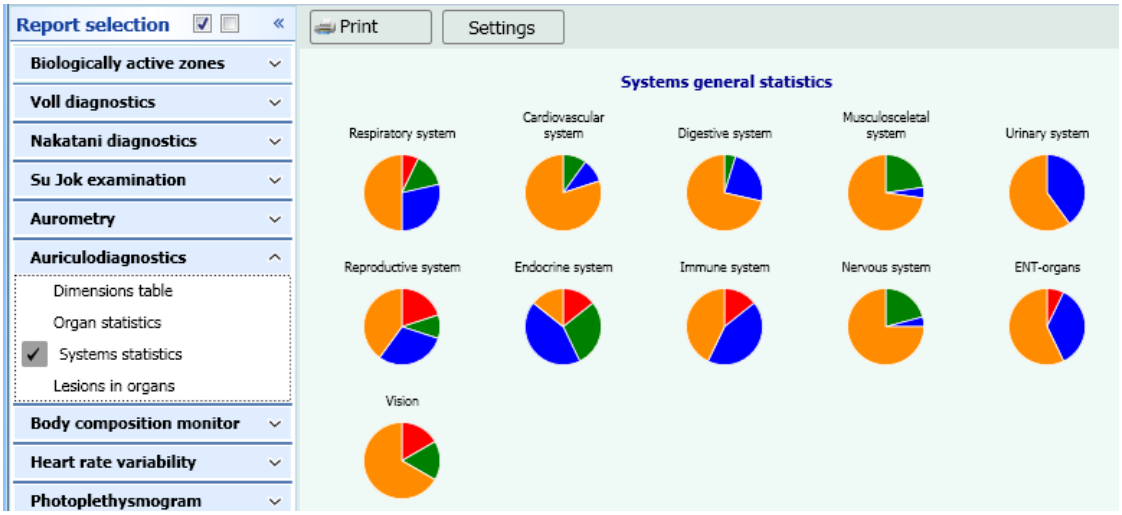
Statistics by organs

The total number of measured BAPs and the ratio of normal and pathologic BAPs in every organ are presented in the form of pie charts. BAPs with increased level of energy are marked in **red**, BAPs with decreased level of energy are marked in **blue**. **Green** color indicates normal level of energy. **Orange** color indicates BAPs on which the measurements were not carried out.



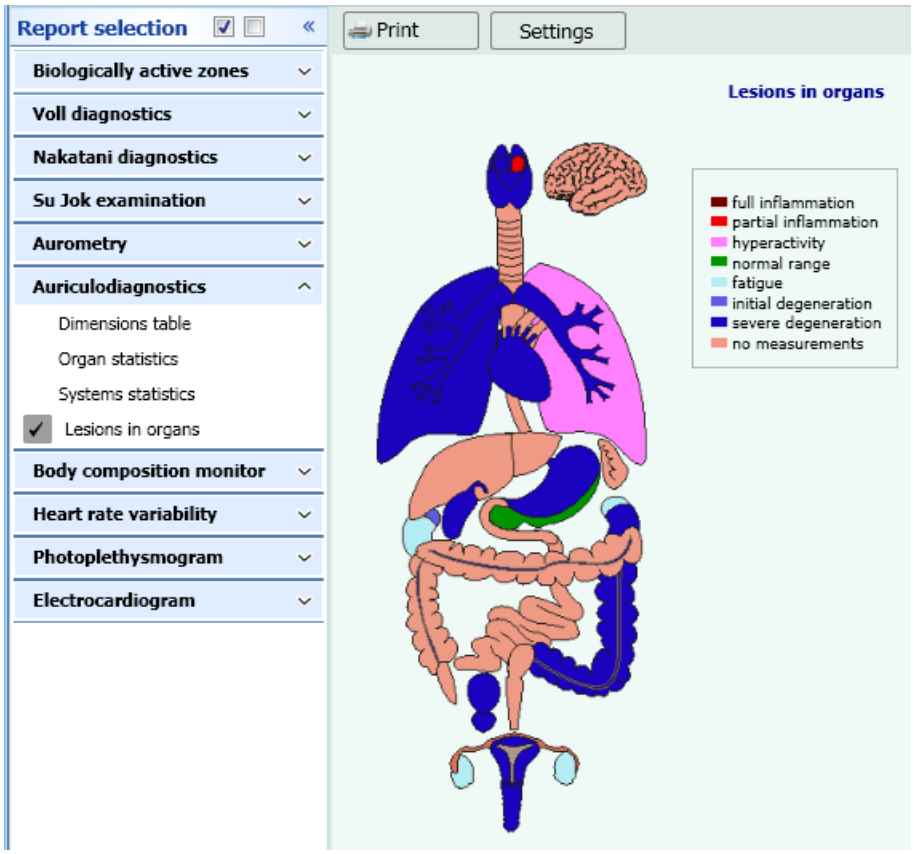
Statistics by systems

The ratio of normal and pathologic BAPs in every system are presented in the form of pie charts. BAPs with increased level of energy are marked in **red**, BAPs with decreased level of energy are marked in **blue**. **Green** color indicates normal level of energy. **Orange** color indicates BAPs on which the measurements were not carried out.



Lesions in organs

Illustrative visualization of a patient's general health status:



BIOIMPEDANSOMETRY (FOR *MEDSCANNER BIORS*; *MEDSCANNER BIORS-04*; *MEDSCANNER BIORS-05* EMBODIMENTS)

Measurement of the human body complex resistance

Modern physicians, practitioners in the fields of nutrition, cosmetic science and sports medicine often encounter difficulties in determining the causes of overweight or monitoring of the weight loss. Calculation of the body mass index (BMI) can give a rough estimate of the situation, since excess weight can be related not only to an accumulation of adipose tissue. The active muscle gain or fluid retention (edema) can also cause excess weight. Overweight does not reflect cosmetic changes only, this condition can indicate different health problems, especially about kidney diseases, cardiovascular or endocrine disorders. To determine the differential diagnosis between obesity and the excess weigh due to edema or muscle gain, full laboratory or special examination often has to be carried out. However there is a more simple, painless and reliable method which is called **bioimpedancemetry**. It is based on the measurement of the biological tissue complex resistance when weak alternate current passes through the human body.

The introduction of this unique function study is associated with the work of a French anesthesiologist A. Thomasset in the early '60s. The method is based on the measurement of the bioelectrical resistance of body tissues ("impedance" means resistance and "bioimpedance" means a resistance of biological tissues) with use of a special device, bioimpedance analyzer, measuring active resistance (R) and reactive resistance (Rx) of biological tissues. This includes an integral estimate of body composition with use of the three-component model: analysis of fat mass, lean body mass (i. e. fat free mass) and the total body liquid. In particular, in a dynamic perspective the following parameters are monitored: adipose tissue and active cell mass content, metabolic rate values and an intracellular to extracellular fluid ratio. On the basis of the data obtained, the program draws conclusions about the hydration level (normal or impaired), lipid and water-salt metabolism. Thus a bioimpedance analyzer makes it possible to estimate the risk of developing or presence different diseases, define the physiological age of a person, choose an optimal weight improvement program, physical activity type and level, control the weight loss and/or muscle gain during the entire period of conducting the program.

Note. Electrical pulse goes on the path of least resistance. Depending on water saturation of the body it can pass over, "not see" some stored fat. Studies show that even using the most sensitive device, when the procedure performs perfectly, measurement error is up to 8–9%. It means, for example, a person loses 4% of fat but results of bioimpedancemetry show that a patient has gained 4%. It can confuse a person and may cause a disappointment. So it is better to repeat bioimpedancemetry no more than once every 2–3 days to see more significant difference regarding to weight loss or gain. In that case a measurement error is less prominent and you can see the trend in weight changes.

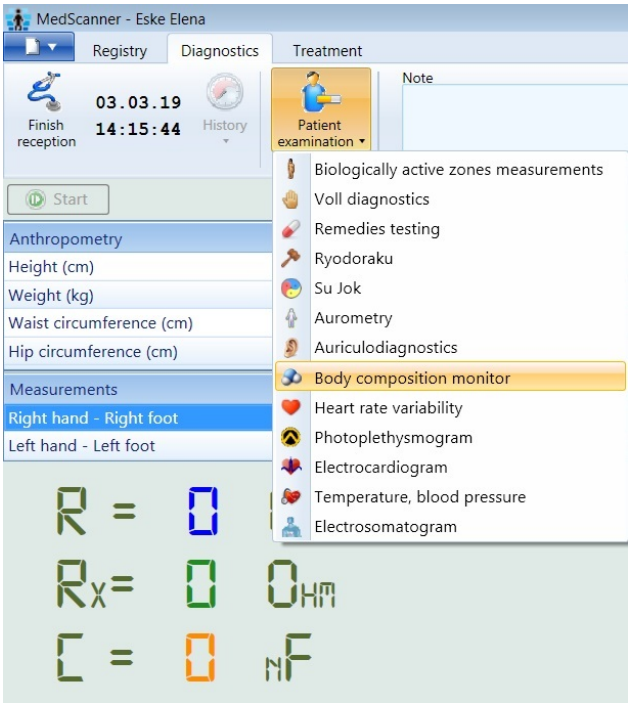
There is no point in carrying out several consecutive measurements because accumulated static electricity from a bioimpedance analyzer is added to the measurement error. It leads to erroneous results.

Working with the program

For the work a tape measure and floor scales are additionally required.

It is not advisable to conduct examination in inflammatory diseases, during menstruation, after alcohol consumption or less than 2.5 hour after a meal, because it can lead to incorrect measurement data.

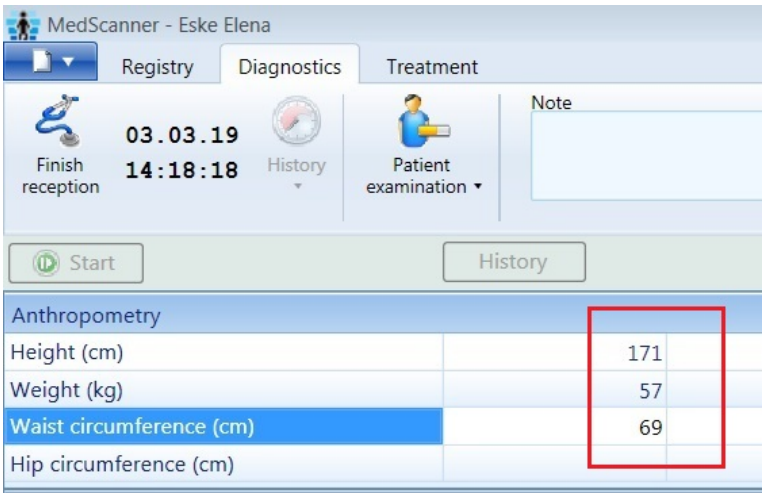
Select a patient or register him/her in the **Registry** menu. Select the **Diagnostics** tab. Click the **Body composition monitor** item in the **Patient examination** menu.



Connect a cable to the corresponding socket on the device case. Connect snaps on cable ends to clip electrodes (or disposable electrodes).

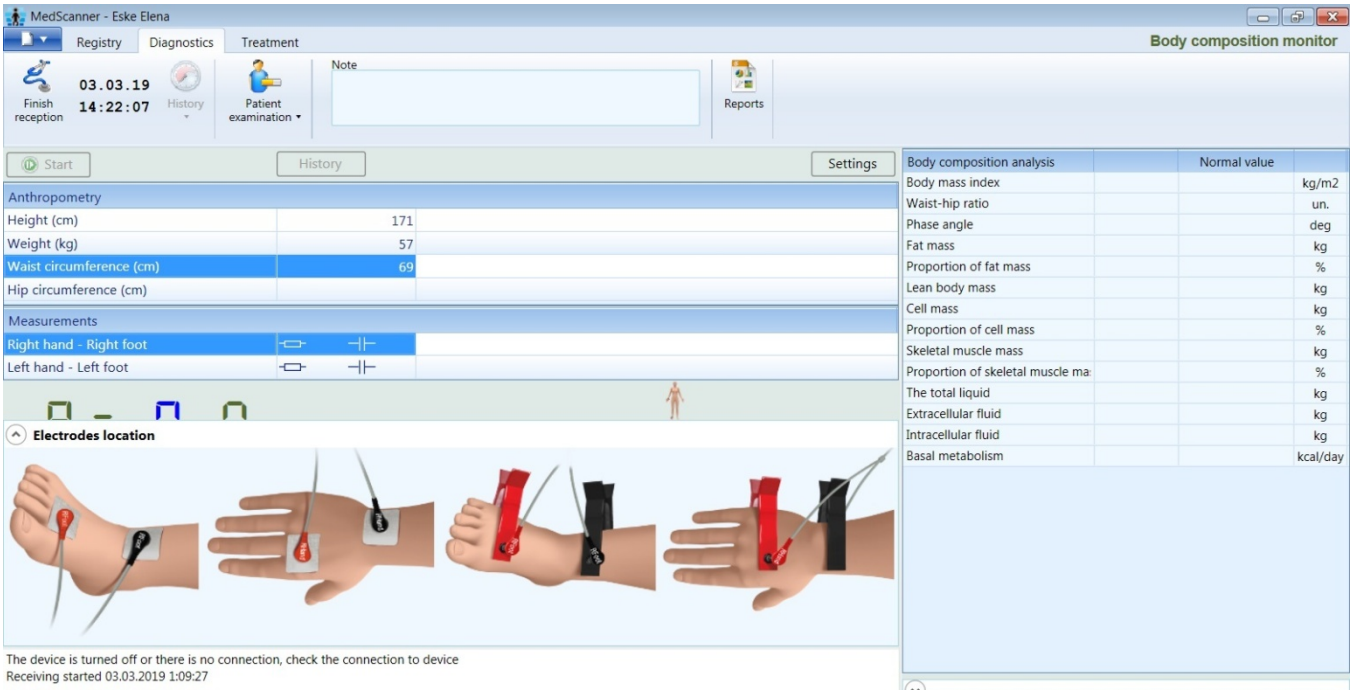
Click the **Start reception** button.

Measure the examined person's body weight, waist and hip circumference. By double click on the empty **Measurements** field enter obtained values into the table of anthropometric measurements.



The client's height and birth of date should be correctly entered when registering in the program. These data are required for precise calculation of the person's body mass index.

Place electrodes on a hand and a foot on the same side of the examined person's body (ipsilaterally). You can view the electrodes placement in the program by clicking the appropriate menu at the bottom, under measurements.



A patient should remove metal objects on the body and lie down on a couch, so that there is no contact between inner thighs (to groin) as well as between inner surfaces of the arms and the trunk (to underarms). A patient should lie still and relax.

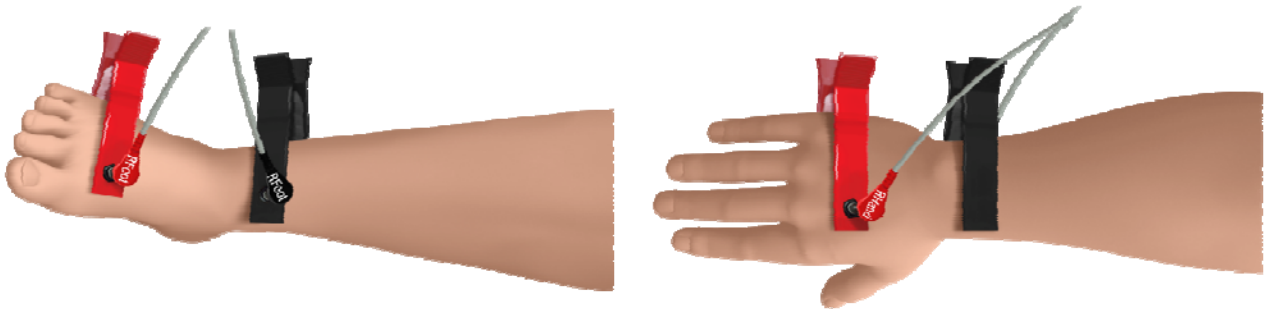
Electrodes are placed on patient's arm and leg (on one side). It is possible to carry out measurements on the opposite side of the body, if necessary. To do that, select the left or right side in the program list.

The hand electrode with a black plug (a proximal one) is fixed on the wrist (articulation of the hand and forearm bones), and the electrode with a red plug (a distal one) is fixed on the skin area between a thumb and index finger. The foot electrode with a black plug (a proximal one) is fixed over the ankle joint and the electrode with a red plug (a distal one) is fixed on the skin area between big and second toes. If an examined person has too much hair on arms and

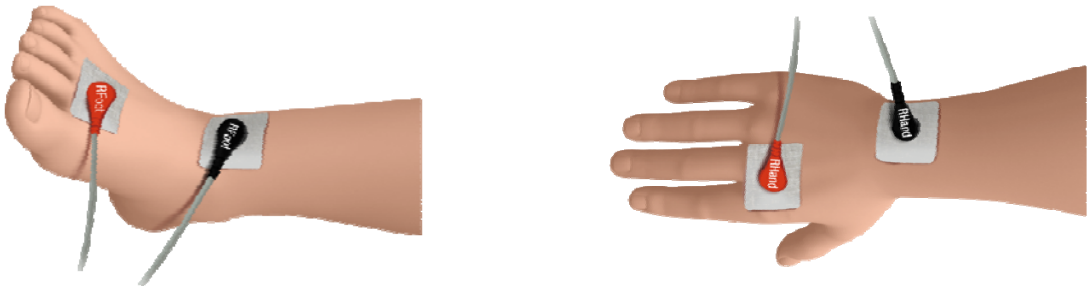
legs, it is necessary to choose an area with the minimum amount of hair or remove hair on skin areas on which electrodes are placed.

During the measurement process a patient should be relaxed and calm. He/she should stay still and keep silence.

Distal (red) electrodes are intended for including a patient into probing current circuit. Proximal (black) electrodes are for including into analyzer measuring circuit. It is necessary to provide good contact between electrodes and patient's skin. In case of poor contact (it is determined by absence of measurement process or displaying of greatly underestimated values regarding fat tissue) during the measurement process the operator may press the electrode to the patient's skin by a hand avoiding contact with metal parts of the electrode. Contacts of clip electrodes must be moisten with sodium chloride, 10% solution (to prepare it you should dissolve a whole teaspoon of salt in 100 ml of cooled boiled water).

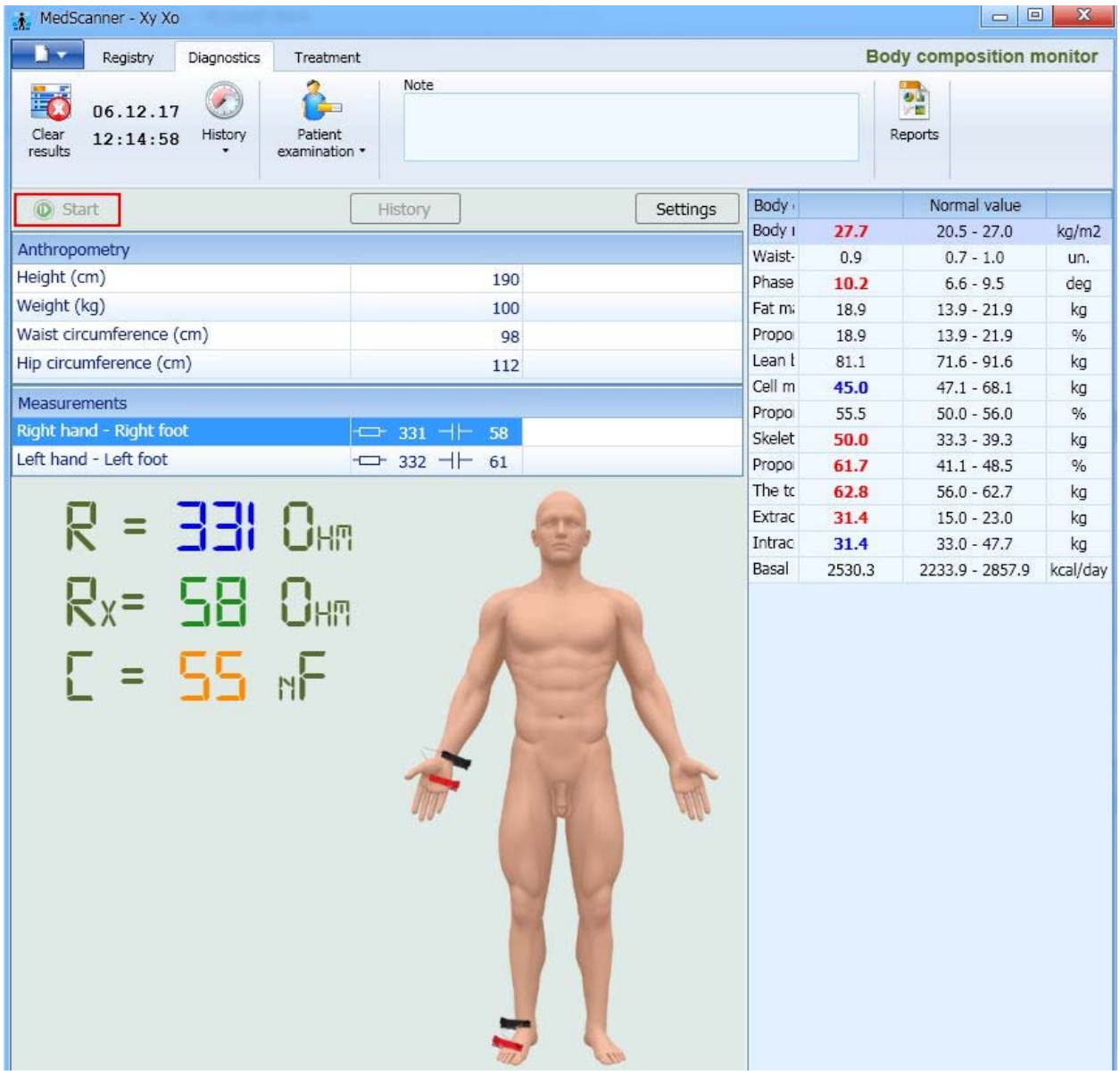


The disposable adhesive electrodes PG-470 for bioimpedance measurement are included into the delivery set. They are fixed on the same areas as clip electrodes. **The use of the disposable adhesive electrodes enables to obtain more precise values during the measurement process of the biological tissue complex resistance.**

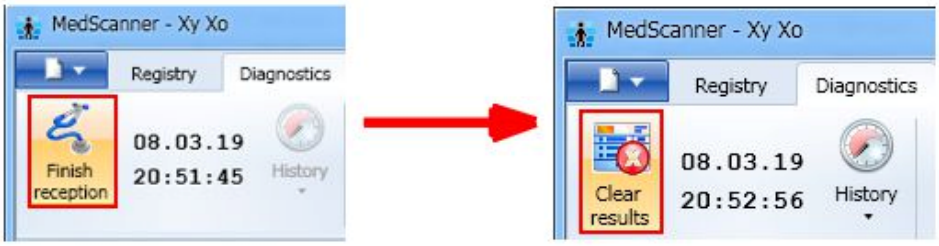


Note. When measurements are carried out in patient's lying position, it leads to more accurate results of measurement of body biological tissues complex impedance.

Click the **Start** button. The program is carried out the measurement of active and reactive resistance in the measuring circuit. After successful measurement on the right side move electrodes to the left side and click the **Start** button again. If measurements have not been carried out, check that electrodes are placed correctly and there is a good contact between electrodes and patient's skin.



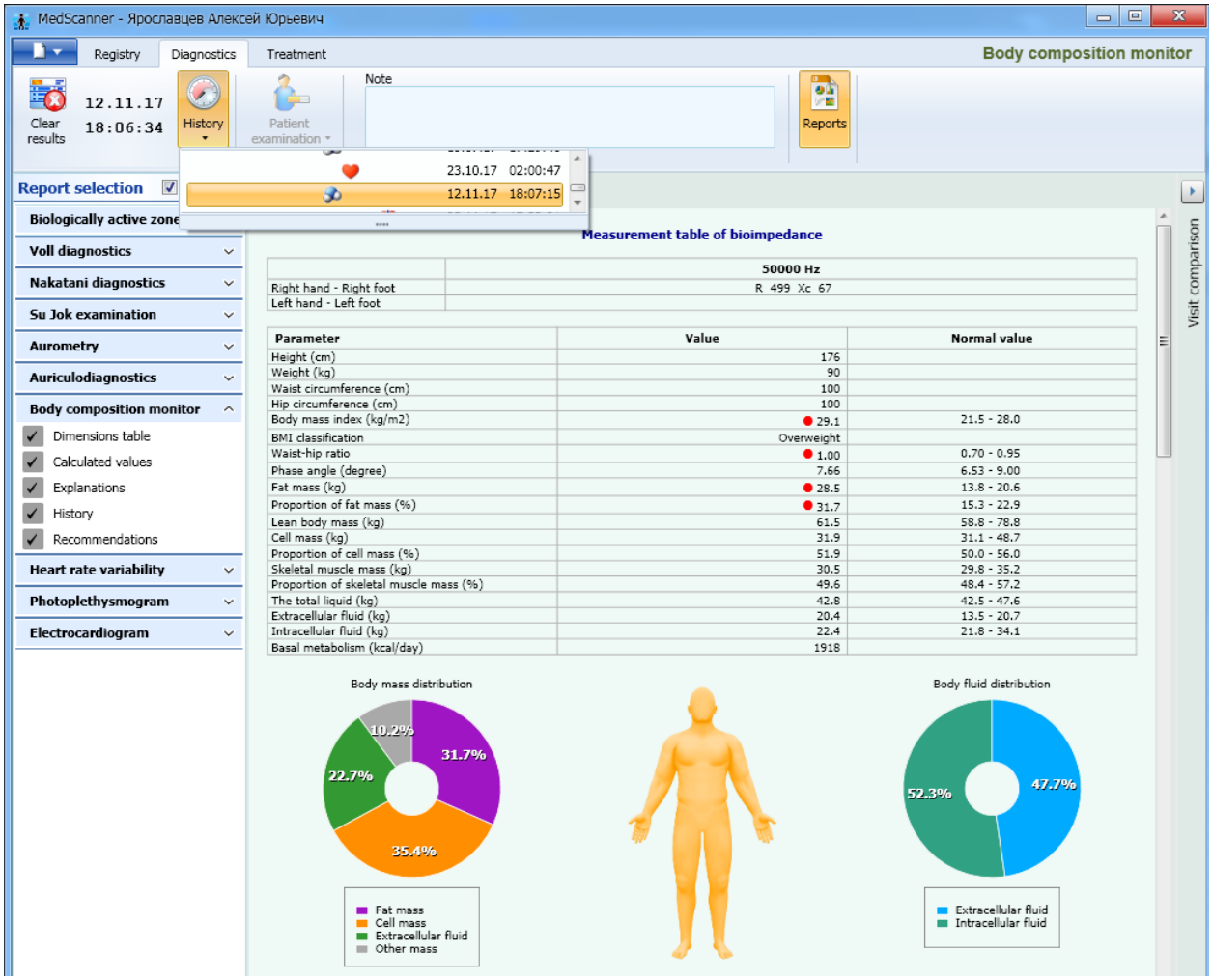
When diagnostics is completed, click **Finish reception** button. The obtained measurement results are shown on the screen. Upon successful completion of the examination, click the **Clear results** button. The screen is cleared and the obtained measurement results are saved in the database.



The disposable adhesive electrodes should be disposed after examination in accordance with the existing rules and regulations. Reusable electrodes should be disinfected using hydrogen peroxide 3% with addition of detergent, a kind of Fairy 0,5%, or chloramine solution 1%.

Bioimpedansometry reports

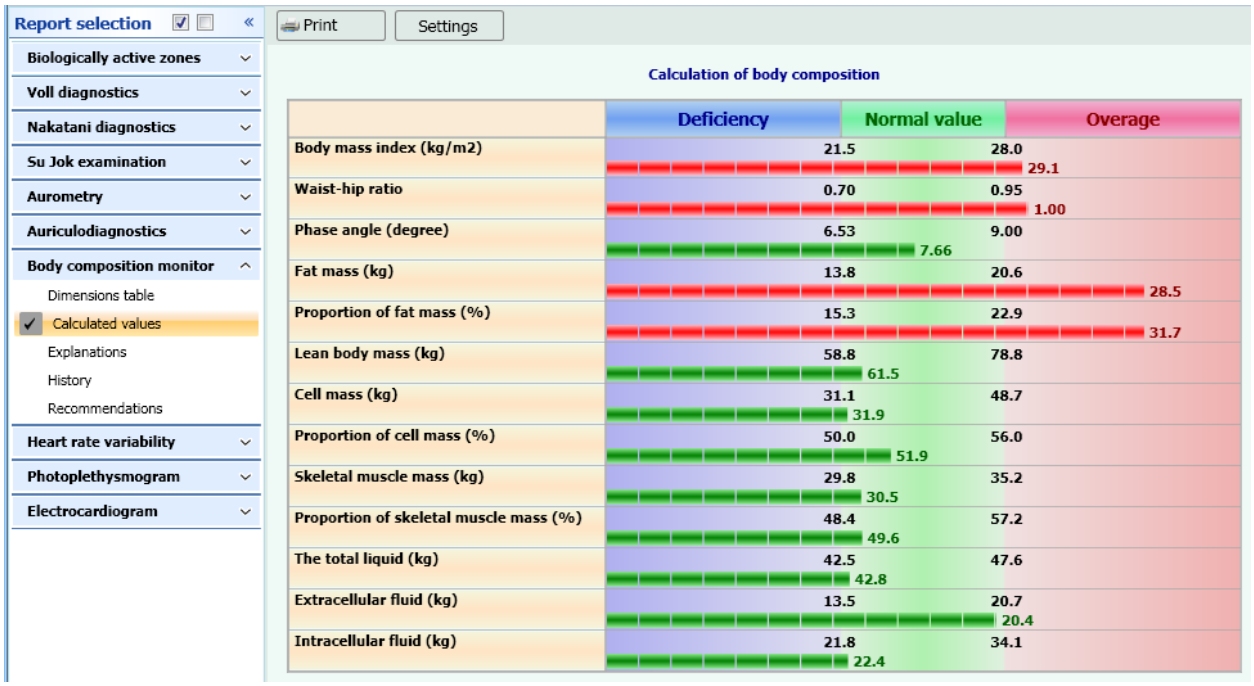
To view measurement results, click the **Reports** button on the right and tick relevant reports on the left after the diagnostic procedure. To view a history of visits, click the **History** button on the left.



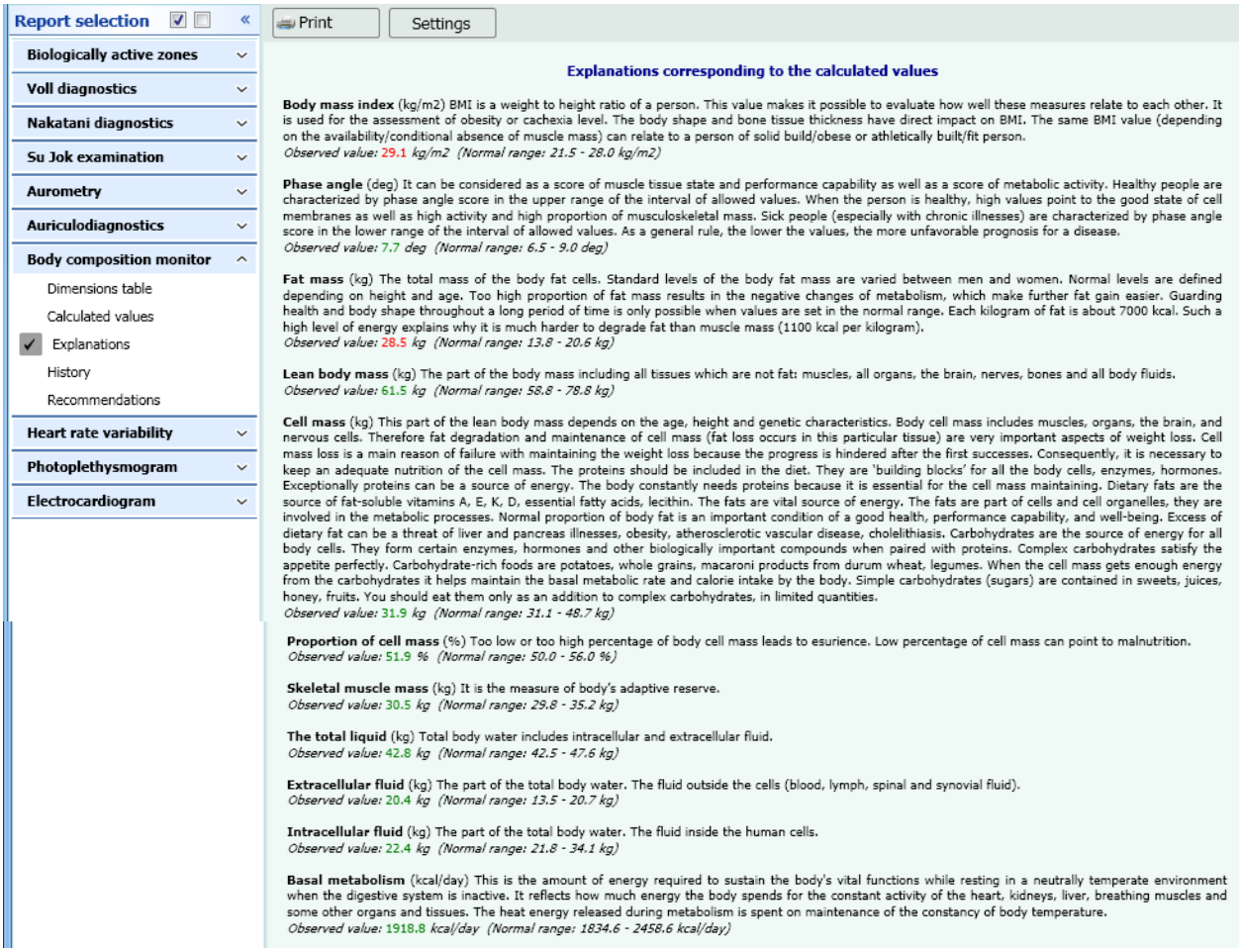
The body shape is displayed according to the Body Mass Index:

Severe body weight deficit	Underweight	Normal body weight	Overweight	Obesity I degree	Obesity II degree

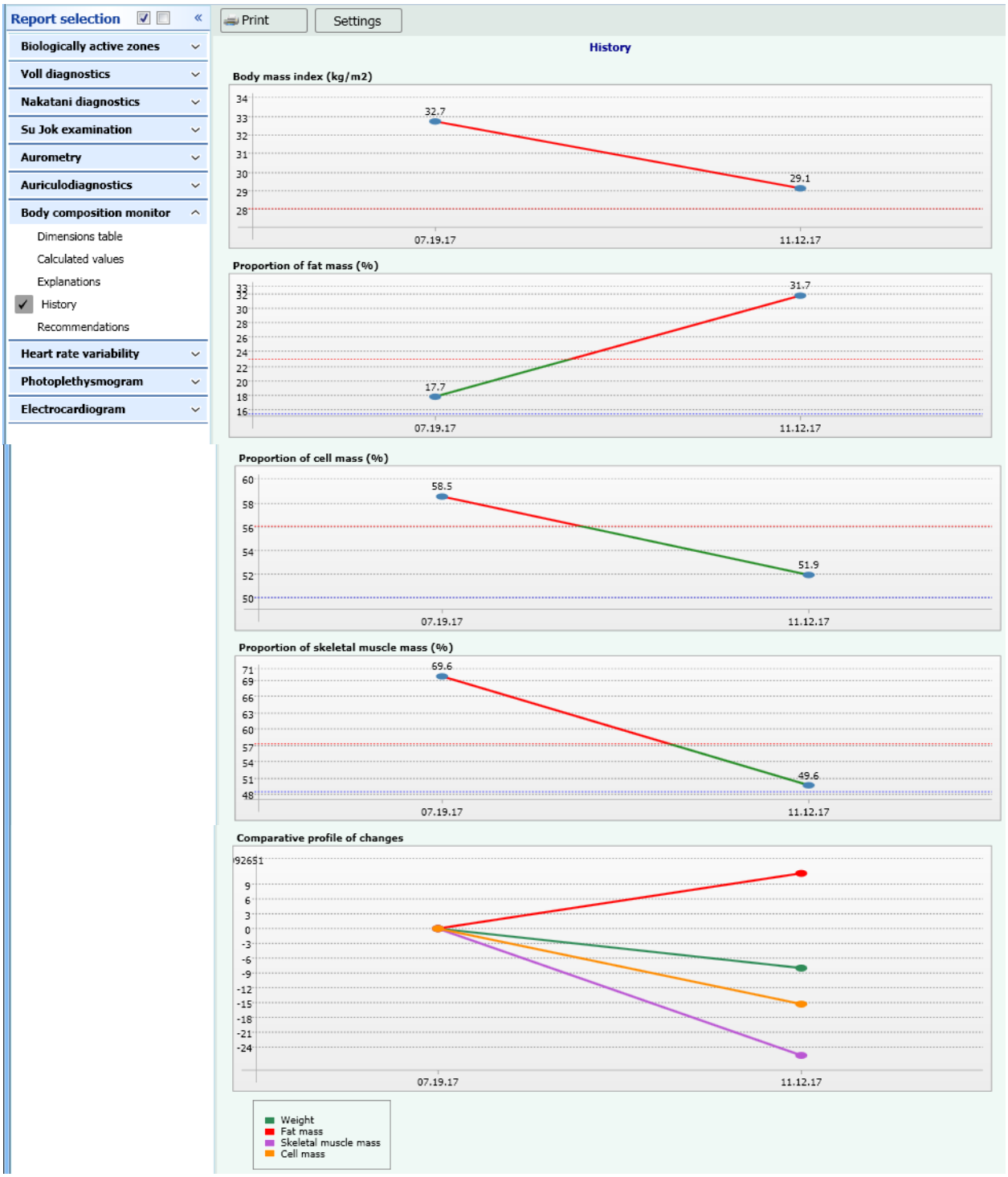
Body composition calculation



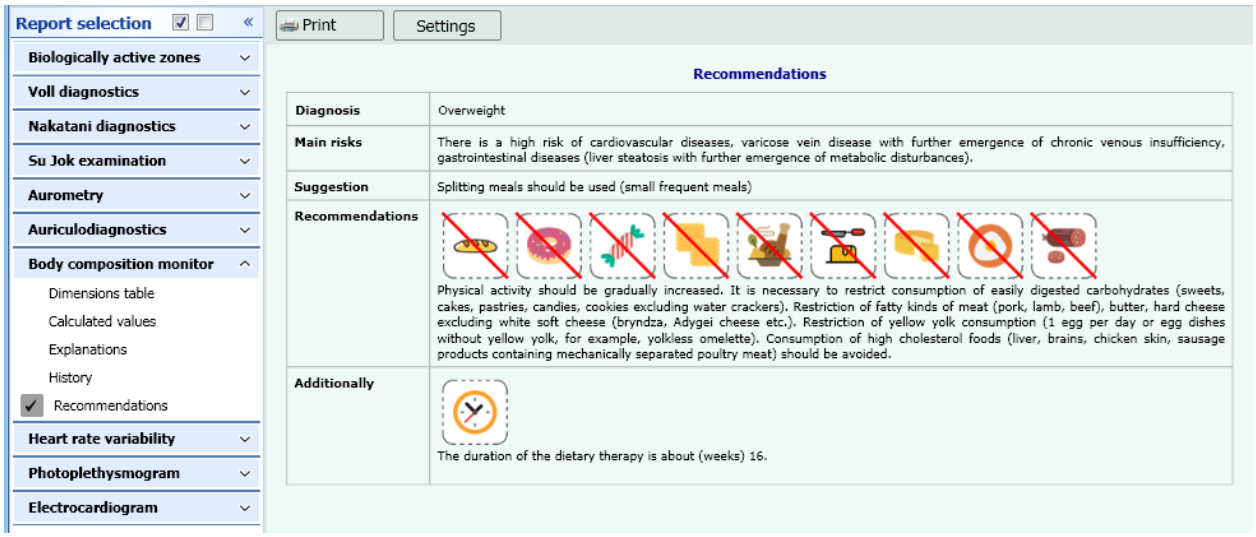
The explanations for obtained results



Follow-up data



Recommendations



PULSEOXIMETRY AND HRV (FOR *MEDSCANNER BIORS*; *MEDSCANNER BIORS-02*; *MEDSCANNER BIORS-05* EMBODIMENTS)

One of the hardware-software extensions of HSC *Medscanner BIORS* is a professional device for photoplethysmography and heart rate variability calculation (according to Bayevskiy). Measurements are carried out with use of the pulseoximeter sensor placed on any finger tip. The data are transmitted to the computer program that calculates the heart rate variability and evaluates the adaptive compensatory activity of the whole body including presence or absence of psychoemotional stress. The examination duration does not exceed 15 minutes.

Pulse diagnostics has been around for thousands of years and it is still very common in China and India. The heart influences every body organ and system, and any homeostasis changes in turn affect regulation of cardiac activity. Hardware-software complexes have now been made available in order to register pulse changes. They allow getting data about oxygen saturation of the capillary blood (SpO_2) and analysis of data about heart rate variability (HRV) with a very high degree of confidence.

SpO_2 measurement is based on difference between spectral characteristics of oxygenated and deoxygenated haemoglobin. The pulseoximeter sensor probes the end phalanx of a finger. That finger sensor emits optical radiation at two wavelengths in red and near infrared ranges. The radiation passed through the tissues (due to the arterial blood pulsing) has a pulsing component (a pulse wave), amplitude of which is linked to the radiation absorption by haemoglobin in the arterial blood. A pulseoximeter determines a relative amplitude of a pulse wave using two wavelengths and calculates SpO_2 value. Obtained data are statistically post-processed in order to increase their reliability.

Figure 1 schematically shows a pulse wave shape of radial artery, obtained with the use of an optoelectronic sensor.

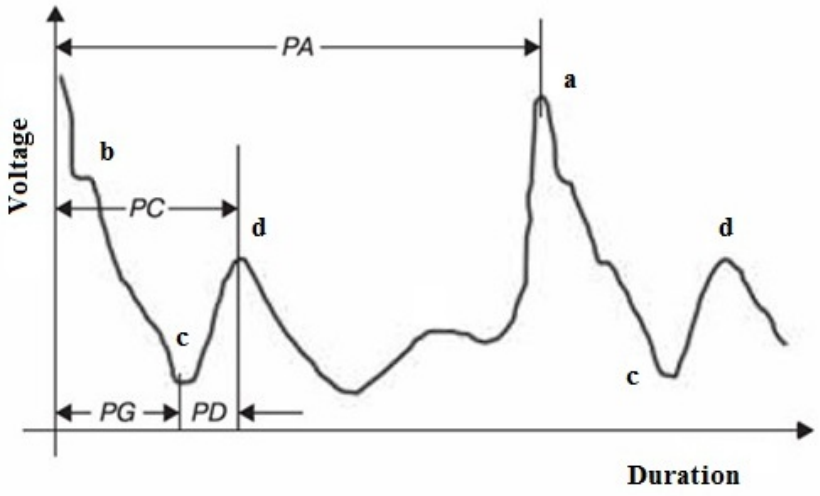


Fig. 1
Schematics of the radial artery pulse wave: a – systolic wave maximum (a-wave); b – late systolic wave; c – beginning of dirotic wave; d – presystolic (postdicrotic) wave maximum; PA – maim period of pulse wave; PC – time to dirotic wave maximum; PD – ascending part of dirotic wave; PG – catacrota fall time

Pulse signals in different patients can vary significantly in the set of local waves within the main period, their intensity, values of the main parameters characterizing every additional wave (maximum, minimum, time to maximum and minimum, etc.). For example, in many cases there are no postdicrotic or late systolic wave, dicrotic wave maximum is poorly expressed or multiple (several local maximums follow consecutively), etc.

Heart rate variability (HRV) is a length variability of RR-intervals of consecutive cardiac cycles for certain periods of time. HRV is an extent of heart rate (HR) variability in relation to its average level. Currently, HRV is considered as the most informational method among the non-invasive techniques of evaluation of the heart rate autonomic regulation. This screening technique, universal with regard to age, makes it possible to analyze the humoral and autonomic regulation of different organs and organ systems.

The intended use of a pulseoximeter finger sensor applies to children over one year old and adults up to the age of 75, at home and in hospitals. The sensor is not intended to carry out a continuous monitoring. The absolute contraindication is the presence of artificial heart pacemaker in a patient if it is the main pacemaker.

Only the sensor included into the delivery set of HSC Medscanner BIORS must be used for device operation in the pulseoximeter mode.

Pulseoximeter of HSC *Medscanner BIORS* is *calibrated to display the functional oxygen saturation of the blood*. It allows detection of hypoxic state. Wavelengths at maximum radiation are 660 and 940 nm, maximum light power is 0.8 mW, the measuring range of heart rate is 30–245 beats per minute, the measuring range of oxygen saturation of the blood (SpO_2) is 70–100%, update time is 20 ms.

It is prohibited to use a functional tester for the accuracy assessment of the pulseoximeter sensor. The accuracy assessment of SpO_2 measurement is determined on the basis of clinical testing. Using the pulseoximeter, the oxygen saturation of the haemoglobin is measured. Detected values are compared with values obtained on the basis of arterial blood samples testing with the use of CO-oximeter.

The pulseoximeter block of the *Medscanner* BIORS is not used for monitoring of a patient's state in the emergency department or intensive care unit, and that is why alarm signals and corresponding settings are absent. The pulseoximeter is intended only for use as an auxiliary device for assessment of a patient's state. It should be used together with other methods of evaluation of clinical symptoms and signs.

During measurements the room temperature should be maintained in a range of 10° to 35°C.

The temperature of the applied part of pulseoximeter must not exceed 41ºC. If the temperature exceeds 41ºC, it is necessary to interrupt the diagnostic procedure, remove the pulseoximeter sensor from a patient's finger and turn off the *Medscanner*.

The sensor of the pulseoximeter is not sterile, non-toxic, does not cause skin allergy when applied.

The pulseoximeter does not require periodic verification and calibration.

Disposal of *Medscanner* devices after their specified service life is made according to the 2.1.7.2790 Sanitary Rules and Regulations and manufacturer's recommendations stated in accompanying documentation and markings of components.

After every procedure it is necessary to disconnect the pulseoximeter sensor from the *Medscanner* and disinfect internal and external surfaces using hydrogen peroxide 3% with addition of detergent, a kind of Fairy 0,5%, or chloramine solution 1%.

Warnings

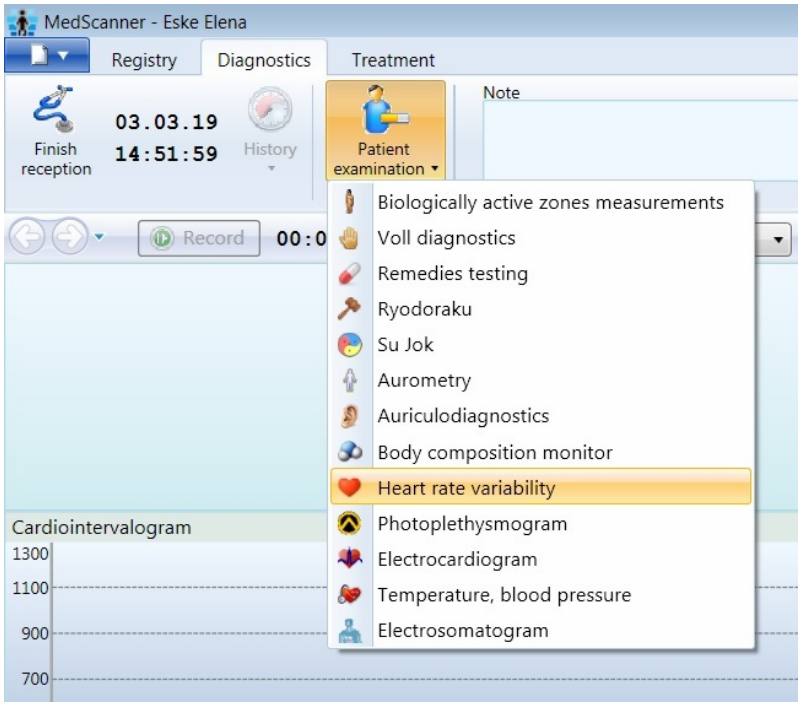
- It is prohibited to sterilize the device in autoclave, use ethylene oxide or immerse the sensor within the fluid because it can lead to inaccurate measured data.
- To get accurate SpO_2 values, the pulseoximeter is supposed to be able to measure pulse rate properly. Before SpO_2 measurement it is necessary to ensure that nothing prevents from proper pulse rate measurement.
- It is prohibited to use a pulseoximeter in an explosive environment.
- The place where the pulseoximeter sensor is set should be inspected regularly in order to check position of the sensor, evaluate blood circulation and patient's skin sensitivity under the sensor.
- Read and understand the operating manual before use of the device.
- Periodic changing a finger for the sensor depends on long period of use of the applied sensor and patient's condition. It is necessary to change the location of the sensor, evaluate skin condition and blood circulation, as well as make an adjustment every 4 hours.
- The temperature of the applied part of the pulseoximeter must not exceed 41ºC.

Factors that can be a reason for inaccurate measurement results

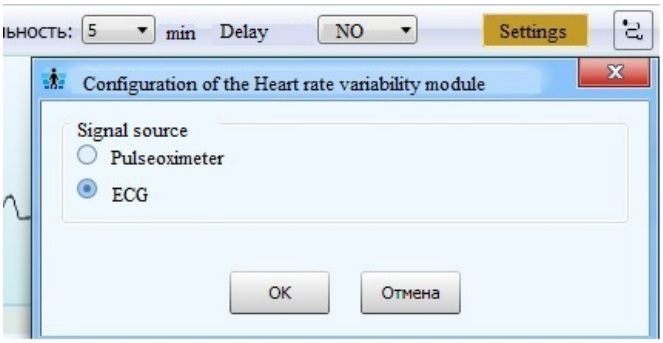
- The pulseoximeter must not be used during magnetic resonance imaging (MRI) or computed tomography (CT) conducting as well as during diagnostic and therapeutic procedures with the use of *Medscanner*.
- Electromagnetic interference (from mobile phones, paging devices, radio set, etc.), an electrosurgical unit, defibrillator can affect the performance of the pulseoximeter.
- The sensor of the pulseoximeter should not be placed on the same side as a blood pressure cuff, an artery or venous catheter.
- It is prohibited to fix a sensor on the limb using adhesive tape.
- Bright room light can adversely impact SpO_2 measurement. The sensor should be shaded from the direct sunlight, if necessary (for example, using a surgical towel).
- High levels of dysfunctional hemoglobin (for example, carboxyhemoglobin or methemoglobin) can affect the measurement results.
- Low perfusion or venous pulse have influence on the measurement accuracy.
- Blood must not contain any intravascular dyes, such as methylene blue or indocyanine green.
- Too high mobility of a patient is not permitted.
- Examination is not permitted when a person has hypotension, significant vasoconstriction, severe anemia or hypothermia.
- A patient should not have a cardiac arrest or be in shock.
- Nail polish or artificial nails may result in inaccurate readings during evaluation of SpO_2.

Working with the program

Select a patient or register him/her in the **Registry** menu. Select the **Diagnostics** tab. In the **Patient examination** menu select the **Heart rate variability** item.



For switching from the pulseoximetry mode to the recording from the ECG leads mode, click the **Settings** button and select a signal source in the *Configuration of the Heart rate variability module* window.



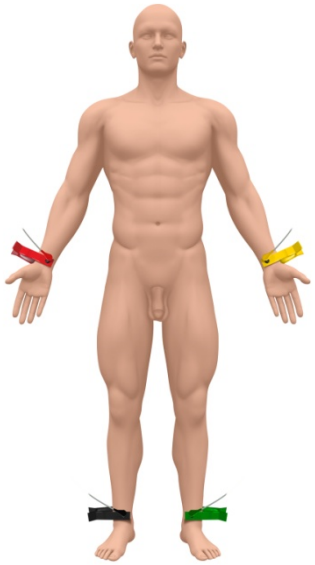
The cable with the sensor of the pulseoximeter should be inserted until it stops to the appropriate socket on the device panel.

The examination should be conducted when an examined person is in his/her seating or lying position. Nail polish or artificial nails can lead to inaccuracy of measurements with the use of the pulseoximeter sensor. In that case it is advisable to record data from the ECG leads.

When making measurements with the use of the pulseoximeter sensor, put it on the examined person's finger until tight. The red light-emitting diode must be placed directly over the nail plate. To view the placement of the sensor on a finger, click the button.

A graph of changes in blood pressure measured by the pulseoximeter is displayed in the program window. Wait for the graph stabilization and reliable detection of pulse wave peaks by the program. The red marker points are displayed above every peak.

If you carry out an examination by four ECG leads, place clip electrodes on a patient's body according to a program explanatory picture. To view the placement of clip electrodes on a finger, click the  button.



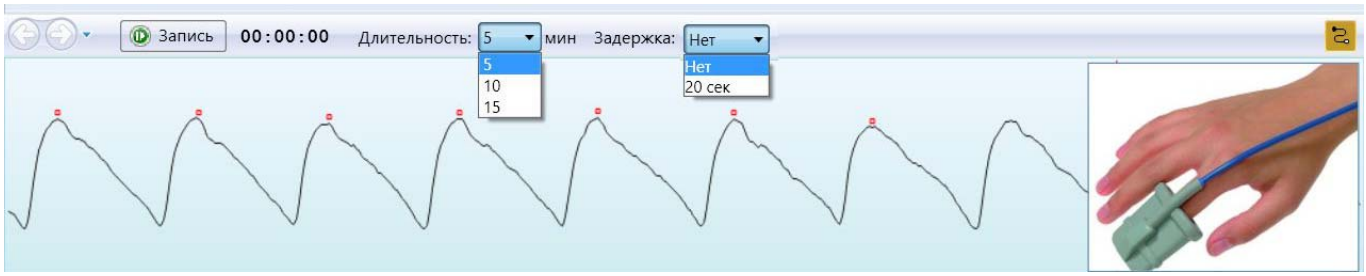
An ECG graph is displayed in the program window. Wait for the graph stabilization and reliable detection of pulse wave peaks by the program. The red marker points are displayed above every peak.

Choose procedure duration (usually 5 minutes) and the time of measurement start delay (it is used for the self-examination, when you need to prepare for measurements after actions with the program interface).

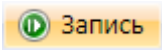
Click the **Start reception** button , check the hand position, ensure that the sensor is fixed correctly. A hand with the sensor must be placed as comfortable as possible, without restricting

blood flow in the limb. Sensor shall be protected from the direct sunlight. During the measurement process an examined person should be relaxed and calm. He/she should stay still and keep silence.

A pulse wave measured by the pulseoximeter is displayed in the program window. Wait for the graph stabilization and reliable detection of pulse wave peaks by the program. The red marker points are displayed above every peak.

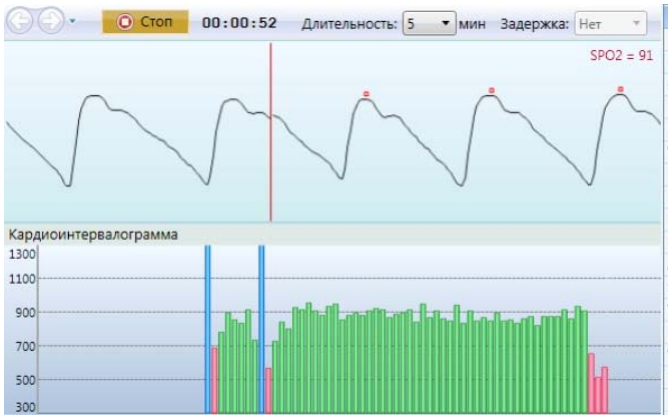


Choose procedure duration (usually 5 minutes) and the time of measurement start delay (it is used for the self-examination, when you need to prepare for measurements after actions with the program interface).

Click the **Record** button 

.

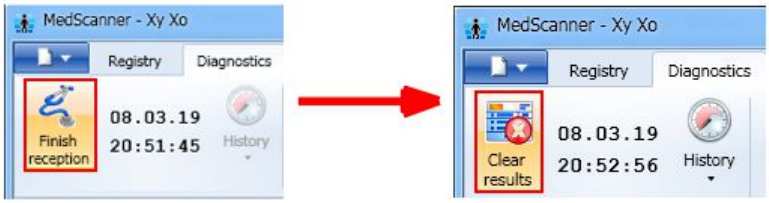
Interim parameters of the heart rate (oxygen saturation of the blood (SpO_2), pulse rate, average duration of R-R interval, etc.) are displayed in graphs and in the table in the right program window. A normal range for every parameter is shown as well.



	Показатели сердечного ритма		Норма	
HR	Частота пульса	64.7	60.0 - 85.0	1/мин
mRR	Средняя длина RR-интервала	926	700 - 1000	мсек
sdRR	Стандартное отклонение средней длины RR-интервала	429.8	40.0 - 90.0	мсек
RMSSD	Корень среднеквадратических отклонений RR-интервалов	487.7	30.0 - 65.0	мсек
pNN50	Отношение пар RR-интервалов (>50 ms) к числу всех RR-интерва	45	2.0 - 30.0	%
VAR	Коэффициент вариации	46.4	3 - 8	%
Mn	Минимальное значение длины RR-интервала	519	700 - 1000	мсек
Mx	Максимальное значение длины RR-интервала	3964	700 - 1000	мсек
MxDMn	Разность Mx-Mn	3445	150 - 300	мсек
Mo	Мода	855	700 - 900	мсек
Amo	Амплитуда моды	36	30 - 50	%
SI	Стресс индекс	6.1	50.0 - 200.0	усл.ед.
TP	Суммарная мощность спектра ВСР	13147	2350 - 4550	мс2
ULF	Мощность сверх низкочастотного домена спектра ВСР	0	200 - 310	мс2
VLF	Мощность очень низкочастотного домена спектра ВСР	1600	355 - 1175	мс2
LF	Мощность низкочастотного домена спектра ВСР	3206	754 - 1586	мс2
HF	Мощность высокочастотного домена спектра ВСР	8341	772 - 1178	мс2

Upon completion of the pulse wave recording, click the **Finish reception** button. The obtained results of the measurement are shown on the screen.

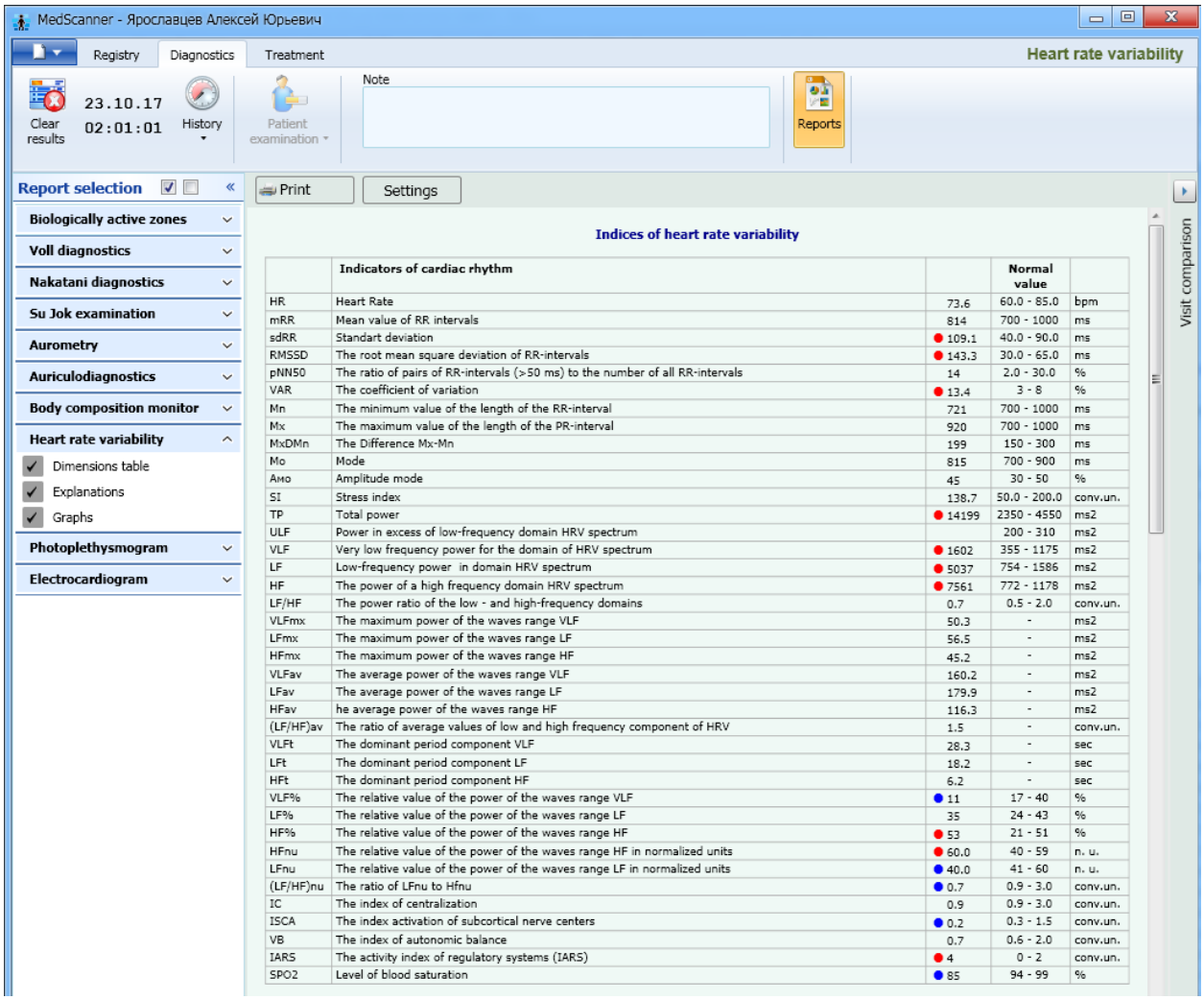
Upon successful completion of the examination, click the **Clear results** button. The screen is cleared and the obtained measurement results are saved in the database.



Reports of the heart rate variability

To view measurement results, click the **Reports** button on the right and tick relevant reports on the left after the diagnostic procedure. To view a history of visits, click the **History** button on the left.

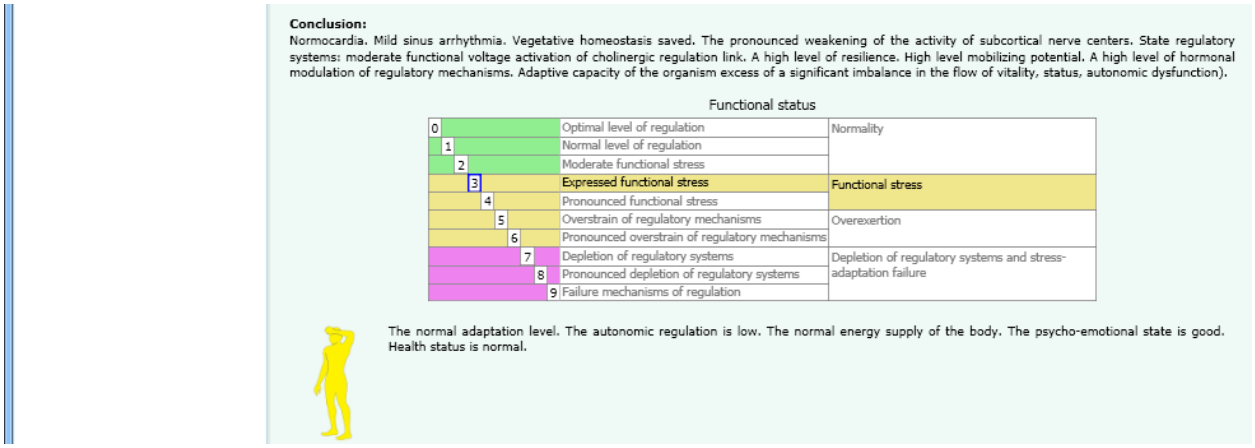
Values of the heart rate variability:



Indices of heart rate variability

	Indicators of cardiac rhythm		Normal value	
HR	Heart Rate	73.6	60.0 - 85.0	bpm
mRR	Mean value of RR intervals	814	700 - 1000	ms
sdRR	Standart deviation	● 109.1	40.0 - 90.0	ms
RMSSD	The root mean square deviation of RR-intervals	● 143.3	30.0 - 65.0	ms
pNN50	The ratio of pairs of RR-intervals (>50 ms) to the number of all RR-intervals	14	2.0 - 30.0	%
VAR	The coefficient of variation	● 13.4	3 - 8	%
Mn	The minimum value of the length of the RR-interval	721	700 - 1000	ms
Mx	The maximum value of the length of the PR-interval	920	700 - 1000	ms
MxDMn	The Difference Mx-Mn	199	150 - 300	ms
Mo	Mode	815	700 - 900	ms
Amo	Amplitude mode	45	30 - 50	%
SI	Stress index	138.7	50.0 - 200.0	conv.un.
TP	Total power	● 14199	2350 - 4550	ms2
ULF	Power in excess of low-frequency domain HRV spectrum		200 - 310	ms2
VLF	Very low frequency power for the domain of HRV spectrum	● 1602	355 - 1175	ms2
LF	Low-frequency power in domain HRV spectrum	● 5037	754 - 1586	ms2
HF	The power of a high frequency domain HRV spectrum	● 7561	772 - 1178	ms2
LF/HF	The power ratio of the low - and high-frequency domains	0.7	0.5 - 2.0	conv.un.
VLFmx	The maximum power of the waves range VLF	50.3	-	ms2
LFmx	The maximum power of the waves range LF	56.5	-	ms2
HFmx	The maximum power of the waves range HF	45.2	-	ms2
VLFav	The average power of the waves range VLF	160.2	-	ms2
LFav	The average power of the waves range LF	179.9	-	ms2
HFav	he average power of the waves range HF	116.3	-	ms2
(LF/HF)av	The ratio of average values of low and high frequency component of HRV	1.5	-	conv.un.
VLFt	The dominant period component VLF	28.3	-	sec
LFt	The dominant period component LF	18.2	-	sec
HFt	The dominant period component HF	6.2	-	sec
VLF%	The relative value of the power of the waves range VLF	● 11	17 - 40	%
LF%	The relative value of the power of the waves range LF	35	24 - 43	%
HF%	The relative value of the power of the waves range HF	● 53	21 - 51	%
HFnu	The relative value of the power of the waves range HF in normalized units	● 60.0	40 - 59	n. u.
LFnu	The relative value of the power of the waves range LF in normalized units	● 40.0	41 - 60	n. u.
(LF/HF)nu	The ratio of LFnu to Hfnu	● 0.7	0.9 - 3.0	conv.un.
IC	The index of centralization	0.9	0.9 - 3.0	conv.un.
ISCA	The index activation of subcortical nerve centers	● 0.2	0.3 - 1.5	conv.un.
VB	The index of autonomic balance	0.7	0.6 - 2.0	conv.un.
IARS	The activity index of regulatory systems (IARS)	● 4	0 - 2	conv.un.
SPO2	Level of blood saturation	● 85	94 - 99	%

Conclusion about functional status



Conclusion:
Normocardia. Mild sinus arrhythmia. Vegetative homeostasis saved. The pronounced weakening of the activity of subcortical nerve centers. State regulatory systems: moderate functional voltage activation of cholinergic regulation link. A high level of resilience. High level mobilizing potential. A high level of hormonal modulation of regulatory mechanisms. Adaptive capacity of the organism excess of a significant imbalance in the flow of vitality, status, autonomic dysfunction).

Functional status

0	Optimal level of regulation	Normality
1	Normal level of regulation	
2	Moderate functional stress	
3	Expressed functional stress	Functional stress
4	Pronounced functional stress	
5	Overstrain of regulatory mechanisms	Overexertion
6	Pronounced overstrain of regulatory mechanisms	
7	Depletion of regulatory systems	Depletion of regulatory systems and stress-adaptation failure
8	Pronounced depletion of regulatory systems	
9	Failure mechanisms of regulation	

The normal adaptation level. The autonomic regulation is low. The normal energy supply of the body. The psycho-emotional state is good. Health status is normal.

Explanations for calculated values

Explanations corresponding to the calculated values

Normocardia is a normal resting heart rate between 60 and 90 beats/min

Mild sinus arrhythmia is not a particular disease, but sometimes it can be a sign of the nervous system dysregulation. A human heart normally has a regular rhythm at a rate of approximately 60-90 beats per minute at rest, but from time to time a healthy person can have a mild irregularity of the rhythm. Normal rhythm is also called a sinus rhythm, since the sinus node, situated in the right atrium, normally controls the heart rhythm by producing electrical impulses that initiate each heartbeat. Normally the time difference between heart beats should not exceed 10%.

Respiratory sinus arrhythmia is commonly found, when the heart rate increases during inspiration and decreases during expiration. It is caused by influence on the heart of so-called vagus nerve which activity increases during inspiration.

Mild sinus arrhythmia can be provoked by:

- pregnancy due changes of autonomic nervous system during that period (i. e. nervous regulation of internal organs, endocrine glands and vessels);
- consuming coffee, green and black tea, alcohol;
- smoking;

Cases when sinus arrhythmia can be dangerous:

As usual, mild sinus arrhythmia is not accompanied by any symptoms. It is not a dangerous condition, but it requires readjustment of the disturbed body balance.

The autonomic homeostasis is constant – it means that sympathetic and parasympathetic nervous systems are in healthy balance. The sympathetic nervous system is one of the two divisions of the autonomic nervous system, the other being the parasympathetic nervous system. The autonomic nervous system controls most of the body's internal organs, endocrine glands and blood vessels.

Significant decrease in activity of subcortical nervous centers can be a normal condition in trained persons, whose nervous centers are trained to react less to irritations (i. e. emotional excitement, heavy physical activity). Besides, this condition can be a sign of subcortical center hypoexcitability.
High nervous centers of brain cortex are responsible for the nervous regulation of the body in general as well as for the body interaction with the environment. The subcortical nervous centers provide the balance of the different body systems (cardiovascular, respiratory systems etc.). The signals from these centers to organs intensify or inhibit their activity. For example, decrease in activity of the cardiovascular center slows down the heart rate.

The following conditions and illnesses are possible causes:

- different chronic diseases;
- long-term stress;
- long-term intake of psychostimulants (alcohol, caffeine and others) exhausts nervous system and leads to decrease in excitability of subcortical centers.

This condition can be dangerous:

It is necessary to determine the cause of significant decrease in activity of subcortical nervous centers, because this condition can be relate to different diseases.

Moderate functional stress means that the organism works actively. If the **activation of cholinergic division** of the autonomic nervous system occurs, probably, there is lack of energy required for the body activity, so the organism tries to save resources.

The sympathetic nervous system is one of the two divisions of the autonomic nervous system (ANS), the other being the parasympathetic nervous system. The autonomic nervous system controls most of the body's internal organs, endocrine glands and blood vessels.

So-called cholinergic division of ANS is parasympathetic division of the autonomic nervous system which controls restitution and relaxation. Therefore cholinergic mechanisms reduce the energy expenditure. They are responsible for maintenance of functional reserves and restoration of body resources.

Cases when this condition can be dangerous:

Moderate functional stress is a normal body condition. However activation of cholinergic mechanisms (it points to low energy level) increases the risk of functional reserve reduction.

Body adaptive capability is an ability of the organism to constantly adapt to the changes of internal and external environment. Decrease in adaptive capability leads to the low level of functional reserves which spent on balance maintenance. Severe body imbalance can lead to different diseases.

High level of restoration potential means that the organism does not much time to restore its functional reserves. Usually it is true for young organism and/or the physically trained person.

Every person has so-called body functional reserves (reserve energy) which constantly spent on optimal balance maintenance. In case of reduction of functional reserves, for various reasons, it is necessary to restore energy resources.

High level of mobilizing potential reflects that the organism can easily mobilize internal reserves and restore them fast.

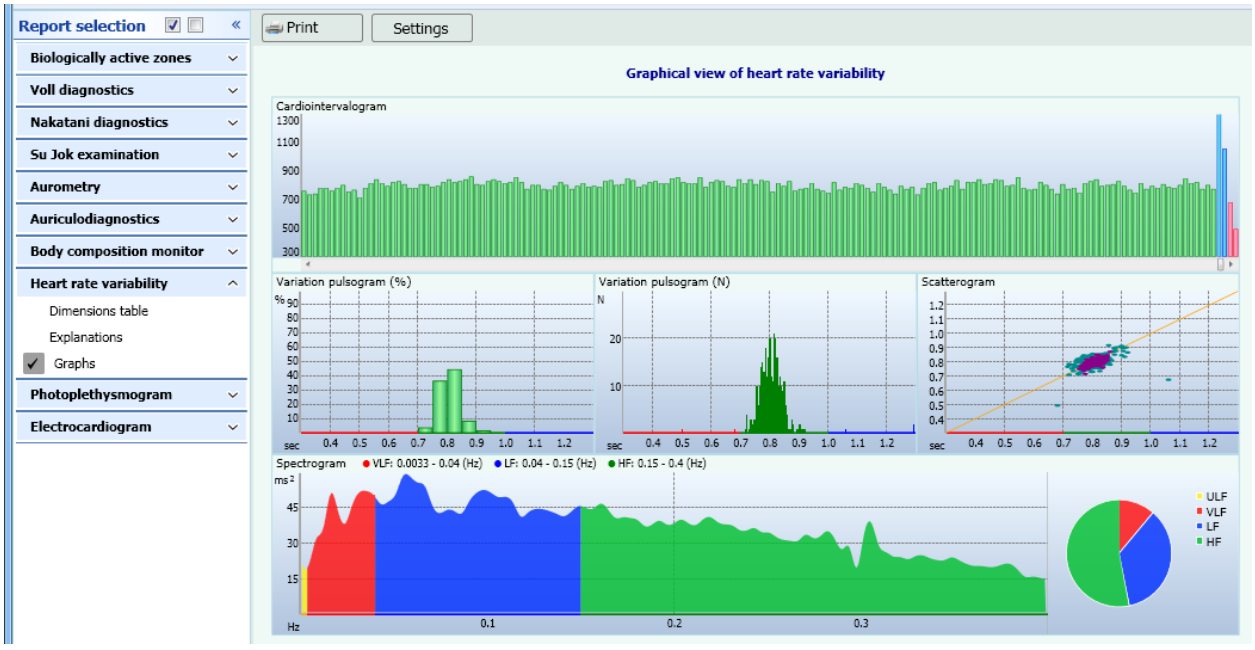
The organism constantly adapts to the changes of internal or external environment. When there is an additional load (stress) it is required to use (mobilize) so-called functional reserves, i. e. increase energy expenditure. The high level of body functional capabilities relates to the slight stress of regulatory systems.

High level of hormonal modulation of regulatory mechanisms points to the active participation of hormones in the nervous regulation. Hormones are essential body resources so the high level of hormone involvement means that the nervous system does not work enough well.

The organism adapts to the changes of internal or external environment by nervous system with the involvement of hormones produced by endocrine glands. For example, adrenal glands produce stress hormone adrenaline, thyroid produces thyroid hormones etc.

High level of hormonal modulation of regulatory mechanisms relates to the significant depletion of the body functional reserves which constantly spent on balance maintenance. High level of hormonal modulation can points to the overstrain.

Graphs



PHOTOPLETHYSMOGRAPHY (FOR *MEDSCANNER BIORS*; *MEDSCANNER BIORS-02*; *MEDSCANNER BIORS-05* EMBODIMENTS)

Photoplethysmography is a screening technique of vessel assessment. This simple, non-invasive, painless and reliable rapid test method is based on detection of blood volume in the microvascular system. This technique was described in details by V. Moshkevitch in his monograph.

The photoplethysmography principle is detection of changes in blood volume in the area of a measurement. The hardware-software complex *Medscanner* allows carrying out the finger photoplethysmography using distal finger phalanx. It provides the maximum information about microcirculatory bloodstream due to intensive capillary blood flow in the fingertip area.

What is the photoplethysmography?

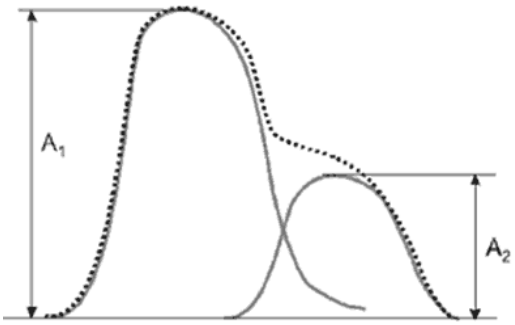
Photoplethysmography is a diagnostic technique of evaluation of tissue blood filling in a dynamic perspective, with data plot. It provides an adequate information on the peripheral haemodynamics state and vascular tone. Given the central role of microcirculatory disorders in the pathogenesis of most diseases, a regular study of the peripheral haemodynamics state enables to detect early stages of diseases and monitor treatment response. Additional conducting of functional tests allows making a differential diagnosis between organic disorders and functional changes of peripheral vessels.

Photoplethysmography is based on the principle of change in a volume of measured area through dynamic change of blood amount. The volume of any organ consists of the tissue volume and the volume of blood that fills the organ. Therefore the tissue volume is constant and the blood volume varies according to the phase of a cardiac cycle. These changes also depend on breathing, thermoregulation and sympathetic nervous system activity. They can be registered using devices. Photoplethysmography is a registration of the tissue optical density. An examined area is transilluminated with infrared light that then enters a photoconverter. A wavelength of emitted light is chosen in such a way that it is absorbed by red blood cells in the arterial system. Therefore its intensity depends on the blood amount in examined tissue. A registered signal is called a photoplethysmogram. It is interpreted according to certain parameters.

Method's capabilities for examination

A pulse wave is a pressure wave that spreads through the aorta and arteries due to the blood output from the left ventricle during systole (heart contraction). A short-term dilatation of the arterial wall is possible to register as a pulse beat. The pulse wave velocity through vessels depends on lumen width and vessel wall elasticity, thickness of the vessel wall and blood density.

The pulse wave forms by the interaction of left ventricle and vessels of the systemic circuit. It consists of two components, anacrotic and dicrotic phases:



A_1 – amplitude of systolic pulse wave (anacrotic phase)

A_2 – reflection wave amplitude, beginning of diastole (dicrotic phase)

The first peak forms due to systolic wave, the second one corresponds to reflection wave when blood goes to lower limbs and returns to aorta. It is known that reflection intensity is determined by arteriola tone, so analysis of the pulse wave shape makes it possible to evaluate the functional state and structural changes of peripheral vessels.

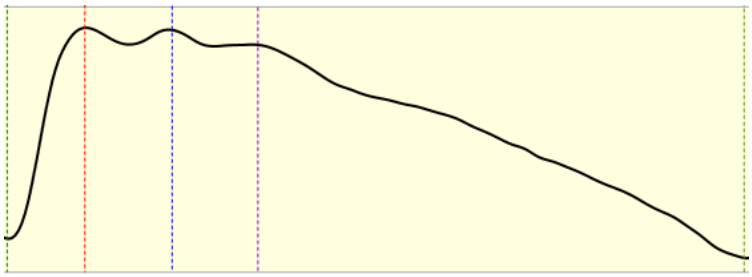
It is considered that pulse wave rate and duration depend on the cardiac function and its shape and peak height depend on the vessel wall state. A pulse wave of a healthy person is characterized by relatively steep ascendant part of the curve, narrow pulse and a presence of a reflection wave. The arteriostenosis leads to the flattening of the pulse wave, lengthening of dicrotic phase duration, increasing of distal pulse wave velocity, decreasing of reflection wave amplitude (it is not possible to detect the reflection wave amplitude when there is a significant stenosis). Photoplethysmography also enables to detect the lower limb ischemia. The wave characteristics determined from the measurements of the left and right feet should be similar. If there is a vessel disorder of one leg, dissymmetry appears.

For vasoreflex evaluation using this method, different functional tests are carried out: for example, compression and decompression test with brachial artery pressure detection allows assessment of the state of venous blood flow; nitroglycerin test makes it possible to assess the nitrate tolerance, etc.

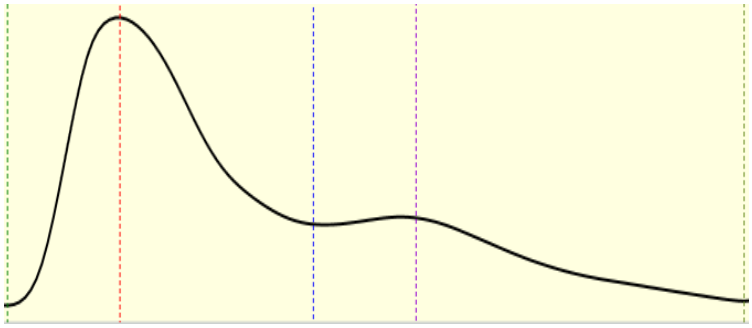
In the treatment monitoring, photoplethysmography helps to choose the optimal influencing factor and its dose/intensity, as well as prevent different adverse effects related to overdose.

Visual evaluation of photoplethysmogram

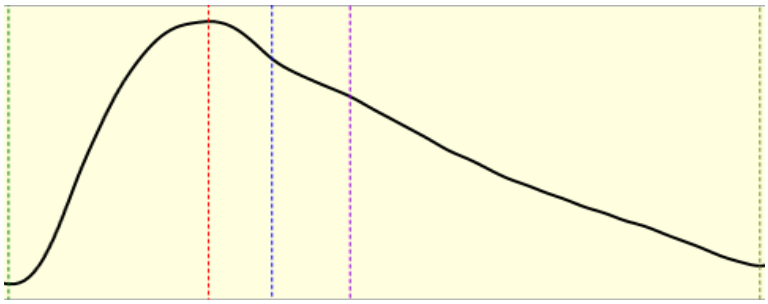
The main features of the hemodynamics disorders, which can be seen on the pulse wave, are as follows:



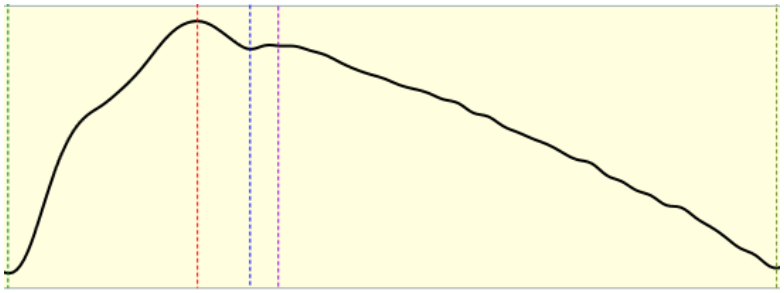
- there are additional waves near the top (a “cock's comb” symptom) indicating general and local hemodynamics disorders and possible existence of a thrombus;



- steep ascended slope of a pulse wave, its rapid decline and a slight incisure are the signs of low peripheral resistance and a large stroke volume output, that indicate the aortic valve insufficiency;



- the absent dicrotic wave can be associated with diabetes mellitus, atherosclerosis or hypertensive disease;



- an increased vessel tone is characterized by a long anacrotic phase of the pulse wave with a flat uneven slope and a slight or high dicrotic wave, which can indicate high blood pressure or the beginning of atherosclerosis.

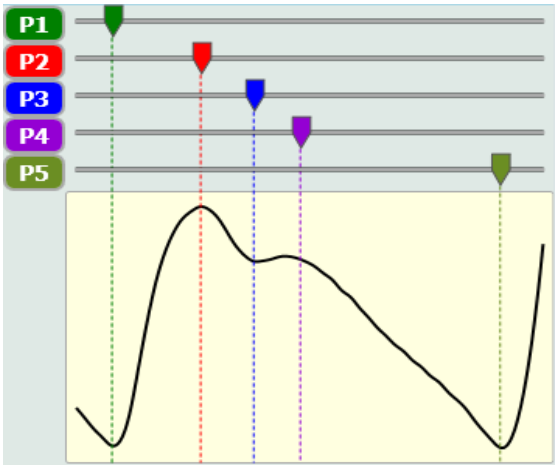
First three signs are considered to be the most important. Besides, another features can be on a photoplethysmogram in different diseases:

- in obliterating endarteritis a pulse wave amplitude is low in every finger of an affected limb;

- there is a growing number of reactions, that indicate the vasodilation, in periods of sudden change in weather conditions and geomagnetic storms, especially in people suffering from rheumatism.

Photoplethysmogram parameters

There are five consecutive checkpoints (P1–P5) for analysis of time and amplitude parameters of a pulse wave in a graph, reflecting one cardiac cycle.



P1 — beginning of the ejection period of systolic time interval,

P2 — a moment of maximum vasodilation (time of maximum pulse wave amplitude),

P3 — protodiastolic period,

P4 — beginning of diastole,

P5 — end of diastole and end of a cardiac cycle.

Based on values at control measurement points, the program allows calculation of the following photoplethysmogram parameters:

1) *Pulse wave amplitude (amplitude of anacrotic phase).* It is measured in relative units, calculated upon the formula: PWA = P2 amplitude — P1 amplitude. There are no standard values. It is estimated in a dynamic perspective.
2) Amplitude of dicrotic phase. It is measured in relative units, calculated upon the formula: ADP = P4 amplitude — P5 amplitude. The normal value is about 1/2 of the PWA value.
3) Incisure height. IH = P3 amplitude — P5 amplitude. The normal value is about 2/3 of the PWA value.
4) Dicrotic wave index. It is measured in percentages, calculated upon the formula: DWI = (P3 amplitude — P5 amplitude) / (P2 amplitude — P1 amplitude) x 100. Standard value range is 60–75 %.
5) Duration of the anacrotic phase of pulse wave. It is measured in milliseconds, calculated upon the formula: DAP = P3 time — P1 time. There are no standard values.
6) Duration of the dicrotic phase of pulse wave. It is measured in milliseconds, calculated upon the formula: DDP = P5 time — P3 time. There are no standard values.
7) Duration of pulse wave. It is measured in milliseconds, calculated upon the formula: DPW = P5 time — P1 time. The normal value is 700–1000 ms. It becomes longer with age.
8) Anacrotic wave index. It reflects the filling phase in systole. It is ratio of the length of the ascending segment (anacrotic wave) to the total pulse wave length. It is measured in percentages, calculated upon the formula: AWI = (P2 time — P1 time) / (P5 time — P1 time) x 100. The normal value is about 15–30%.
9) Filling time. It corresponds to the period from the beginning of a pulse wave to the peak of anacrotic wave. It is measured in milliseconds, calculated upon the formula: FT = P2 time — P1 time. The normal value is about 60–200 ms.
10) Duration of the systolic phase of cardiac cycle. DS = P4 time — P1 time. The normal value must be about 350–550 ms.
11) Duration of the diastolic phase of cardiac cycle. It is measured in milliseconds, calculated upon the formula: DD = P5 time — P4 time. The normal value is about 400–600 ms.

12) Time of pulse wave reflection. It corresponds to the period of myocardium relaxation in protodiastolic phase. TPR = P4 time — P2 time. The normal value must be about 200–400 ms.

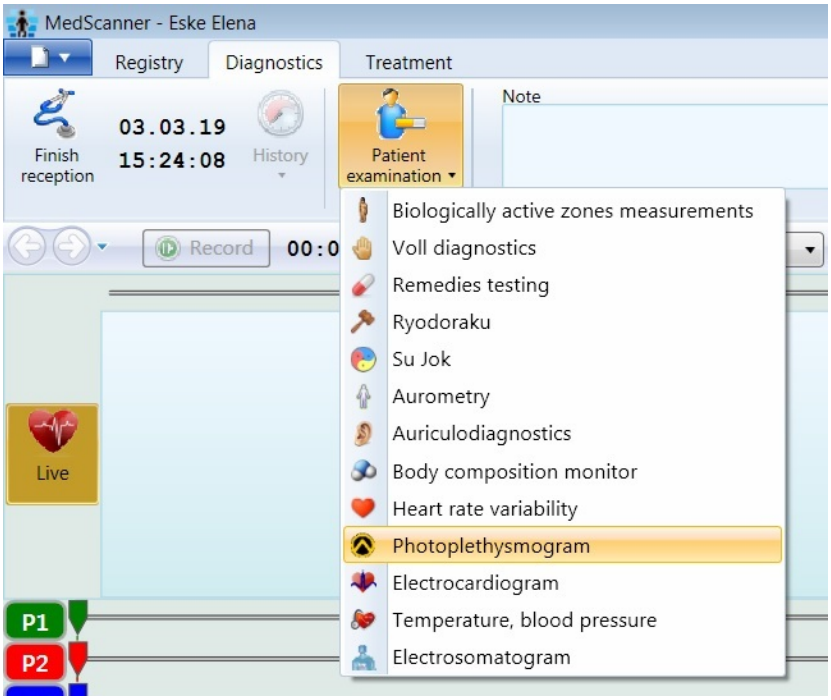
13) Heart rate. It is measured in beats per minute, calculated upon the formula: HR = 60 / DPW. The normal value is about 60–85 beats per minute.

14) **Stiffness index.** It reflects arterial wall compliance relative to pulse volume. It is measured in meters per second, calculated upon the formula: SI = patient's height / (P3 time — P1 time). The normal value is about 5–9 m/s.

15) **Wave reflection.** It corresponds to the value of reflected wave. It mainly characterizes arteriola tone, indicates indirectly if there are atherosclerosis plaques (according to increasing of reflections). Calculated upon the formula: WR = 100 x ADP / PWA. The normal value is about 40–70%.

The examination procedure

Select a patient or register him/her in the **Registry** menu. Select the **Diagnostics** tab. Select the **Photoplethysmogram** item in the **Patient examination** menu.

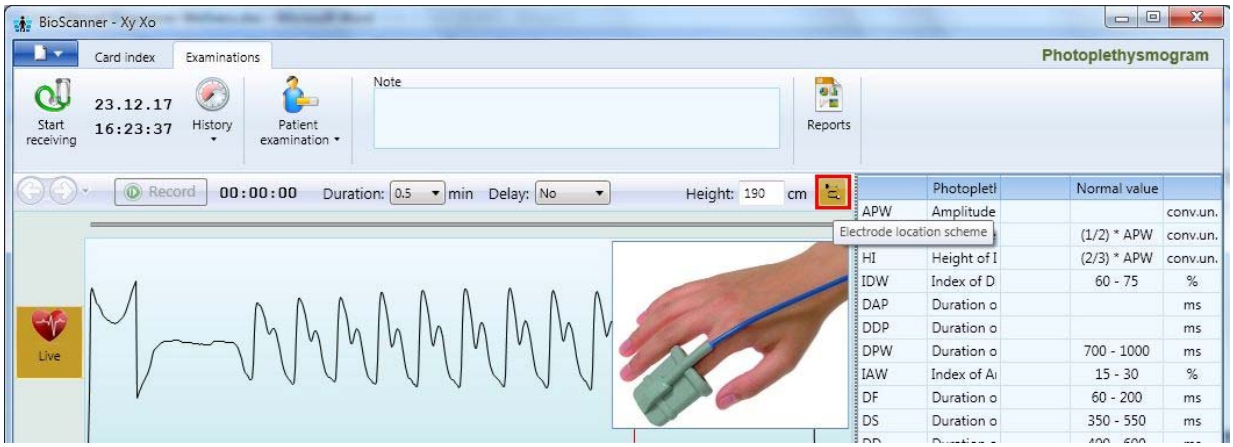


The cable with the sensor of the pulseoximeter should be inserted until it stops to the appropriate socket on the device panel.

The examination should be conducted when a person is in his seating or lying position. Nail polish or artificial nails can lead to inaccuracy of measurement results.

Put the sensor of the pulseoximeter on a patient's finger until tight. The red light-emitting diode must be placed directly above the nail plate.

For stiffness index calculation it is necessary to enter a patient's height in centimeters. If it was not done during registration, you should enter that value into the appropriate **Height** field to the left of the parameters table. To view the placement of the sensor on the finger, click the  button.



Click the **Start reception** button, check a hand position, ensure that the sensor is fixed correctly. A hand with the sensor must be placed as comfortable as possible, without restricting blood flow in a limb. The sensor shall be protected from the direct sunlight. During the

measurement process a patient should be relaxed and calm. He/she should stay still and keep silence.

In the program window a pulse wave is displayed, measured by the pulseoximeter. Wait for the graph stabilization.

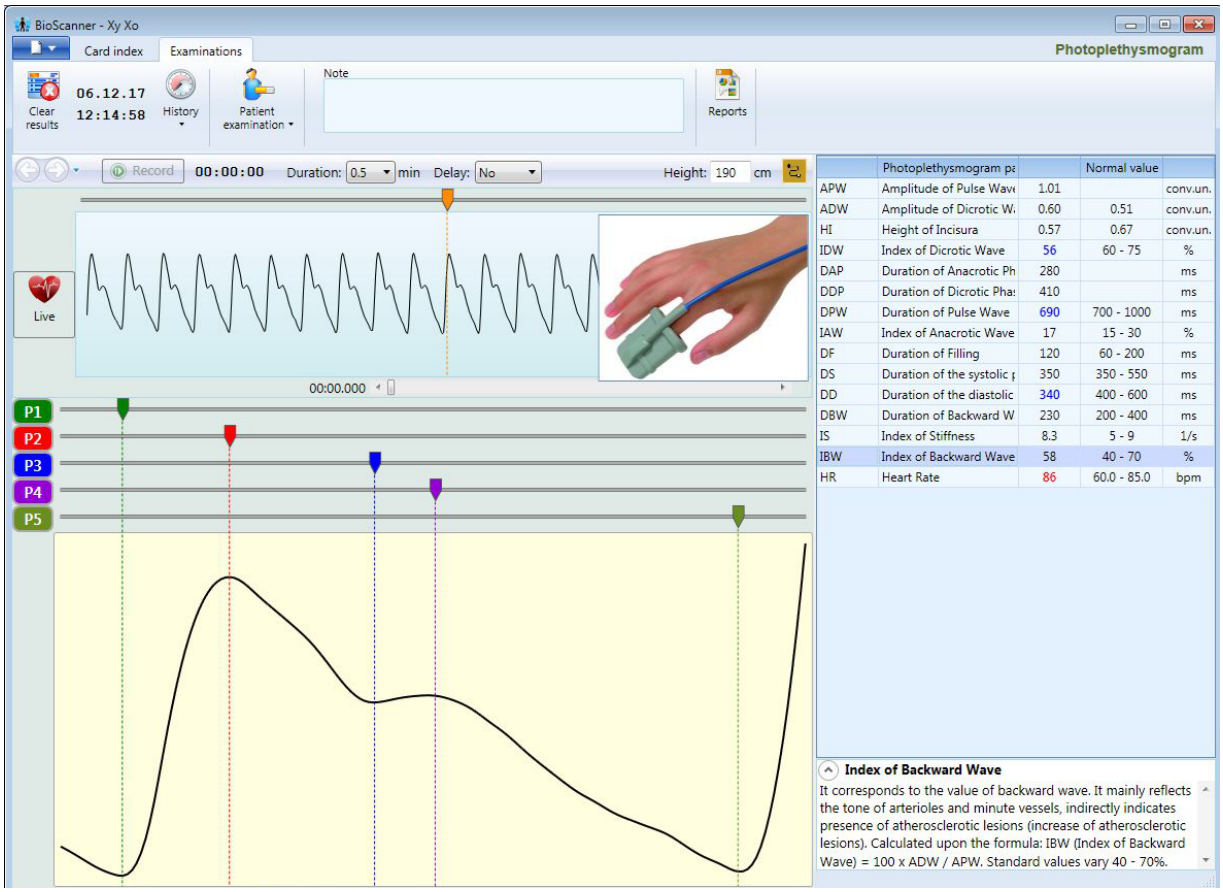
Choose procedure duration (usually 1 minute is enough) and the time of measurement start delay (it is used for the self-examination, when you need to prepare for measurements after conducted actions).

Click the **Record** button.

The program will carry out the consecutive measurements of volume pulse parameters. Upon completion of the recording, the curve of a recorded photoplethysmogram is displayed on the screen.

To view a recorded pulse curve or switch back to viewing of a pulseoximeter sensor signal in real-time mode, click the **Live** button on the left.

You should choose for analysis the most long stable sequence of pulse waves that consists of at least five consecutive pulse waves without interference and artifacts. Choose the appropriate part of the pulse wave by dragging the slider under the pulse curve and place the top orange slider on that part of the wave.



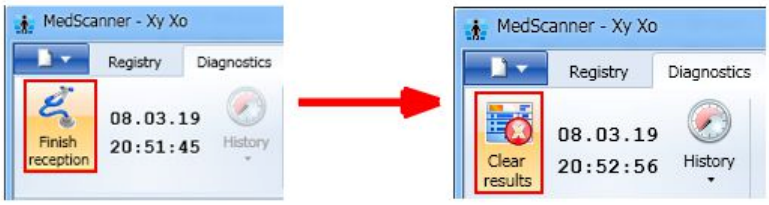
The analysis window is displayed on the screen, with enhanced image of this pulse wave. The program detects **P1–P5** control points automatically, but selection by the program can be

incorrect due to the complexity of the calculations and unclear shape of the pulse wave. Therefore it is advisable to slightly adjust markers position of the specific diagnostic points **P1–P2–P3–P4–P5** on the curve by dragging and moving them to the wanted direction using a mouse. At the right part of the analysis window the calculated values for selected wave parameters are displayed as well as calculated values for **Wave reflection** and **Stiffness index** on the basis of the normal range depending on a patient's gender and age. You can open the description of these parameters under the table.

The selected pulse wave with adjusted markers of diagnostic points is transferred to Reports.

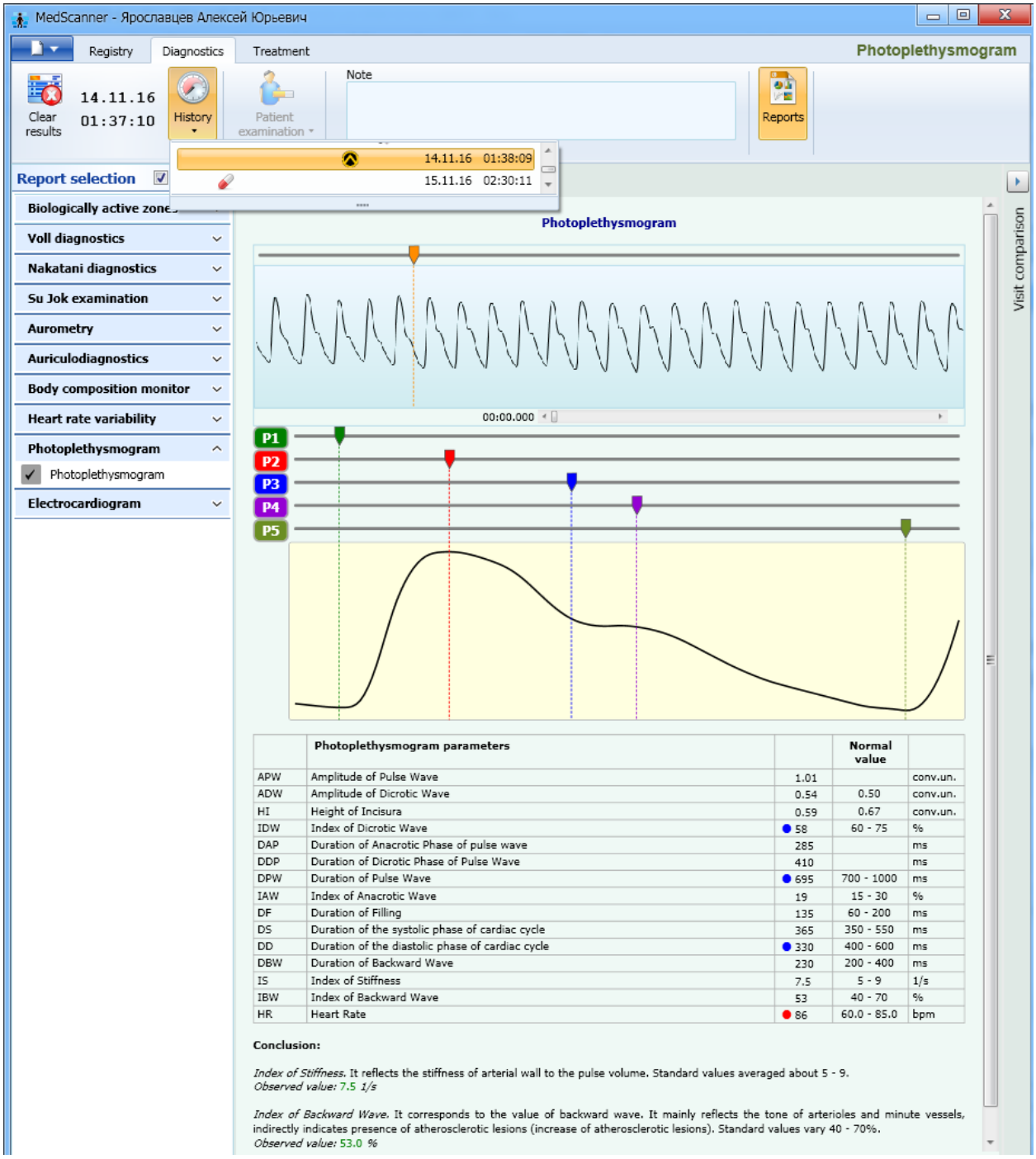
Upon completion of the photoplethysmogram recording, click the **Finish reception** button. The obtained measurement results are shown on the screen.

Upon successful completion of the examination, click the **Clear results** button. The screen is cleared and the obtained measurement results are saved in the database.



Photoplethysmography reports

To view measurement results, click the **Reports** button on the right and tick relevant reports on the left after the diagnostic procedure. To view a history of visits, click the **History** button on the left.



	Photoplethysmogram parameters		Normal value	
APW	Amplitude of Pulse Wave	1.01		conv.un.
ADW	Amplitude of Dicrotic Wave	0.54	0.50	conv.un.
HI	Height of Incisura	0.59	0.67	conv.un.
IDW	Index of Dicrotic Wave	58	60 - 75	%
DAP	Duration of Anacrotic Phase of pulse wave	285		ms
DDP	Duration of Dicrotic Phase of Pulse Wave	410		ms
DPW	Duration of Pulse Wave	695	700 - 1000	ms
IAW	Index of Anacrotic Wave	19	15 - 30	%
DF	Duration of Filling	135	60 - 200	ms
DS	Duration of the systolic phase of cardiac cycle	365	350 - 550	ms
DD	Duration of the diastolic phase of cardiac cycle	330	400 - 600	ms
DBW	Duration of Backward Wave	230	200 - 400	ms
IS	Index of Stiffness	7.5	5 - 9	1/s
IBW	Index of Backward Wave	53	40 - 70	%
HR	Heart Rate	86	60.0 - 85.0	bpm

Conclusion:

Index of Stiffness. It reflects the stiffness of arterial wall to the pulse volume. Standard values averaged about 5 - 9.
Observed value: 7.5 *1/s*

Index of Backward Wave. It corresponds to the value of backward wave. It mainly reflects the tone of arterioles and minute vessels, indirectly indicates presence of atherosclerotic lesions (increase of atherosclerotic lesions). Standard values vary 40 - 70%.
Observed value: 53.0 *%*

ELECTROCARDIOGRAPHY (FOR *MEDSCANNER BIORS*; *MEDSCANNER BIORS-05* EMBODIMENTS)

ECG device of the *Medscanner* does not provide for automatic measurements of electrocardiogram parameters including measurement of amplitudes of P, QRS, T waves and S-T segment. ECG device records ECG with registration of obtained data.

ECG block of the *Medscanner* provides ECG registering and recording in 12 conventional leads: three standard extremity leads (I, II, III), three unipolar extremity leads (Goldberger's leads: aVR, aVL, aVF) and six unipolar chest leads (Wilson's leads: V1, V2, V3, V4, V5, V6).

Before examination a patient should take off the shoes, socks (as well as stockings or pantyhose), gloves, rings, necklaces and other bijouterie or jewellery made of any metal. Skin areas on which electrodes are placed must be clean, without skin damage, scars, papillomas and other skin lesions as well as without manicure and cosmetics. Any cosmetic products on these areas must be removed before examination. If a patient has too much hair on arms and legs, it is necessary to choose areas with the minimum amount of hair or to remove hair on skin areas on which electrodes are placed.

It is desirable that patient’s clothes (including underwear) were made of cotton. Clothes should be casual, not limiting movements, not restricting blood flow in the limbs, not creating static electricity. Any tight clothing should be unbutton. It is necessary to avoid all alcohol consumption 3–5 days before examination. It is not advisable to carry out examination immediately after the meal, significant physical and psychoemotional activity (except in cases of the study of latent human abilities). Besides, the results can be affected by significant physiological discomfort or poor physical condition.

During the ECG recording a patient should be relaxed and calm. The arms must be by his/her sides. An examined person should not be cold. It is significantly reduces the risk of data distortion due to the muscle shivering. During the measurement process an examined person should stay still and keep silence.

It is necessary to wipe metal parts of electrodes with an alcohol wipe for their disinfection before examination.

If the reusable clip electrodes are used, they must be moisten with sodium chloride, 10% solution (to prepare it, dissolve a whole teaspoon of salt in 100 ml of cooled boiled water).

For the one-channel ECG recording the 3-lead ECG cable is used, for the 12-channel ECG recording the10-lead ECG cable is used (Schiller compatible, defibrillator proof) included in the delivery set. Each of these cables is connected to its own socket on the front panel of the *Medscanner*. When placing electrodes, note the correct location of the electrode ECG cable. Keep cables from getting intertwined otherwise it can cause high interference level. It is never acceptable to leave a patient alone during examination. A doctor should continuously monitor a patient’s state. After examination the electrodes should be gently removed from the patient’s body. It is prohibited to pull the cable.

For ECG recording you can use reusable clip or suction electrodes or disposable electrodes, a kind of Scintact or similar ones. Disposable electrodes after examination should be disposed of according to current standards and regulations. Reusable electrodes after every

examination should be disinfected using hydrogen peroxide 3% with addition of detergent, a kind of Fairy 0,5%, or chloramine solution 1%.

Warnings

During ECG recording, conductive parts of electrodes shall not be in contact with each other. It is also necessary to avoid the contact between patient's body and the housing of the *Medscanner*, as well as with other electrodes and cables, except ECG electrodes.

Attention! When using reusable electrodes, the following actions are absolutely forbidden:

- leave gel on the electrodes after working;
- use sharp objects for cleaning electrodes;
- expose electrodes to heat over 100°C,

the *Medscanner* should not be exposed to electromagnetic interference. To reduce line interference during ECG recording, the *Medscanner* should be powered only via the computer USB port. If a portable computer (a laptop) is used, a network cable should be disconnected to reduce line interference (run the laptop only from the battery). It is advisable to ground the *Medscanner* housing. There should be no a high voltage power cable, X-ray unit, ultrasound machine or electro-surgery unit in the room.

If a person has a heart pacemaker, it can affect precision of ECG recording and its results. In that case it is advisable to carry out a check and analysis together with waveshape analysis.

For ECG registration the standard cables (defibrillator proof) should be used, included in the delivery set. The use of cables of a different type can lead to incorrect registration of ECG signals. Besides, they may not be defibrillator proof.

The use of *Medscanner* with a defibrillator and/or electro-surgery equipment is **not permitted**. It is necessary to avoid contact between *Medscanner* electrodes and electrodes for defibrillator or electro-surgery equipment in a room.

When the *Medscanner* operates in the ECG recording mode, protective grounding is not required, but in case of extreme interference it is recommended to ground the metal housing of the *Medscanner*. Conductive parts of electrodes and connectors on ECG cables attached to them, including indifferent electrode (N), must not have a contact with conductive parts of *Medscanner* including the ground cable.

It is not desirable to connect a patient via electrodes to more than one ECG recorder or another *Medscanner* block, because the total value of leakage current can be harmful to a patient. According to IEC60601-1, only equipment of Class 1 can be connected to the device. In that case a user should measure the total value of leakage current to determine whether it is in accordance with IEC60601-1 (as well as a possibility of the use of ECG recorder after its connection).

Placing of the ECG electrodes and lead registration

The electrocardiography lead is a particular system (scheme) of registering electrodes location on the patient's body for the ECG recording. In other words, every measured potential difference between ECG electrodes is called a lead in electrocardiography.

ECG block of the *Medscanner* provides ECG registering and recording in 12 conventional leads: three standard extremity leads (I, II, III), three unipolar extremity leads (Goldberg's leads: aVR, aVL, aVF) and six unipolar chest leads (Wilson's leads: V1, V2, V3, V4, V5, V6).

For the **one-channel** ECG recording it is enough to place only three electrodes on a patient's body:

Red electrode — on the right hand,

Yellow electrode — on the left hand,

Black electrode — on the right foot.

For the **six-channel** ECG recording it is necessary to place four electrodes on a patient's body in four standard leads:

Red electrode — on the right hand,

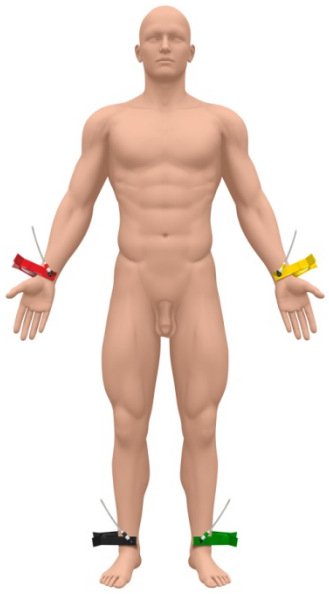
Yellow electrode — on the left hand,

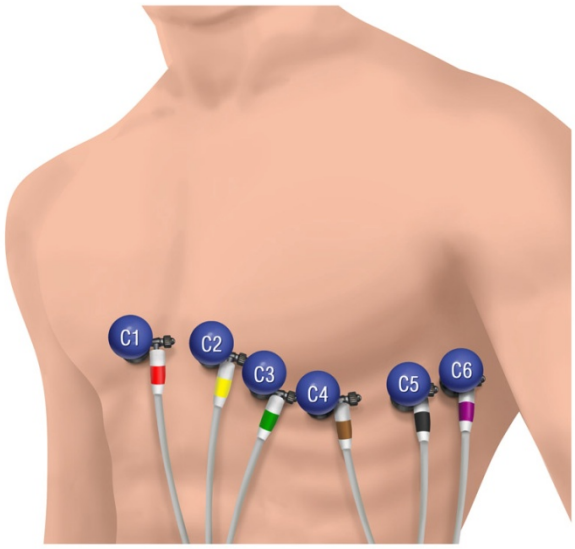
Green electrode — on the left foot,

Black electrode — on the right foot.

The cables not used during one-channel or six-channel ECG recording should be put aside avoiding the contact between their plugs and a device housing.

ECG electrodes placement when working with the Medscanner:





Moisten the contact surfaces of clip and suction electrodes as well as skin under them with sufficient amount of hypertonic solution. If a patient has too much hair on the chest, it is advisable to additionally apply some gel for ECG (a kind of Uniagel) on contact surfaces of

suction electrodes. Make sure there is a close contact between entire surface of every electrode and patient's skin. When placing electrodes, pay attention to color marking of ECG cable plugs. Keep the cable wires from getting intertwined otherwise it can cause high interference level and lead to inaccurate results.

During ECG recording, conductive parts of electrodes shall not be in contact with each other. It is also necessary to avoid the contact between person's body and the housing of *Medscanner*, as well as with other electrodes and cables, except ECG electrodes.

There are 12 standard leads:

1) standard (bipolar) leads (I, II, III);

2) unipolar extremity leads (aVR, aVL, aVF);

3) chest leads.

I standard lead — electrodes are placed on the forearms of both arms.

II standard lead — electrodes are placed on the right forearm and on the left leg.

III standard lead — electrodes are placed on the left forearm and on the left leg.

The unipolar extremity leads are identified as follows:

1) aVR — right arm lead;

2) aVL — left arm lead;

3) aVF — left leg lead.

These leads are characterized by only one active electrode and second one is inactive, it links electrodes from other limbs.

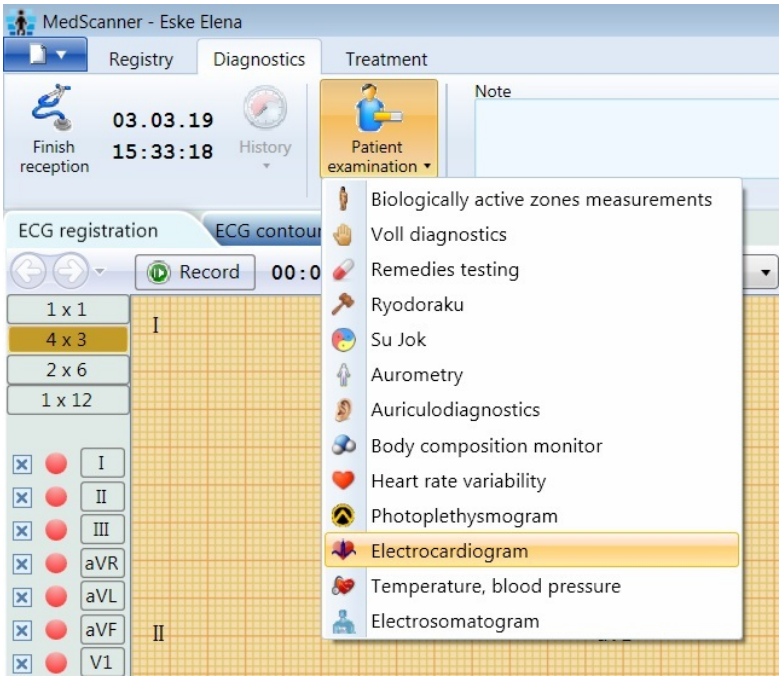
The chest leads are also unipolar. An active electrode is connected to the positive pole of the device. Triple integrated, from the limbs, inactive electrode is connected to the negative pole of the device. The chest leads are identified by the letter "V" (Latin C):

1) C1 (V1) active electrode is placed at IV intercostal space to the right of the sternum;
2) C2 (V2) active electrode is placed at IV intercostal space to the left of the sternum;
3) C3 (V3) active electrode is placed between IV and V intercostal spaces along the left parasternal line;
4) C4 (V4) active electrode is placed at V intercostal space along the left medioclavicular line;
5) C5 (V5) active electrode is placed at V intercostal space along the anterior axilar line;
6) C6 (V6) active electrode is placed at V intercostal space along the middle axilar line.

The brief video instruction for how to place ECG electrodes is available on the website **www.biors.ru** in the article "Classical electrocardiography"
http://www.biors.ru/tech/klassicheskaya-elektrokardiografiya.htm

Working with the program

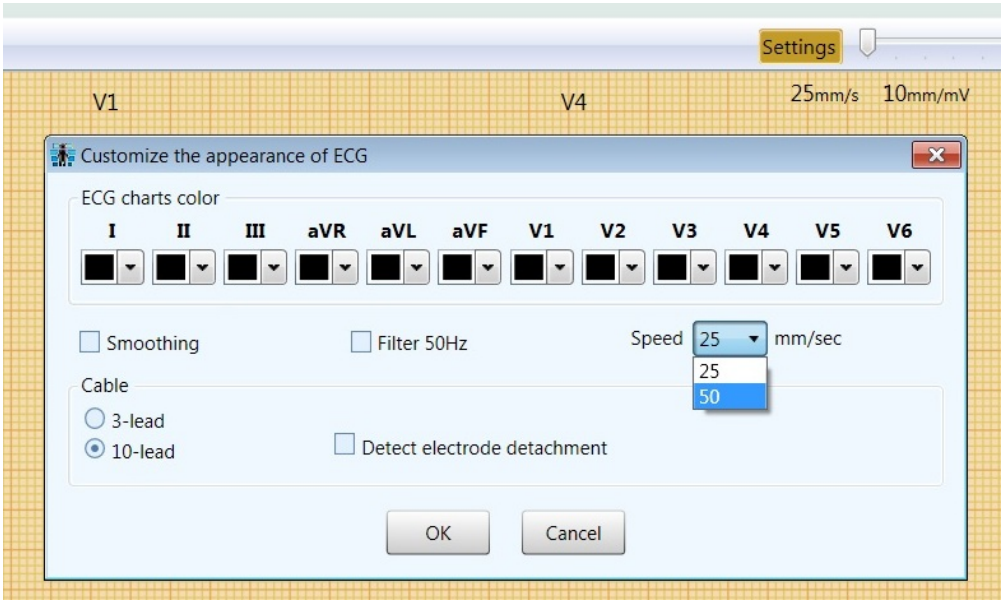
Select a patient or register him/her in the **Registry** menu. Select the **Diagnostics** tab. Select the **Electrocardiography** item in the **Patient's examination** menu.



For the electrocardiogram recording the 3-lead ECG cable or standard 10-lead ECG cable (Schiller-compatible, defibrillator proof), can be used. A cable is connected to the appropriate socket on the front panel of the device. Connect cable plugs to clip and suction electrodes.

Click the **Start reception** button.

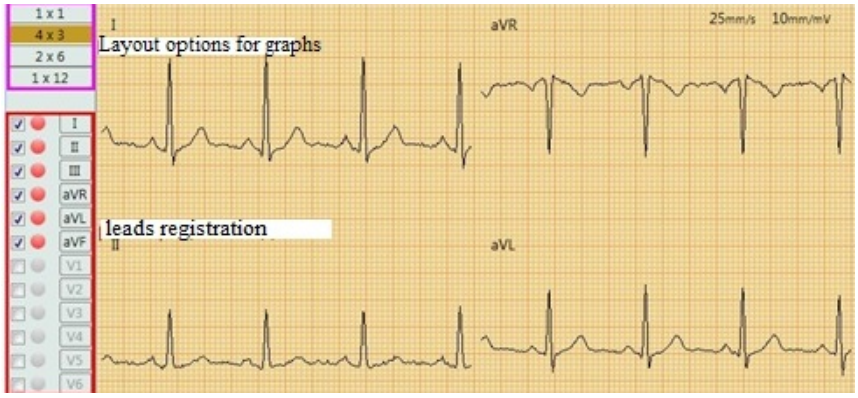
Click the **Settings** button on the right. Select the type of the cable in the dialog box. It is also possible to enable the filter 50 Hz, flattening of the ECG curve, detection of contact loss between patient's skin and an electrode. Besides you can choose the recording rate (25 mm/s or 500mm/s) and a curve color. You can choose the curve color for every lead (they are black by default).



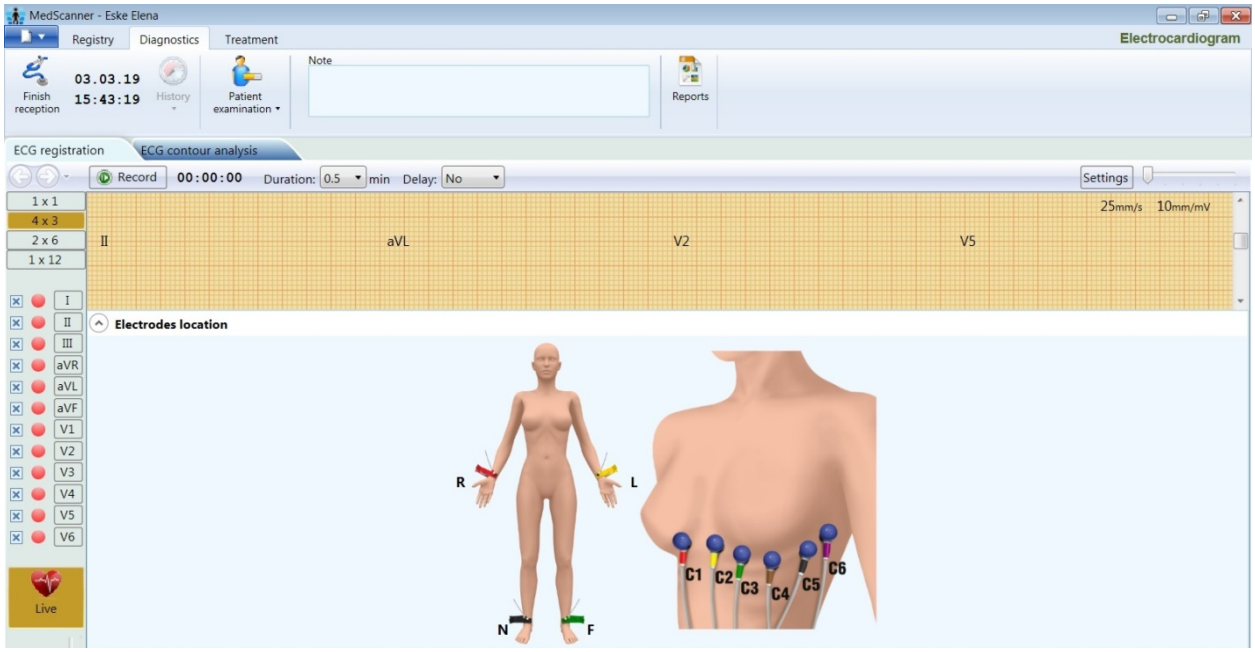
In 12-channel (10-lead) and 6-channel (4-lead) ECG recording mode it is possible to choose the following items in the left part of the window:

1. Layout options for graphs (1×1, 4×3, 2×6, 1×12)

2. Hiding of the graph of leads that you are not going to use (aVR, aVL, aVF, V1, V2, V3, V4, V5, V6).



Place the electrodes on a patient's body according to the location scheme. You can view the location scheme and image by clicking the rightmost button, on the right of the **Settings** button. Make sure that graphs of ECG leads are stable, clear and distinguishable.



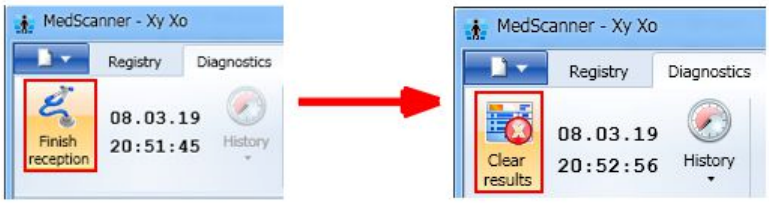
Choose the necessary duration of the ECG recording (30 seconds by default). Click the **Record** button and wait for the end of recording time.

To view the recorded ECG or switch back to viewing of the signal in real-time mode is done by clicking **Live** button at the left part of the page.

A mutual vertical placement of the graph of leads is changed by a vertical slider. The graph on the screen can be enlarged by horizontal slider.

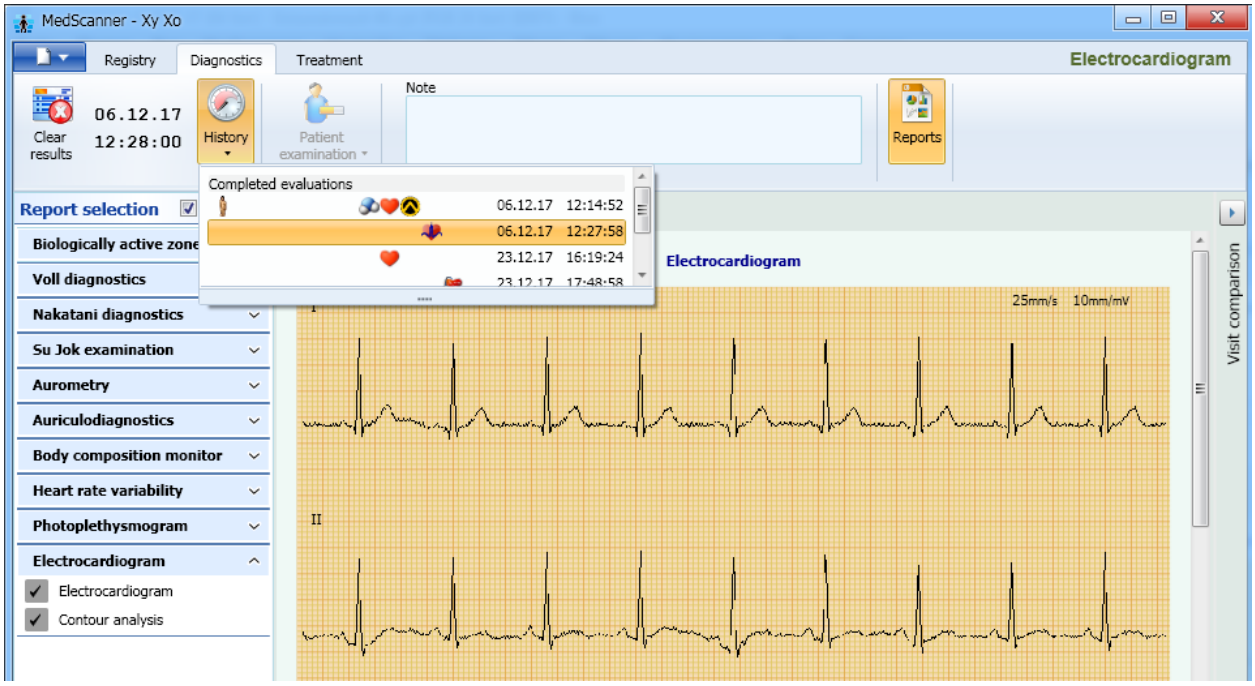
Upon completion of ECG recording, click the **Finish reception** button. The obtained measurement results are shown on the screen.

Upon successful completion of the examination, click the **Clear results** button. The screen is cleared and the obtained measurement results are saved in the database.

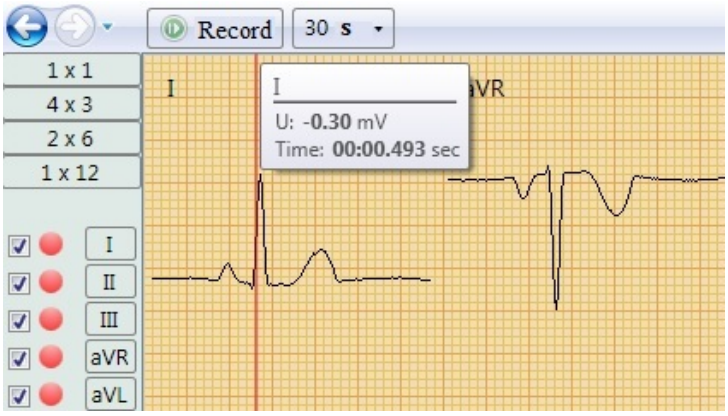


Viewing the electrocardiogram

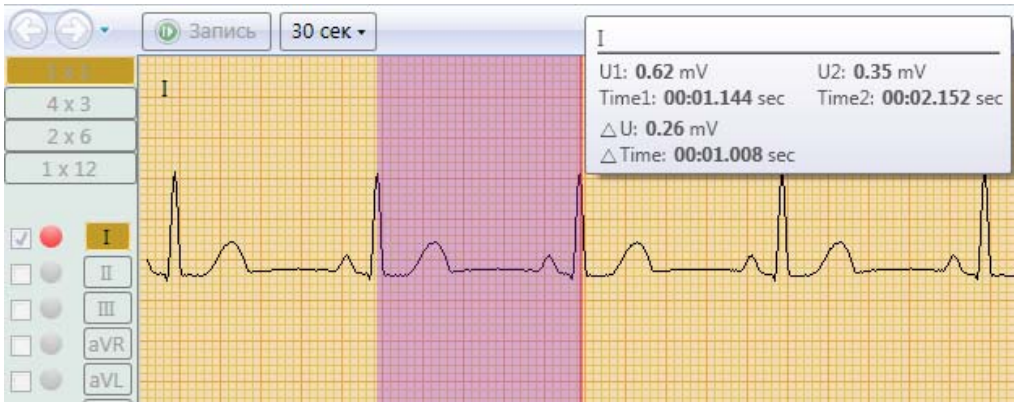
To view ECG recording results, click the **Reports** button on the right and tick relevant reports on the left after the diagnostic procedure. To view a history of visits, click the **History** button on the left.



In the view of recorded ECG mode you can measure the needed part of the curve. The current position on a graph regarding beginning of the record (in seconds) and voltage in millivolts are displayed by clicking the graph with the left mouse button.



The characteristics of two time points and the difference between them are displayed by clicking the graph with the right mouse button and by moving the mouse along the graph.

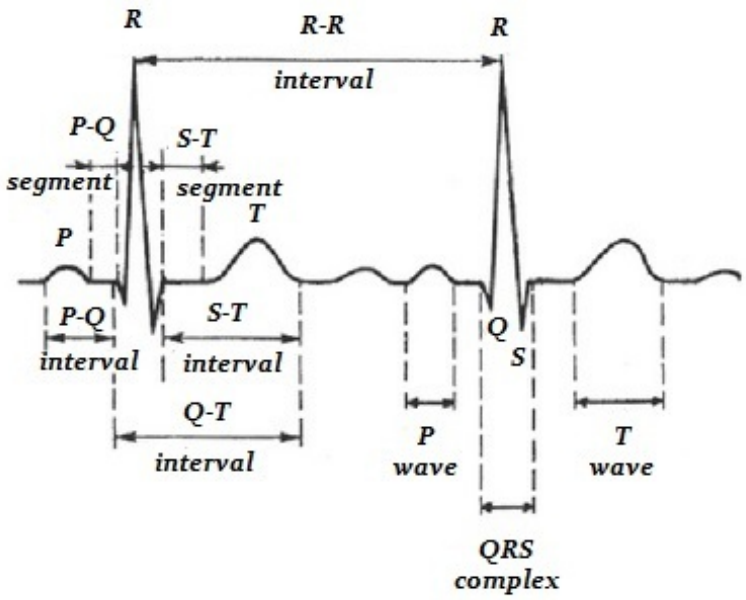


ECG contour analysis

The module of contour analysis is intended for finding diagnostically significant points on ECG graph as well as calculation of the cardiogram parameters. It helps to detect different heart diseases.

Attention! Contour analysis takes into account the base ECG characteristics only and cannot be considered as a ground for the establishment of clinical diagnosis. In case you suspect a disorder, a cardiologist must read the ECG.

In order to use successfully the module of contour analysis, it is necessary to understand the basic principles of the cardiosignal structure. It is possible to divide the standard ECG graph into many repetitive, similar segments, called cardiointervals. Every cardiointerval in turn consists of set of peaks and lows (waves) specific to the different time intervals of cardiac activity. A section of a straight line (isoline) between two neighboring waves is called an ECG segment. Segments P-Q and S-T are the most important ones. An interval consists of a wave (wave complex) and a segment. Thus, an interval = a wave + a segment. Intervals P-Q and Q-T are the most important ones.



Cardiogram waves are indicated by Latin letters P, Q, R, S, T according to the order in which they appear from left to right.

P wave

The beginning of the P wave corresponds to activation of the right atrium, the middle part represents the end of this process and beginning of the activation of the left atrium. The end of the P wave is generated by the left atrium. The P wave is registered first. It is a small, spherical, not steep deflection, preceding the serrated QRS complex.

Normal P wave is always positive in I, II, aVF, V2–V6 leads. In III, aVL, V1 leads the P wave can be positive or diphasic (one wave part is positive and another part is negative). In aVR lead the P wave is always negative.

Normal P wave duration does not exceed 0.1 s, normal amplitude is between 1.5 and 2.5 mm.

The top of the P wave can be split, while the distance between waves must not exceed 0.02 s. Time of activation of the right atrium is measured from the beginning of P wave to its first top (no more than 0.04 s). Time of activation of the left atrium is measured from the beginning of P wave to its second top or to the highest point (no more than 0.06 s).

PQ interval

PQ interval is a distance (time interval) between the beginning of P wave and the beginning of Q wave (or R wave if Q wave is absent; in that case it s a PR interval). PQ interval is shown red in the image. It corresponds to conduction time through atria and atrioventricular node to ventricle myocardium. PQ interval (PR) depends on age, body weight, heart rate.

The normal PQ interval is between 0.12 and 0.18 s (up to 0.2 s), it is 6–9 squares. PQ interval elongates with age.

Ratio of P wave duration to PQ segment duration is called **Macruz Index**. Normal value of Macruz Index is 1.1–1.6. This index is used in diagnosis of atrial hypertrophy.

QRS complex

QRS complex is a ventricular complex, that is registered during activation of the ventricles. It is the largest deflection on the ECG. The complex consists of several spiky waves: positive (above the baseline) and negative (below the baseline). The width of QRS complex indicates duration of intraventricular activation. Its normal value is 0.06–0.08 seconds (up to 0.1 s). The width of QRS complex decreases slightly with the heart rate increase and vice versa.

Q wave

Q wave (initial wave of the QRS complex) is registered during activation of the left side of the ventricular septum.

Q wave must be present in V4, V5, V6 chest leads.

Q wave must not be registered (otherwise it is considered as an abnormality) in V1, V2, V3 chest leads.

Normal width of Q wave must not exceed 0.03 s.

Q wave amplitude in each lead must be less than 1/4 of value of following R wave amplitude in the same lead.

Normal Q wave is not supposed to be split.

Normal Q wave amplitude must not exceed 0.2 mV (with the exception of III standard lead).

R wave

R wave (the main wave on the ECG) represents the ventricular activation.

R wave, the same as Q wave, can be registered in all standard and unipolar limb leads. Amplitude increases in leads from V1 to V4: RV4>RV3>RV2>RV1 (while RV1 wave can be absent) and then it decreases in V5 and V6 leads. R wave amplitude in each standard and unipolar limb lead in adults must not exceed 2 mV. In I lead its value must not exceed 1.5 mV. In any of chest leads this value must not exceed 2.5 mV.

S wave

S wave (inconstant wave) represents a final activation of a base of the left ventricle. It is the deepest negative wave on ECG. It gradually decreases from V1 to V6. It is normal if this wave is absent in V5 and V6 leads.

S wave amplitude may vary, but in I, II, aVF leads must not exceed 0.5 mV.

S–T segment

S–T segment is a section from the QRS complex end to the beginning of T wave. It is necessary to pay special attention to S–T segment in IHD, because it reflects the oxygen deficit (ischemia) of myocardium. The transition point of QRS complex to S–T segment is called J point (from the word "junction"). A degree of J point deviation from the isoline is used, for example, in diagnosis of myocardial ischemia.

Normal elevation (a deviation above the isoline) of S–T segment is allowed to be no more than:

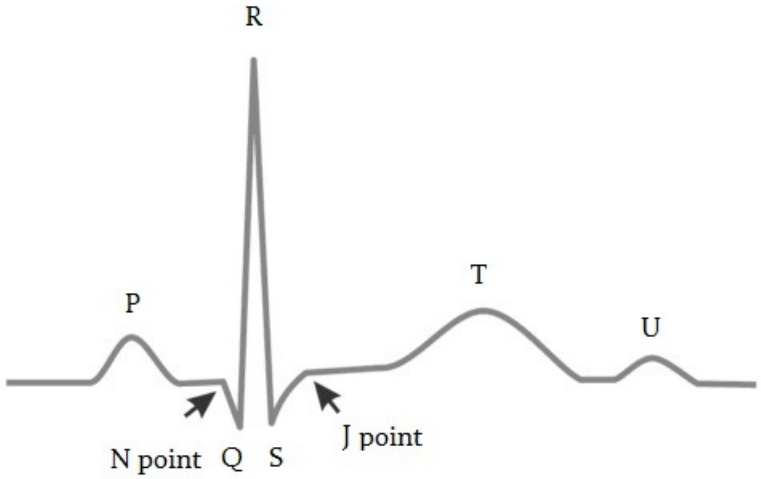
0.1 mV in limb leads, 0.3 mV in V1 and V2 leads, 0.2 mV in V5 and V6 leads.

Depression (a deviation below isoline) of S-T segment is allowed to be no more than:

0.05 mV in limb leads.

Deviation of the S–T segment is measured according to the formula J+60 or 80 ms (it depends on pulse rate). Deviation of the S–T segment is considered diagnostically significant if its duration from the J point is 0.06 s.

N point is a transition from the isoline to Q wave (the beginning of QRS complex). J point is a transition from S wave to S–T segment (the end of QRS complex).



T wave

T wave represents a repolarization process of the ventricles. In most of the leads where high R wave is registered, T wave is positive as well. Normal T wave is always positive in I, II, aVF, V2-V6 leads, while TI > TIII and TV6 > TV1. T wave is always negative in aVR lead. T wave amplitude (standards have not been developed) in standard and unipolar limb leads is usually between 0.3 and 0.6 mV (up to 0.8 mV). T wave duration varies from 0.16 to 0.24 s and has no great diagnostic value.

QT interval

QT interval is called an electrical systole of the ventricles, because during this time period all ventricular compartments are activated. Normal QT interval is not more than 50% of the preceding RR interval. It is possible to determine upon the Bazett's formula if QT interval is normal or abnormal on the ECG of a patient (QT interval is considered to be abnormal if its value exceeds 0.42):

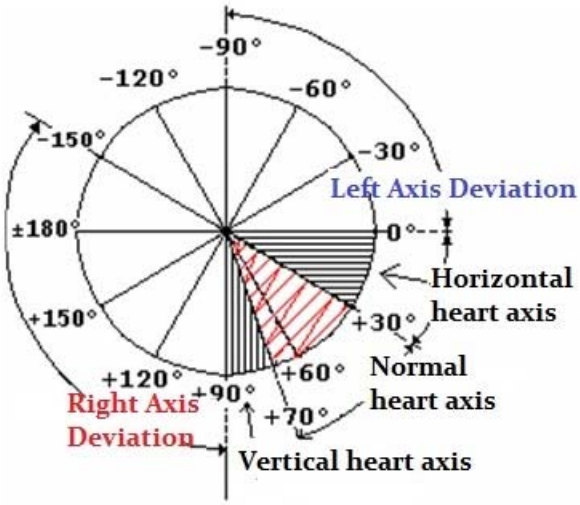
QTb = QT (measured on ECG) / √(R-R) (an interval between two neighboring R waves, measured on ECG)

Electrical axis of the heart

The electrical axis of the heart is the projection of the resulting vector of ventricular excitation in the frontal plane. The deviation of the electrical axis of the heart is determined from the angle alpha and measured in degrees. The angle alpha is formed by the electrical axis of the heart and the horizontal line that is drawn through the conditional electrical center of the heart, i. e. I lead axis, shifted towards the centre of the Einthoven Triangle.

The angle alpha in normal individuals may vary from 0° to +90°, depending on the body type. There are three types of position of the cardiac electrical axis depending on the physique of a person:

- normal position: alpha angle is between +30°and +70°;
- horizontal position: alpha angle is between 0°and +30°;
- vertical position: alpha angle is between +70°and +90°.



Condition itself, in which the electrical axis of the heart is deviated, is not a diagnosis. However, such changes of an electrocardiogram can indicate different cardiac disorders. Most often the deviation of the cardiac electrical axis is related to ventricular hypertrophy. This condition is a sign of age-old chronic disorder, so usually the emergency medical assistance of cardiologist is not required. But the deviation of the electrical axis of the heart related to the bundle of His block poses a danger. This situation calls for emergency medical assistance of cardiologist and treatment in a specialized hospital.

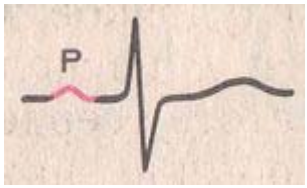
Cardiac rhythm analysis

Rhythm regularity is evaluated by R-R intervals. If the waves are at equal distances from each other, a rhythm is called regular. The duration range of different R-R intervals is allowed no more than ±10% of their average duration. If a rhythm is sinus, it is usually a regular beat rate.

Sinus rhythm (it is a normal rhythm, whereas other ones are pathological). The pacemaker is situated in the sinoatrial node.
ECG signs:

- in II standard lead P waves are always positive and located before every QRS complex,

- P waves in the same lead have a constant similar shape.



P wave in sinus rhythm.

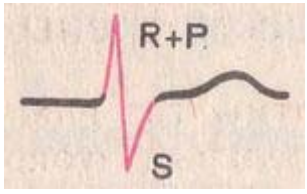
Atrial rate. If a pacemaker is situated in the lower atrial regions, the cardiac impulse spreads to atria from bottom to top (retrogradely), so:

- negative P waves in II and III leads,
- there is a P wave before every QRS complex.

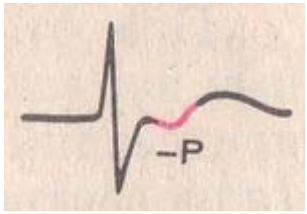
P wave in atrial rate.

Rhythm from AV node. If a pacemaker is located in the atrioventricular node, ventricles activate as usual (from top to bottom), but atria activate retrogradely (i. e. from bottom to top). In that case on the ECG:

- P waves can be absent because they are buried in normal QRS complexes.
- P waves can be negative and follow every QRS complex.



The rhythm from AV node, P wave is buried in QRS complex.



The rhythm from AV node, P wave follows QRS complex.

The rhythm from AV node is associated with HR which is slower than sinus rhythm. It is about 40 to 60 beats per minute.

Ventricular or idioventricular rhythm. In that case the pacemaker is a ventricular conduction system. The impulse spreads through the ventricles by abnormal pathways and because of that it spreads slower. Characteristics of idioventricular rhythm:

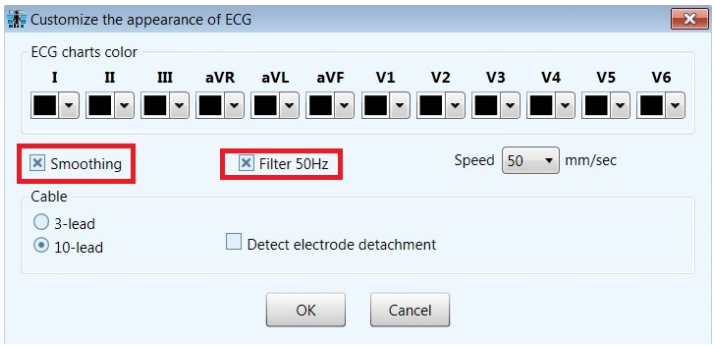
- QRS complexes are wide and deformed (they are split and look “scary”). Normal QRS complex duration is 0.06–0.10 s, so this rhythm is associated with duration of QRS complex more than 0.12 s.

- There is no fixed ratio between QRS complexes and P waves, because AV node does not release impulses from ventricles, but atria can be activated from the sinus node, as in normal conditions.
- HR is less than 40 beats per minute.


Idioventricular rhythm. There is no connection between P wave and QRS complex.

The examination procedure

Record the cardiogram of a patient or choose the necessary examination from the **History**. To facilitate analysis, it is advised to enable **Flattening** and **Filter 50 Hz** in **Settings**. It is sufficient to record ECG in three leads.

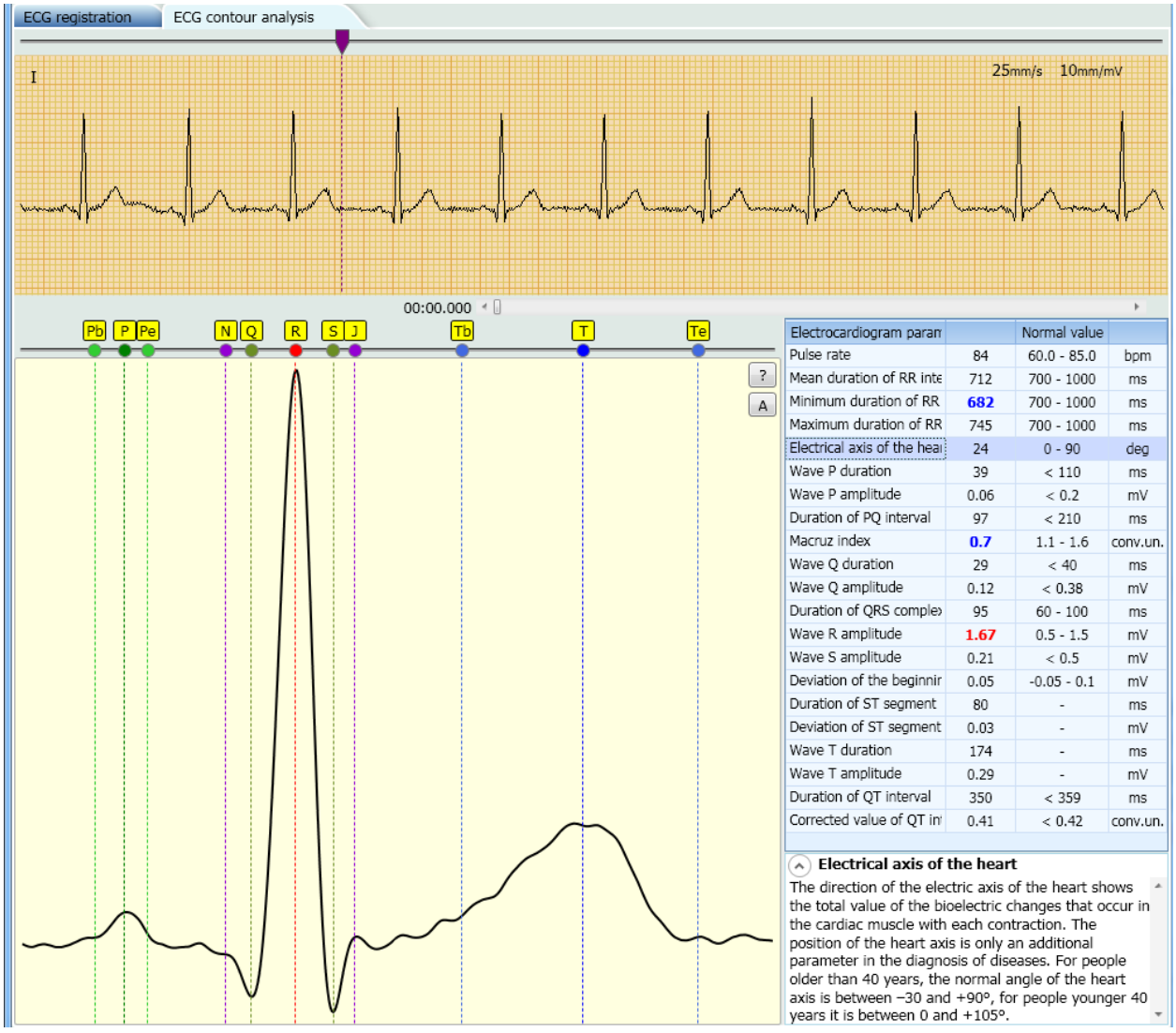


Select the **Contour analysis** tab.

Choose the appropriate for analysis cardiointerval by dragging the slider under the ECG graph and place the top raspberry-red slider on that part of the graph.

It should be noted that the accuracy of diagnosis depends heavily on the selected part of the ECG, so you should select the cardiointerval without interference and artifacts.

The analysis window is displayed on the screen with enhanced image of that cardiointerval.



The program detects control points automatically, but selection by the program can be incorrect due to the complexity of the calculations and unclear shape of the ECG graph. Because of that the operator should correct the marker position (position of waves) of the specific diagnostic points on the curve by dragging them with the mouse and moving towards the wanted direction. The accuracy of diagnosis depends heavily on how correct the markers are set.

In that case:

Pb — the beginning of the P wave
P — the top of the P wave
Pe — the end of the P wave
N — the beginning of the QRS complex
Q — the top of the Q wave
R — the top of the R wave
S — the top of the S wave
J — the end of the QRS complex
Tb — the beginning of the T wave
T — the top of the T wave
Te — the end of the T wave

At the right part of the analysis window the calculated values of ECG parameters for the selected part of ECG are displayed. You can call the description of these parameters under the table.

By clicking the ? button, you can open the help image to see how the markers should be set on the graph ideally.

By clicking the A button, the markers can be returned to automatically set position.

Electrocardiogram printing

ECG contour analysis results and recorded electrocardiogram can be printed using a standard printer, with a millimeter grid background. Before report printing you should tick the needed reports in left boxes. All ticked items are printed. After that you should click the **Print** button and then a printer icon .

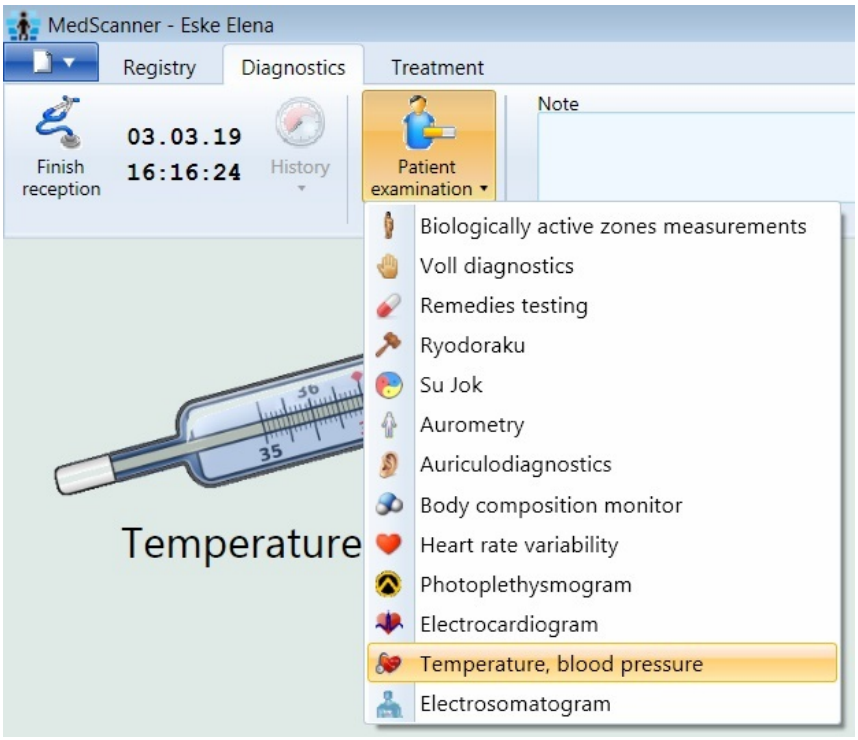
BODY TEMPERATURE, BLOOD PRESSURE (FOR ALL EMBODIMENTS)

The window is used to enter and save values of a patient's body temperature and blood pressure at the time of a visit. It is also intended for the viewing of follow-up data for several last visits for different days.

Working with the program

Follow instructions of corresponding medical measuring devices, measure the patient's temperature and/or blood pressure (BP) using a medical thermometer and/or a sphygmomanometer.

Select a patient or register him/her in the **Registry** menu. Select the **Diagnostics** tab. Select the **Temperature, blood pressure** item in the **Patient examination** menu.

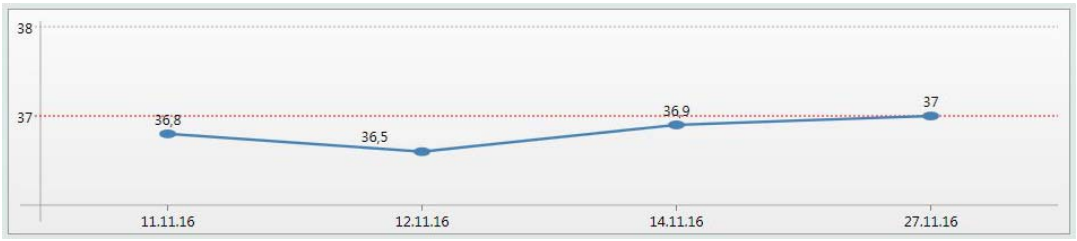


Click the **Start reception** button. Enter the measured temperature value manually (enter integer and decimal values separately) as well as systolic and diastolic blood pressure values to the appropriate program fields.

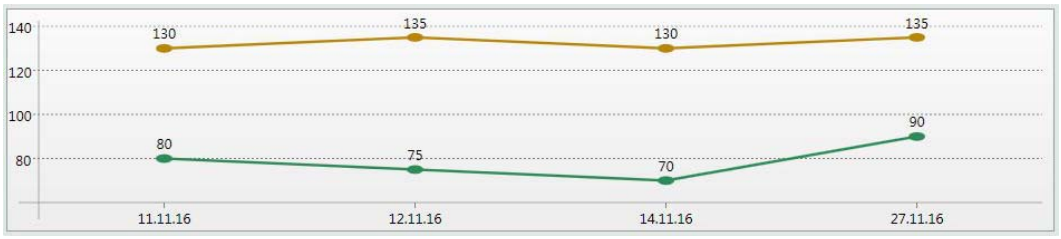
To enter correct BP values, it is necessary to make at least three measurements and choose the one with the lowest value. It is advisable to wait about 2–3 minutes between measurements to restore the blood circulation. It is recommended to measure blood pressure on the left arm if a person is a right-handed, and on the right arm if a patient is a left-handed. For the first time it is necessary to measure blood pressure on both arms. During following procedures you should use for measurements the arm with higher BP values obtained during the first visit.

After several patient's visits a graph of change in body temperature and blood pressure values for different days is displayed.

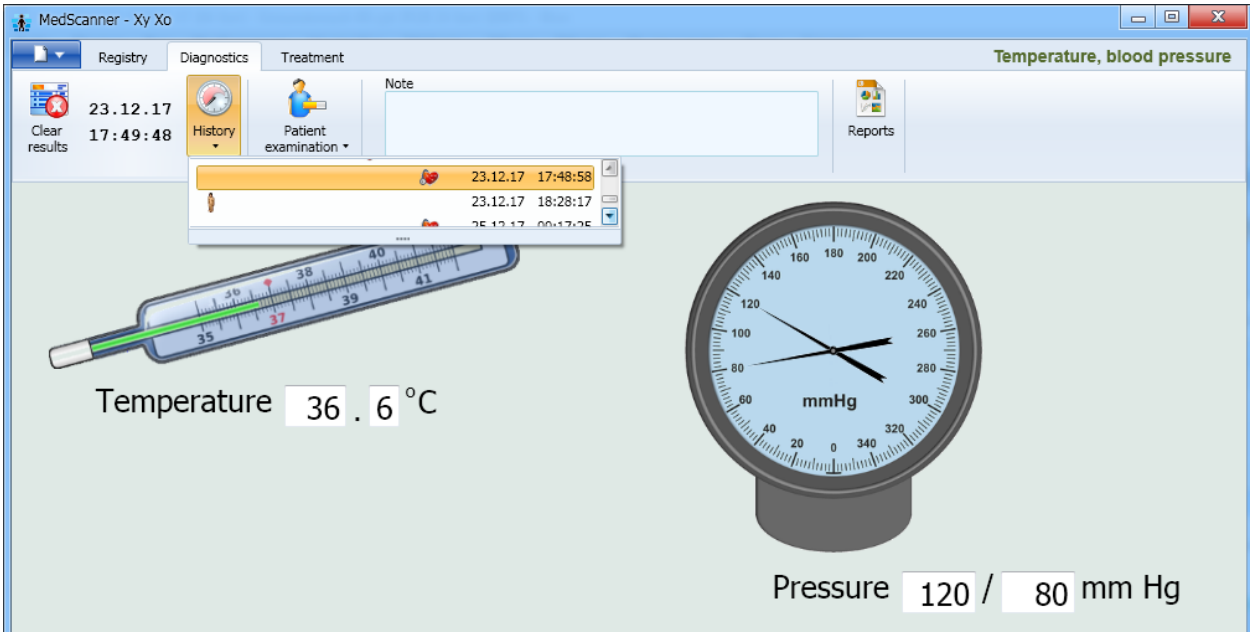
Body temperature graph



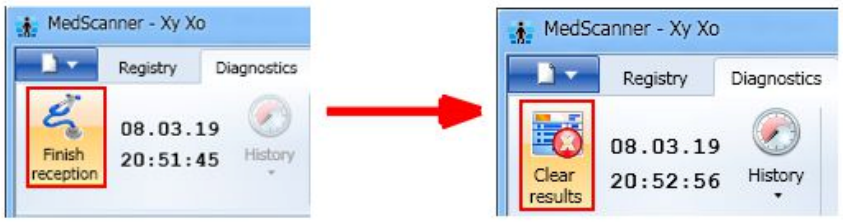
Blood pressure graph



To view entered values of body temperature and blood pressure, click the **Reports** button on the right and tick relevant reports on the left. To view a history of visits, click the **History** button on the left.



When numerical data are entered, sequentially click the **Finish reception** and **Clear results** buttons.



THERAPY
(FOR *MEDSCANNER BIORS*; *MEDSCANNER BIORS-01*; *MEDSCANNER BIORS-02*; *MEDSCANNER BIORS-03*; *MEDSCANNER BIORS-04* EMBODIMENTS)

ELECTROPUNCTURE AND ENDOGENOUS BRT

Electropuncture therapy

Electropuncture therapy (electrotherapy) is a form of a physiotherapy, based on the influence of pulse and direct electric current of milliampere, microampere and nanoampere range on biologically active points (BAP) or biologically active zones (BAZ).

By way of impact on BAP two methods are distinguished:

- **electropuncture (EP)** — influence on BAP using a point active electrode without hurting the skin surface;
- **electroacupuncture (EAC)** — influence with the use of metal needles inserted into BAP. i. e. a traditional needle therapy technique together with influence of pulse or direct electric current.

With the use of the *Medscanner*, it is possible to carry out three types of electropuncture therapy:

1. Voll therapy with electrical impulses.
2. Electropuncture therapy.
3. Endogenous bioresonance therapy.

These types of therapy can be applied by five directions:

1. By “Head–Feet–Hands” leads.
2. By Voll points.
3. By auricular points (points on auricles).
4. By chakra points on palms.
5. By corporeal points.

Voll electrotherapy

There are many opportunities in **Voll electrotherapy** (more than in electropuncture) for setup of electric current parameters. There is a possibility to use a medicine from the internal selector and external container as well as using a recorded autonosode as an individual homeopathic remedy.

Pulse parameters in **Voll electropuncture** were empirically selected by Reinhold Voll together with Fritz Cremer and later developed by their followers (O. Klaus, K. Silling, O. Kollmer and others). The study was based on an empirical search of a certain frequency that causes the most pronounced sensory sensations in a patient when influencing on a certain skin BAP in the “wave swing” mode. In such a way the resonant response of affected organs was registered. The following frequency ranges are identified:

0.9–4.0 Hz have mainly influence on bones, muscles, ligaments, connective tissue, lymph and hemodynamics, endocrine glands;

4.0–7.0 Hz have influence on autonomic plexuses and peripheral nervous system (mainly, parasympathetic nervous system);

7.0–10.0 Hz regulate anionic, cationic, and biologically active substances transport in intercellular fluid.

Table of frequencies for Voll electropuncture

Frequency, Hz	Pathological condition*
1.2	Autoimmune diseases, tachycardia, knee joint weakness
1.6	Arthritis, arthrosis
1.7	Acne, abscess, hypotension, dermatitis, parodontosis, sympathicotonic action, furunculosis, eczema
2.2	Fatigue, pustular eczema
2.5	Insomnia, autonomic disorders, hypermenorrhoea, headache associated with the nasal sinus diseases, haemorrhages, brain contusions, lesions, menorrhages, uterine myoma, oedemata, toxic and infectious liver damage (hepatitis, cirrhosis), parodontosis, sinusitis, contusions, eczema
2.6	Virile syndrome, haemorrhoids, headaches in liver diseases, intestinal headache, dermatitis, impotence
2.8	Nephritis, nephrolithiasis, renal colic, nephrosclerosis, uremia
2.9	Rhinitis, sinusitis
3.3	Arteriosclerosis, hypertension, otosclerosis, toxic and infectious live damages (hepatitis, cirrhosis), nephrolithiasis, renal colic, nephrosclerosis, uremia, nephritis, furunculosis, hypertension against the background of atherosclerosis
3.5	Cholelithiasis, nephrolithiasis, renal colic, knee joint weakness, menorrhages
3.6	Inflammation, tearfulness, irritability
3.8	Allergy, haemorrhoids, spasms of various genesis
3.9	Neuralgia, sleep disorders (sleep transition phase disorders)
4.0	Adipose-genital dystrophy (obesity), asthma, virile syndrome, haemorrhoids, hypermenorrhoea, endocrine headache, dizziness, hypophyseal disorders, impotence, menopause, menorrhages, pancreatic disorders
4.6	Parathyroid gland functional disorders (influence on the calcium balance)
4.9	Virile syndrome, meningeal headache, menopause, menorrhages, obesity, occipital muscle rigidity, furunculosis, algodismenorrhea (dysmenorrhea)
5.5	Vascular headache
5.8	Otogenic headache, depressions
5.9	Spastic paralysis

6.0	Hypertension, headaches in liver diseases, occipital muscle rigidity, extrasystole, systolic hypertension
6.3	Headache due to cerebral angiospasms, neuroses, irritability, brain concussion
6.8	Myalgia, muscle cramps
7.5	Trigeminal neuralgia
7.7	Spastic paralysis
8.0	Intestinal headache, bronchial asthma, allergic bronchitis
8.1	Diuretic action (including the effect upon potassium and sodium balance), nephrolithiasis, renal colic, nephritis, cystitis (pyelocystitis)
8.5	Insomnia
8.6	Fractures, duodenal ulcer
9.2	Hypertension, otogenic headache, nephrogenic headache, gout, diastolic hypertension, dermatitis, spastic paralysis, nephrosclerosis, uremia, furunculosis, eczema (including eczema combined with renal function disorders), diabetes mellitus
9.3	Flaccid paralysis
9.4	Adnexitis, obstructive bronchitis, hypertension, gastrogenic headache, urogenital headache, endocrine headache, duodenitis, impotence, oedemata, paresthesia, paresis, prostatitis, angina pectoris, erythema nodosum, furunculosis, cystitis (pyelocystitis), eczema, parametritis, gastric ulcer, ulcerous-necrotic endomyocarditis
9.5	Hypertension, vascular headache, climacteric hypertension, laryngitis, parodontosis
9.6	Arthritis, arthrosis, Bechterev’s disease, depressions, spinal injury, degenerative disc disease
9.7	Arthritis, arthrosis, sciatica, gout, nephrosclerosis, uremia, rheumatism
9.8	Toxic and infectious liver damage, hepatitis, cirrhosis

In some cases the greatest therapeutic effect can be achieved when applying a universally applicable frequency of 10 ± 0,5 Hz. Its exact value depends on the frequency of the Earth's electromagnetic field (so called Schumann resonance) and corresponds to the average value of EEG alpha rhythm registered in occipital region of cerebral cortex within frequency interval from 8 Hz to 14 Hz.

A frequency of 100 Hz reduces the sympathetic tone.

It must be noted that a low-frequency pulse current of value up to 200 Hz can lead to undesirable effects such as skin irritation, electrolytic effect, difference in impact of heteropolar electrodes on tissues.

A pulse shape can be rectangular (it is used in most cases), triangular, sine, exponential. Besides, a special spike (neuropulse) can be used.

Electropuncture therapy (EPT)

In classical acupuncture BAPs associated with certain organs are stimulated using gold, silver or steel needles. In **electropuncture therapy (EPT)** for the same purpose the low-frequency pulse current from the electropuncture device is used. Ways of electrode placement are the same as those in electroacupuncture diagnostics (see "**Voll diagnostics**" section). Electrotherapy is intended to control physical, chemical and electric processes in intracellular and extracellular space.

The mechanism of action has mainly regulating effect on formations of nervous system. The energy exposure during one session (its average duration is 20 minutes) is about 0,0086% of the body energy expended for a day.

Optimal pulse shape for stimulating influence is an analog of Ranvier action potential, with a steep pulse leading front.

If is is necessary to predominantly stimulate nerve endings (not muscle cells), a spike is usually used. Its length must not exceed 0.1 ms.

There are the following intervals of pulse-recurrence rates (**frequency bands**):

1–15 Hz — for stimulation of sympathetic nervous system;

20–70 Hz — for vasodilation and improvement in neuromuscular signaling;

20–100 Hz — for stimulation of parasympathetic nervous system;

80–200 Hz — for effective pain treatment.

For optimal therapeutic effect, the pulse polarity is set for every patient by a physician individually.

Electropuncture therapy types

1. **Cross-hatching (hatching).** A certain skin site is treated with the electrode probe, that is moved fast along the affected area to one side and another without much pressing. While doing so, the voltage level shall be gradually increased until patient's limit of tolerance. Cross-hatching is finished when skin gets noticeably red or pain disappears, but the session duration should not exceed 5 minutes. It is performed with frequency of 6.8 Hz. Pulse shape is rectangular, bipolar or negative. It is used for the treatment in myofascial pain syndrome, as well as for diaphragm and breathing muscles relax in order to make the manual therapy more effective.
2. **Moxa (cautery).** The strongest short voltage pulses are delivered. It is performed with fixed electrode probe applying directly to the BAP. The passive electrode is placed below or above the impact area or opposite to it. It is performed with frequency of 9.6 Hz or 10 Hz. Pulse shape is rectangular, bipolar or negative, 3–7 current pulses are sent. The voltage level is increased and reduced several times, until patient's upper limit of tolerance. It is used for the treatment of fractures, tendovaginitis and diseases accompanied by calcium transport abnormality.
3. **Current flow.** Flexible electrodes made of conductive rubber are applied on biologically active zones. The electrodes should be soaked in water or wrapped with wet gauze to facilitate the current flowing. In the current flow mode the cylindrical electrodes and foot pads can be also used. Electrodes are placed and fixed on a patient's body in such a way that the path of electric current was as short as possible. The impulse voltage is given to the electrodes with intensity causing formication but not tenderness. The treatment is carried out using specific frequency for the certain organ or nosology, or, if it is unknown, a floating frequency is used. A therapeutic effect of a current flowing is to improve the nutrition of tissues due to the lymph and blood flow acceleration.

The rules for the conducting of electropuncture therapy

- Setting voltage values, please note that delivery of low-frequency pulses should *never* cause any pain (except for moxa and cross-hatching modes).
- A negative voltage supply to active electrodes results in the conductance value increase (i. e. the tone increases). A positive voltage supply reduces the conductance value, the BAP values decrease (the tone decreases, relaxation occurs).
- The more acute the pathological process in the body, the less voltage should be applied.
- In chronic disease processes higher voltage is used.
- It is necessary to monitor the BAP state in the graph during the therapy process. If there is any sign of deterioration, the parameters should be adjusted, or stop therapy immediately.

Endogenous bioresonance therapy (BRT)

Endogenous (internal) bioresonance therapy (BRT) is a treatment with person's own electromagnetic waves after their special processing.

Bioresonance therapy is based on the empirical views that were stated for the first time by a doctor F. Morell) in 1977. Later, in the course of joint work with an engineer E. Rasche, Dr Morrel implemented it into practical medicine as a treatment method with an original name MORA-therapy.

Every human body produces its own physiological (healthy) waves. Stress, infections and adverse environmental factors can result in pathological waves. The device registers body signals, makes an inversion and filtration of physiological waves and reintroduces them to the body to create resonance. Therefore, a patient and the device form a closed-loop circuit of adaptive regulation, with the result that the processed waves over and over return to a patient. Therapy parameters are determined by a patient's state. Influence is maximally individualized which suggests that it is the one of the most optimal methods. The process of body self-regulation takes place. A human body "sets up" the device by itself and "shows" what to do for the treatment.

Application of endogenous BRT

Because of the universality of this approach to treatment of various diseases, and because it is maximally individualized to every particular patient, there is a quite wide range of disorders that can be treated using BRT:

- functional disorders of various genesis;
- central nervous system and sense organs disorders;
- autonomic nervous system disorders;
- pain syndromes of various localization and genesis;
- blood circulatory system diseases;
- respiratory organs diseases;
- gastrointestinal tract diseases;
- skin and subcutaneous tissue disorders;
- musculoskeletal system disorders;
- urinary and genital organs disorders;
- persistent wounds, indolent ulcers, etc.

There are two options of endogenous BRT conducting:

1. By all or selected leads (horizontal, vertical, diagonal, circular). For the therapy foot, hand and head electrodes are used. In the program the needed leads (or all of them) are selected and the therapy procedure starts. Usually the treatment starts from the most affected lead.

2. BRT with the use of biologically active points (BAP). This BRT type is designed to treat a certain body organ or system. It is based on results of **Voll diagnostics** (usually using BAPs with the worst values).

Generally, the endogenous BRT is carried out in the following order:

- On the basis of diagnostics results BAP or BAZ with the greatest abnormalities are selected.
- The therapy duration is set as well as other necessary impact parameters: amplification, inversion, LPF, HPF, medicine including, autonosode prerecording.
- BRT is carried out by selected leads or points.
- Duration of pauses between BRT sessions depends on nature of a disease. For example, in ARI you can perform BRT sessions daily or even several times per day. In case of chronic diseases, sessions are carried out once in two or three weeks until stable positive effect.

The *Medscanner* makes it possible to carry out (through the endogenous BRT) the resonant frequency therapy using specific frequencies of certain infecting agents (nosodes of viruses, bacteria, protozoa, helminths, fungi, etc.), organopreparations and any other substances from the device ROM. For example, electronic copies of infecting agent nosodes allow treatment of acute and chronic inflammatory processes (of viral, bacterial, fungal, parasitic ethiology), and nosodes of lesions enables to treat various degenerative diseases.

Besides, for the therapy the pre-prepared (recorded to a carrier, taken from a patient or purchased in a pharmacy) homeopathic remedies, nosodes, organopreparations and any other substances can be used. To do that, a substance is placed into the external container connected to both outputs of the device “Reprinter” via the cable for the connection of container for testing and biotransference.

Endogenous bioresonance therapy is also well operates jointly with homeopathy for allergy treatment, regardless of disorder duration or etiology. Particularly good results are achieved when an individual remedy (autonosode) is used, that is an optimal regulator.

Autonosode

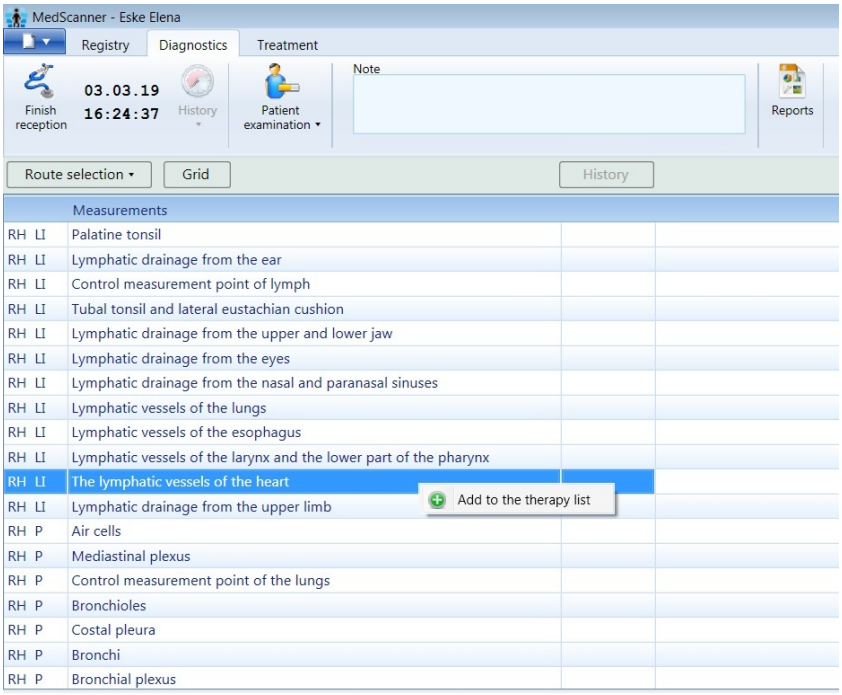
Autonosode is an instant electromagnetic “sample” of a patient’s state at a given moment. It can have an influence on a disease process in a certain patient as a whole. It is a sort of homeopathy analog, because every homeopathic remedy cancels a disorder that the corresponding substance causes when it is taken by a healthy person in high poisonous doses. When preparing an autonosode, a homeopathic medicine is created that fully characterizes the individual properties of the disease. Therefore, an effect of a such medicine is the most potent.

General type of autonosode is usually taken from BAZ or leads (for example, “hand–hand”). This type of medicine has a general regulating effect on a human body. An autonosode prepared from BAP is more potent in impact on certain tissues, organs and systems of organs, but it is not recommended at later stages of a disease.

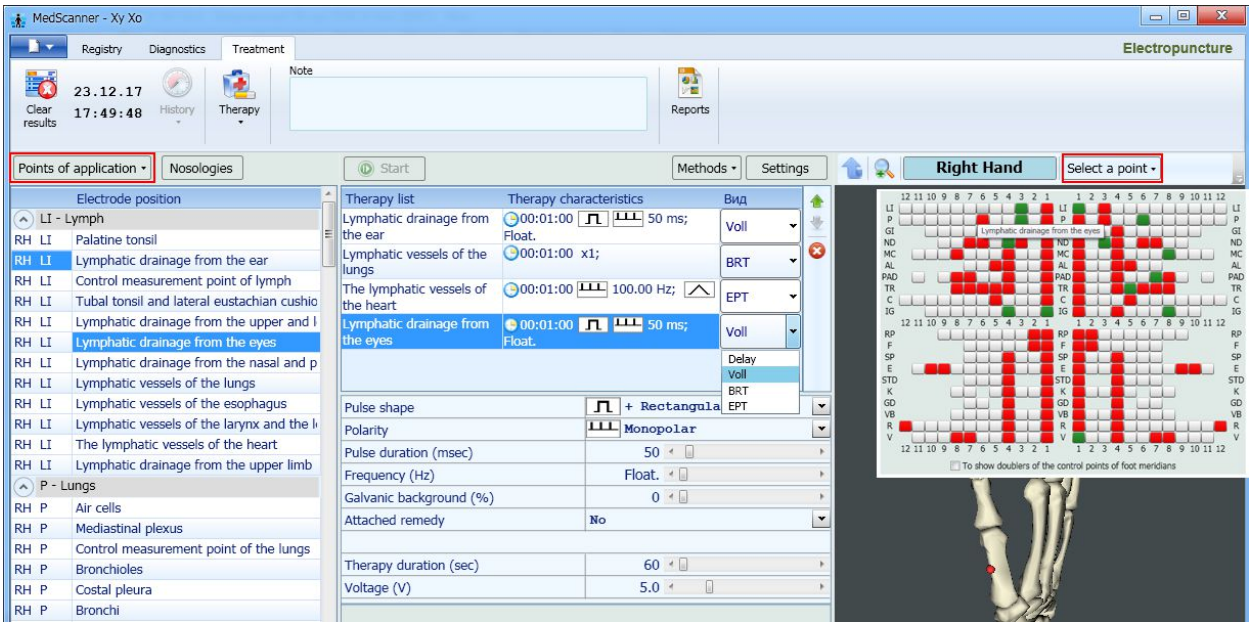
Therapy procedure

For therapy, cables are connected to the same sockets that are used during diagnostic procedure. It is not necessary to switch between modes manually, because switch to the therapy mode is made by the program automatically. When switching from the diagnostic mode to the therapy mode, all data are transferred to the corresponding window.

A system user can select any BAP or BAZ to carry out a therapy based on **Voll diagnostics** results. To do that, click the needed item on the list in the **Diagnostics — Voll diagnostics** menu with the right mouse button and select the **Add to the therapy list** item in the appeared menu:



Selected zones or points from diagnostics are transferred to the electrotherapy list. Last examination results can be also displayed in the therapy menu.



All treatment parameters (acupuncture points for therapy, electric signal parameters, exposure time) are set by the system automatically for the most effective therapy. During a

procedure it is possible to change electric signal parameters depending on patient's sensations or treatment efficacy.

The program allows control of a point state during therapy by reading data under the Voll scale at specified intervals. By default, 10-second intervals between diagnostic measurements are set. The readings are clearly displayed in the form of a graph in the bottom right corner of the program window and you can monitor the therapy process:

During a procedure a patient is in his/her seating or lying position. Areas intended for the treatment are stimulated either simultaneously or sequentially with the use of electrodes made of conductive rubber. They are fixed on a patient's body using an elastic bandage or an adhesive tape. To carry out a therapy by "Hands–Feet–Head" leads, the cylindrical, foot pads and forehead electrodes are used, respectively. For BAP therapy connect the active (**red**) plug of the patient wire to the electrode probe. Connect the passive cylindrical electrode to the **black** plug of a patient wire.

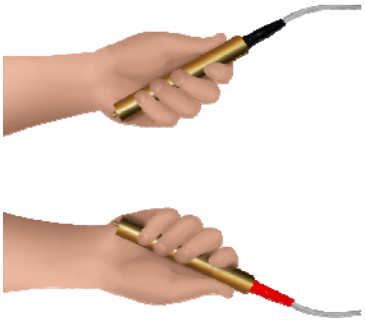
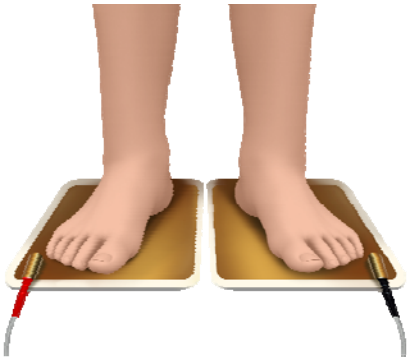
Wet electrode surfaces with clean boiled water. To increase electroconductivity, you can put a piece of wet gauze or cotton wool under electrodes. It is also desirable to wet the tip of the electrode probe. For microelectrophoresis the electrodes should be wrapped with gauze impregnated with solution of required composition.

If during therapy session the values after interim measurement are too low, a warning message about poor contact between an electrode and skin is displayed.

In that case an operator can either eliminate the cause of poor contact between an electrode and skin (by pressing the electrode), or stop therapy procedure (by pressing the **Esc** key on the keyboard).

Therapy by leads

Connect the corresponding sockets on the *Medscanner* housing to electrodes using patient cables. "Feet" socket should be connected to footpad electrodes. The red plug must be on the right side of a patient. "Hands" socket is connected to cylindrical electrodes. The red plug must be on the right side of a patient. "Head" socket should be connected to forehead electrodes. The **red** plug must be on the **right** side of a patient. Wet electrodes a bit, place them on a patient's skin. Patient's bare feet must be placed on the foot pads. A patient should hold hand (cylindrical) electrodes in his/her hands. The head electrodes (if they are required) should be fixed on a patient's forehead.

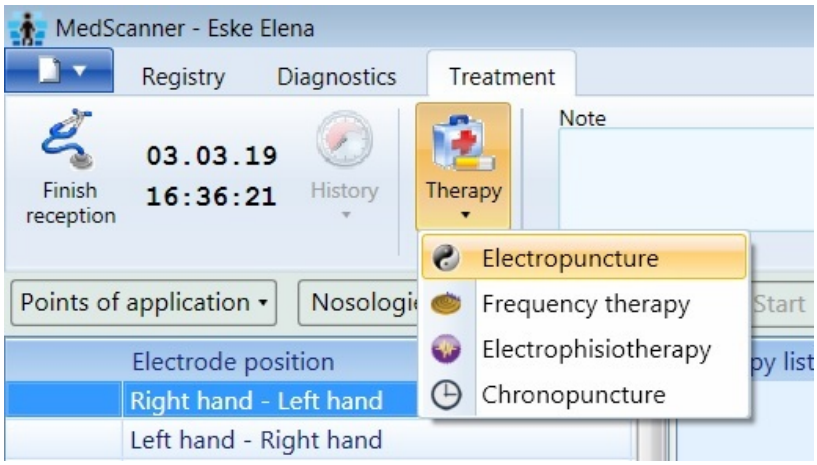




BAP therapy

Connect a patient cable to the "BAP" socket on the front panel of the *Medscanner*. Connect the black plug of a patient cable to the passive cylindrical electrode that a patient holds in his/her hand (opposite to the side of measurements). Connect the **red** plug to the probe that is set on BAP. If you intend to use a probe with a touch sensitive button, connect it to the "Sensor" socket (in that case the red plug of a patient cable is not used; it is desirable to avoid its contact with the *Medscanner* or a patient). A 3 mm or 4 mm attachment should be on the probe.

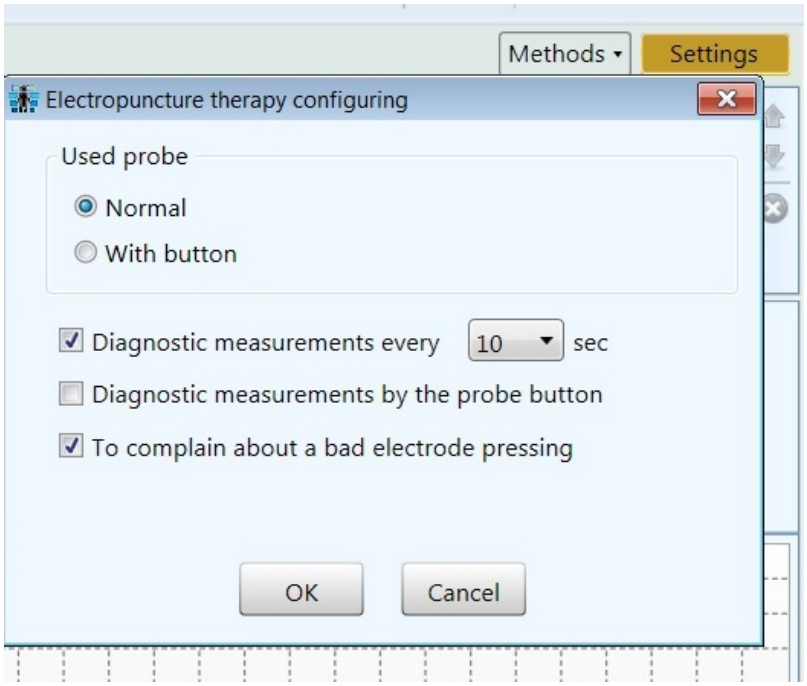
Working with the program

It is desirable to carry out a therapy after diagnostics. Select a patient from the database or register him/her in the **Registry** menu. Go to the **Treatment** menu, click the **Therapy** button, select the **Electropuncture** item in the pop-down menu. Click the **Start reception** button.

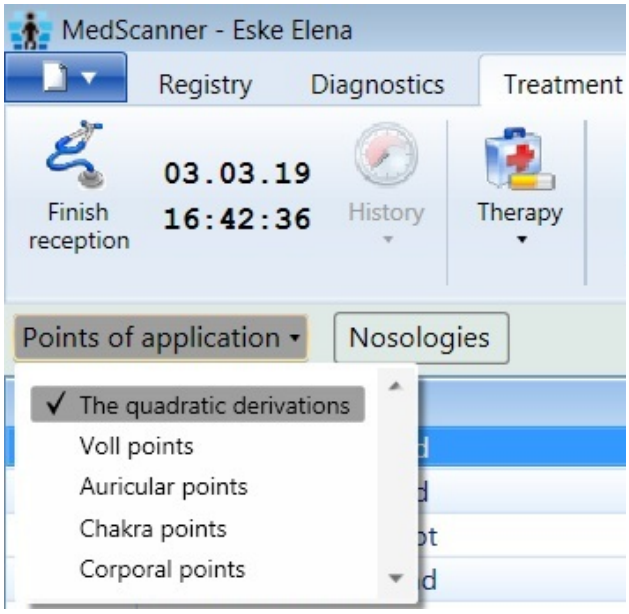


Click the **Settings** button on the right. In the appeared dialog box select:

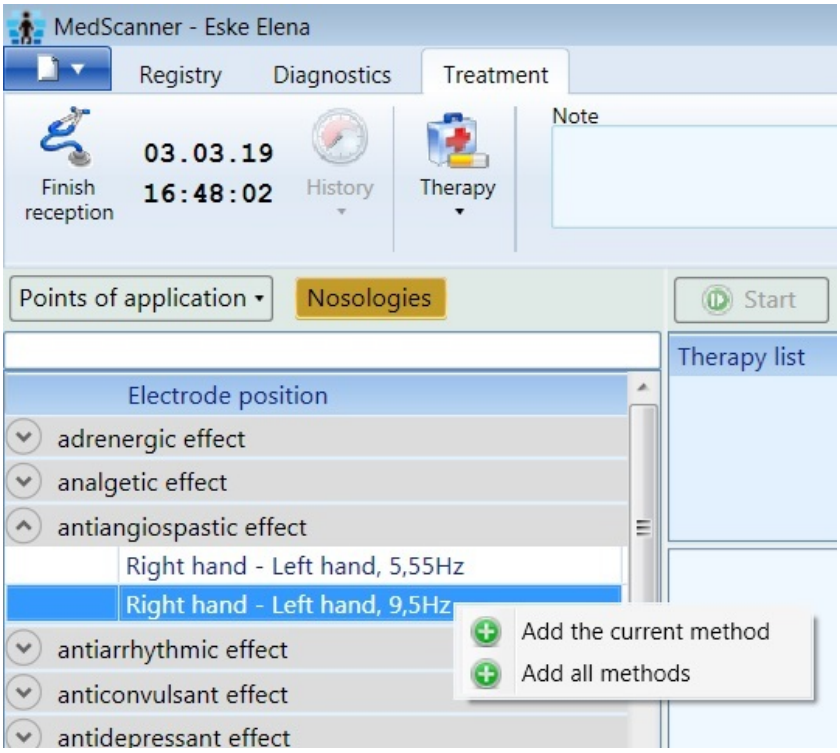
1. a desirable probe type: traditional or with a touch sensitive button.
2. if it is necessary to make interim measurements during therapy (either after a certain period of time or when pressing a button on the probe).
3. if it is necessary to display a message about poor contact between an electrode and skin.
4. if a quadrant therapy (by "head–hands–feet" leads) starts either by pressing a **Space** key or immediately after clicking the **Start** button.



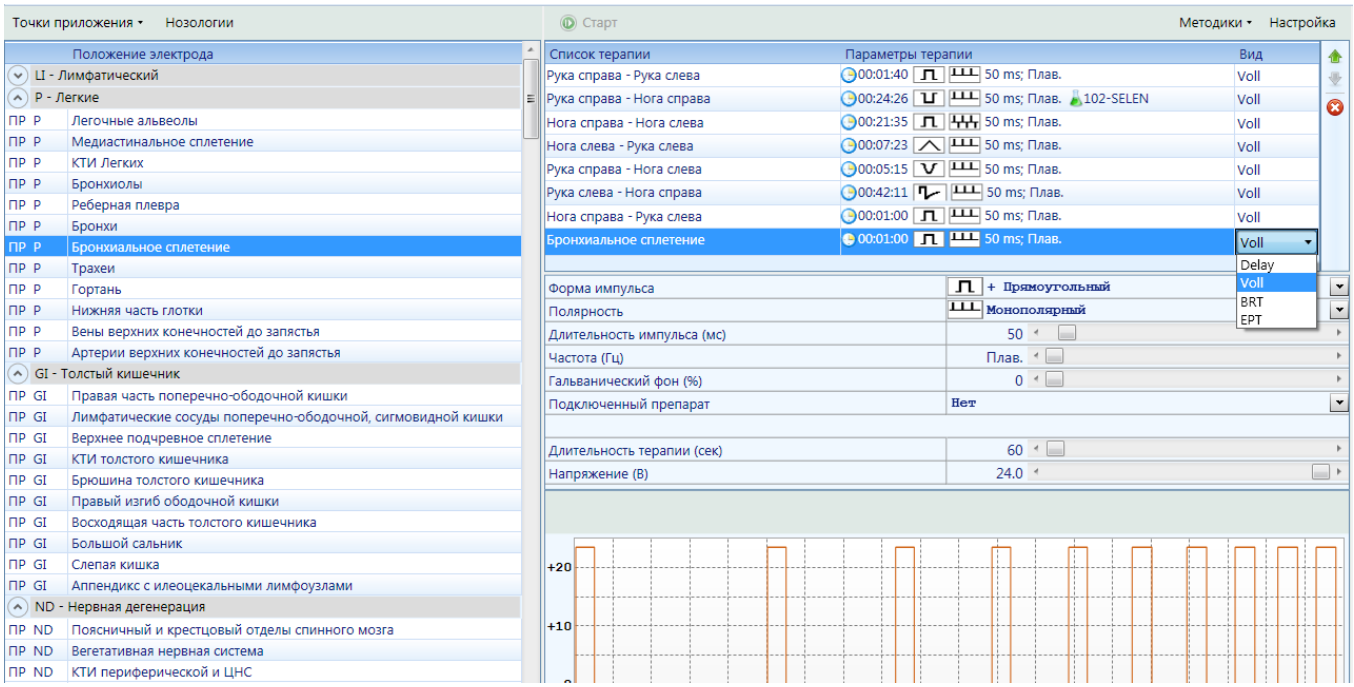
Click the **Points of application** button on the left and select needed BAP or BAZ for the therapy from the drop-down list.



To carry out therapy of known nosology, click the **Nosologies** button to the right of the **Points of application** button. After that a nosology list appears. For each one an appropriate influence is recommended depending on selected type of electrodes application (quadrant leads, Voll points, auricular points, chakra points, corporeal points).



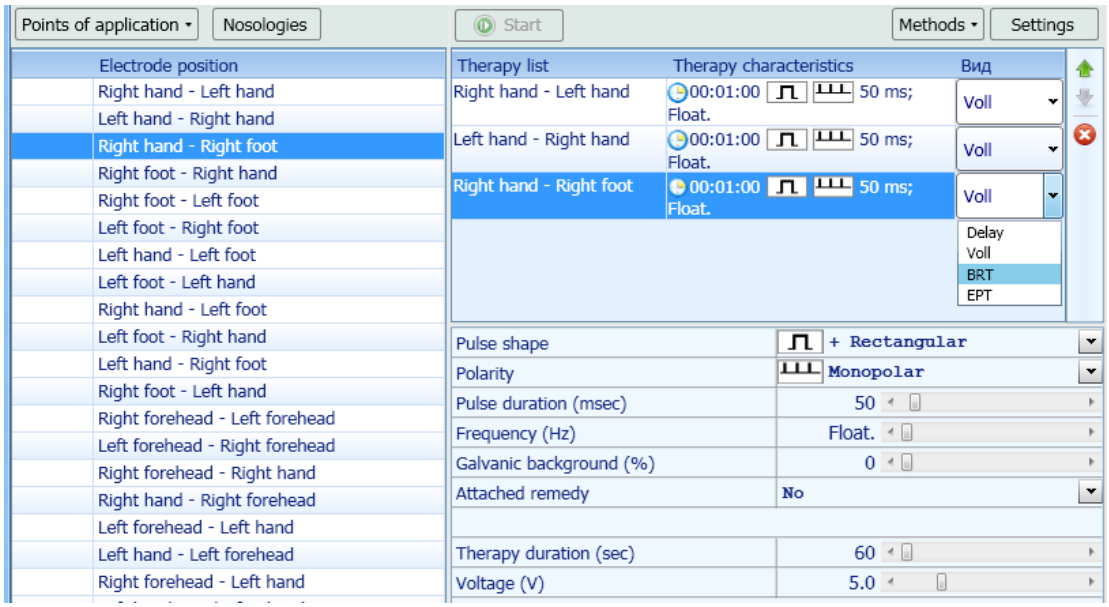
Select desirable leads, BAPs or nosologies from a corresponding list, add them to the therapy list.



You can do this in several ways:
a) Click the needed item on the list with the right mouse button and select **Add to the therapy list** in the appeared menu.
b) Click the needed item on the list with the left mouse button and holding the button down, drag a it to the therapy list (*Drag-and-drop* function).
c) Just click the needed line.

In such a way a therapy list for various leads or BAPs is created.

Select the added item in a therapy list and double-click the **View** field with the left mouse button. Select a therapy type in the pop-down list:



Delay — pause in therapy session (a period of time during which a therapy is not carried out).

Voll — Voll therapy

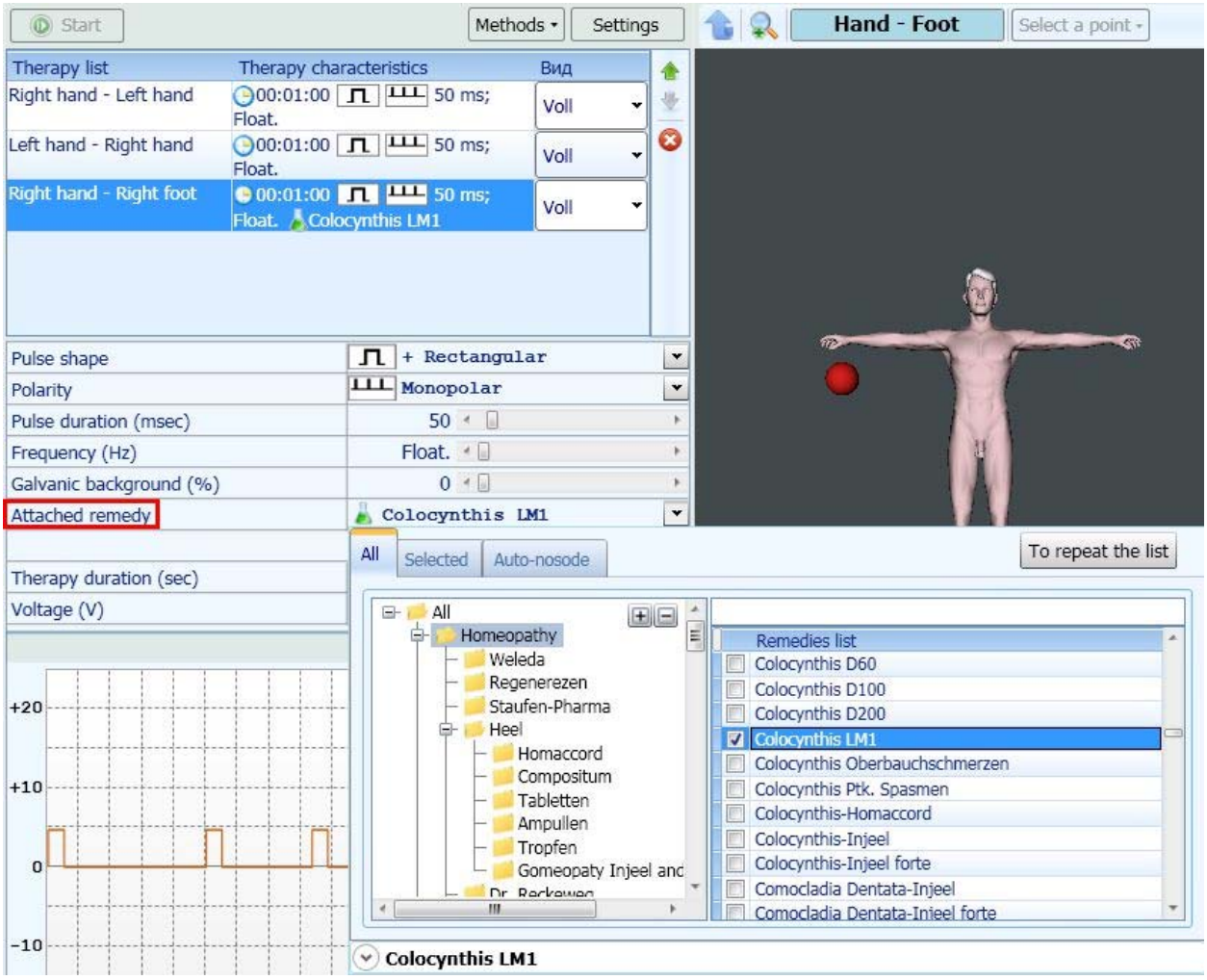
BRT — bioresonance therapy
EPT — electropuncture therapy

Select the needed parameters from the list: pulse shape, therapy duration, electric current parameters and others (individually for every therapy method).

By clicking the line with selected therapy item with the right mouse button, you can delete this item, apply impact parameters to the entire list, repeat the line or repeat the entire prepared list.

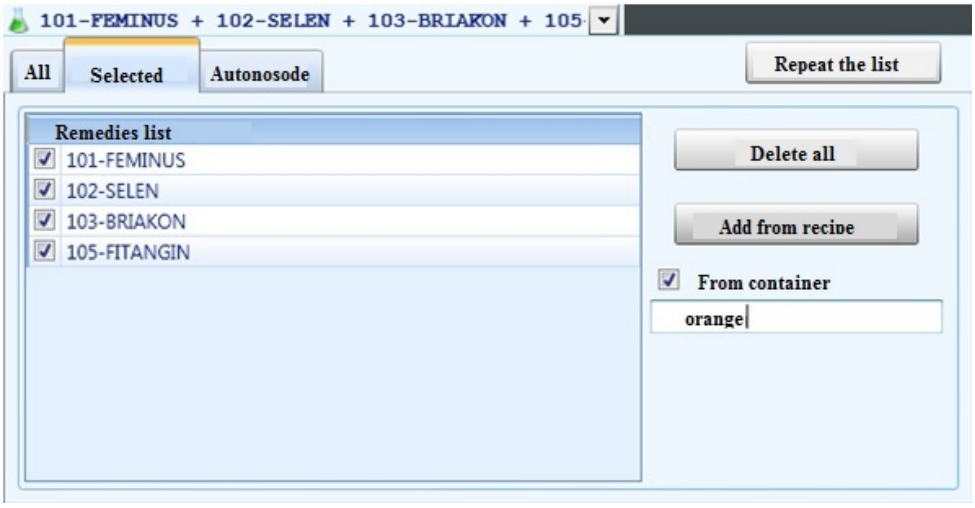
Including of medicines and autonosode

To select medicines from the selector, click the **Attached remedy** tab.

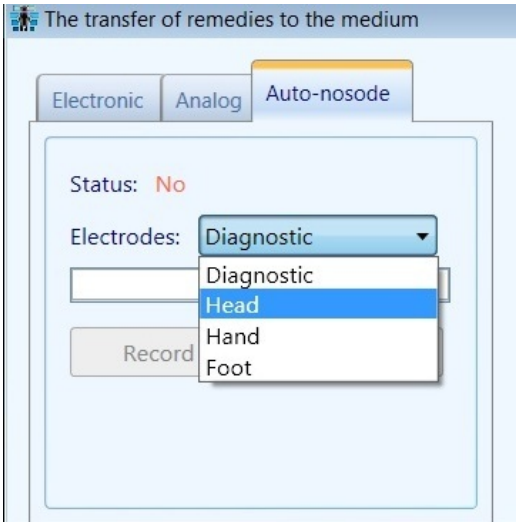


In the appeared dialog box tick medicines that you intend to send to the *Medscanner* output during therapy session. If you intend to use the same medicine list as in the previous item of therapy list, click the **To repeat the list** button at the top right.

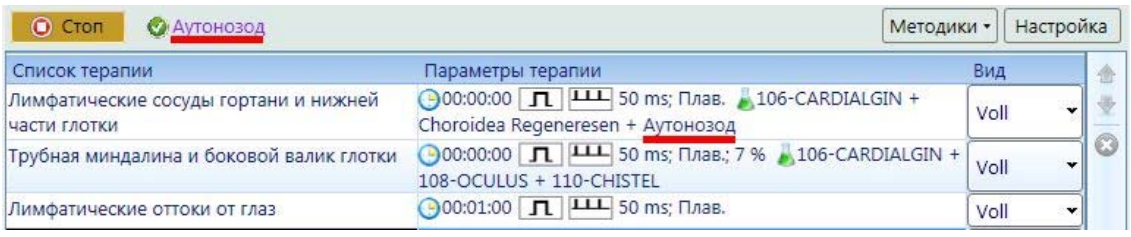
By clicking the **Selected** tab, the entire list of selected medicines is displayed. By clicking the **Add from recipe** button the tested medicines are added to the medicine list from **Remedies testing** window (**Diagnostics** menu). To clear the list, click the **Delete all** button. To include a medicine from the container, tick the **From container** item and enter the name of medicine placed into the container.



To include a patient autonosode, click the **Autonosode** tab, select electrodes for the recording of an autonosode from a patient (diagnostic probe, hand (cylindrical), head or foot electrodes), place them on a patient's body and click the **Record** button. The *Medscanner* program records an autonosode into the internal buffer. To clear the autonosode, click the **Delete** button.



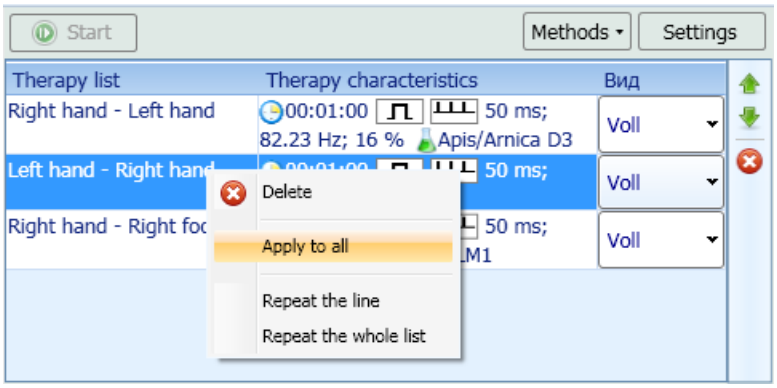
The information about recorded autonosode appears to the right of the **Start** button on the list of points in which the autonosode is going to be used.



If during therapy when switching to the next point other medicines are used on this point, the autosode is removed (except leads: therapy by all leads are carried out using the recorded autonosode). If medicines are the same (or absent), the autonosode remains recorded and included in therapy. With any change of the list of medicines from selector, an autonosode is removed, so after changes it should be recorded from a patient again. It is advised to record an autonosode immediately before therapy of every point.

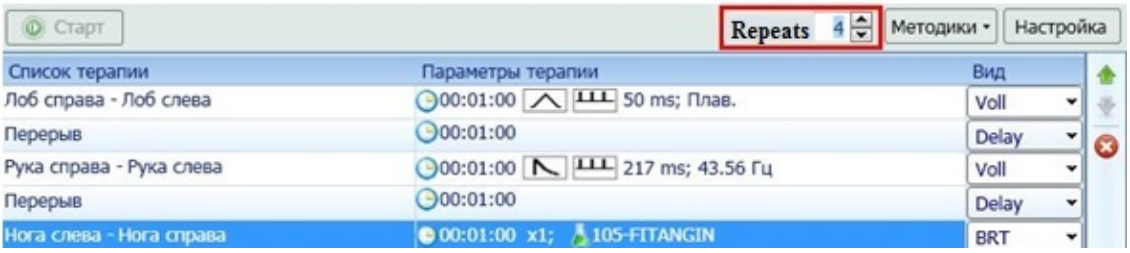
When adding the next BAP or BAZ to the therapy list, it is necessary to repeat all actions and settings. If settings are similar to previous ones, it is possible to repeat an item or apply its parameters to all other items on the therapy list (to do that, click an item with the right mouse button). To delete an item from the therapy list, click it with the right mouse button and select **Delete** item.

Any line with settings can be also repeated (for example, in order to do several runs after a pause). It is possible to repeat the entire list of points for therapy in order to go through selected BAP or BAZ in a cycle.



To move an item on the therapy list, click green up or down arrow on the right. To clear the entire list, click the button with a cross under the arrows.

In the final step, it is possible to set the number of repeats for the entire set of leads and frequencies for the influence (maximum number is 99):



After the therapy list is ready and the number of repeats for the list is selected, place corresponding electrodes on a patient's body and click the **Start** button.

Sequentially carry out the therapy by all selected BAP or BAZ in the therapy list according to selected impact technique. Switching from one point to another is done when you take off the electrode probe from a BAP or by pressing the **Space** button (during BAZ therapy).

Energy imbalance restoration

Impact points or zones are selected on the basis of a **measurement of biologically active zones**. The therapy should be started from a zone with the worst values.

A theoretically ideal energy state in electropuncture diagnostics is considered to be a state without value swings and

- when a conductivity value ("hand–hand" lead) is within the normal range of 82–86. Respectively,
- all BAP measurement values should be normal (50 scale marks).

In that ideal case a patient is healthy in respect of energy state; no therapy in order to align the energy balance is required. Otherwise, it is necessary to "roll-in" or "roll-out" the energy.

Therapy in order to "roll-in" the energy is carried out, as a rule, by using negative or alternating pulses with voltage level causing formication (pins and needles sensation) in a patient.

1. Set in the program the following parameters:
    - Pulse shape: **rectangular – (negative), monopolar**
    - Pulse duration: **50 ms**
    - Frequency: **10 Hz (or floating)**
    - Voltage: **5 V (or less)**
    - Therapy duration: **120 s**
2. Start therapy by clicking the **Start** button.
3. Monitor closely the conductivity increase in the graph and gradually increase the voltage.
4. The therapy is finished after achievement of normal values.

With the rapid growth, the achieved conductivity value usually does not remain for long. The discomfort is possible along the voltage level increase. It should not last long, otherwise it is necessary to stop the therapy session. The longest lasting therapy session in order to "roll-in" the energy must not exceed 30 minutes. It is necessary to make pauses of about 20 minutes between sessions.

Therapy in order to "roll-out" the energy is usually performed with use of the low-frequency positive pulses. The energy reduction effect is achieved with quite low output voltage level. Shall be performed as follows.

1. Set in the program the following parameters:
    - Pulse shape: **rectangular + (positive), monopolar**
    - Duration: **50 ms**
    - frequency: **10 Hz (or floating)**
    - Voltage: **5 V (or less)**
    - Therapy duration: **120 s**
2. Start therapy by clicking the **Start** button.
3. Briefly (for 3–4 seconds) increase the voltage level until pins and needles sensation arises in a patient, then reduce it again to 5 V or less.
4. Monitor the value decrease in the graph and repeat the brief voltage increase several times.
5. The therapy is finished when upper limit of the normal conductivity range is achieved.
6. You should stop to "roll-out" the energy if a patient starts to yawn or experience severe fatigue.

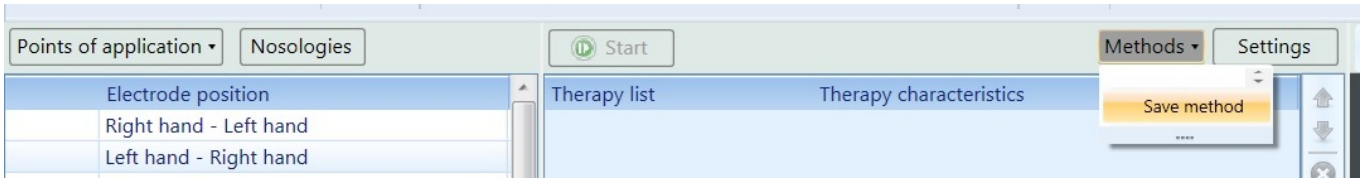
Usually every therapy session in order to "roll-out" the energy lasts no more than 15 minutes. It is advisable to make pauses of about 15 minutes between sessions. It is possible to achieve the effect of energy decrease if you just ground a patient.

Often the conductivity value decreases no more than 1–2 conditional units. However, even that is enough for vitality enhancement. The long term use of the pulse current can be counterproductive. Once decreased almost to normal range, the conductivity value may increase again as a result of follow-up therapy. In that case you should stop the therapy immediately and try to continue it only the next day.

Note. The energy excess is less harmful than the lack of energy.

Personal techniques creation

Created sets of impact points and areas with set parameters and therapy techniques can be saved to use them subsequently. To do that, select the **Save method** item in the **Methods** menu.



Enter the name of technique in the appeared dialog box, click the **OK** button. The next time you can select the saved technique from the list.

To delete a technique from the technique list, click it with the right mouse button and select **Delete** item in the appeared menu.

FREQUENCY THERAPY (EXOGENOUS BRT)

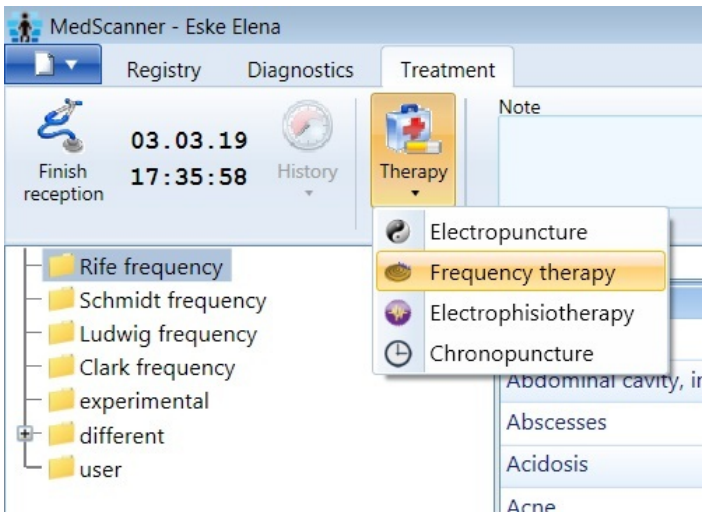
Frequency therapy (exogenous BRT) is a treatment with external (induced) electromagnetic waves of low intensity, exact shape and frequency for resonance creation in the human body. The treatment is based on the suppression of pathological wave frequency spectra as well as restoration and strengthening of physiological ones. It is also aimed at maintaining of relative synchronization of different wave processes creating a physiological homeostasis in the human body.

This section is for exogenous BRT with fixed frequencies. It is a treatment with certain frequencies specific to various pathological states and having an ability to neutralize them. They are organized as programs on authors, effects, nosologies and organs. This is a contact influence on a patient by applying electrodes to the skin in corresponding body areas.

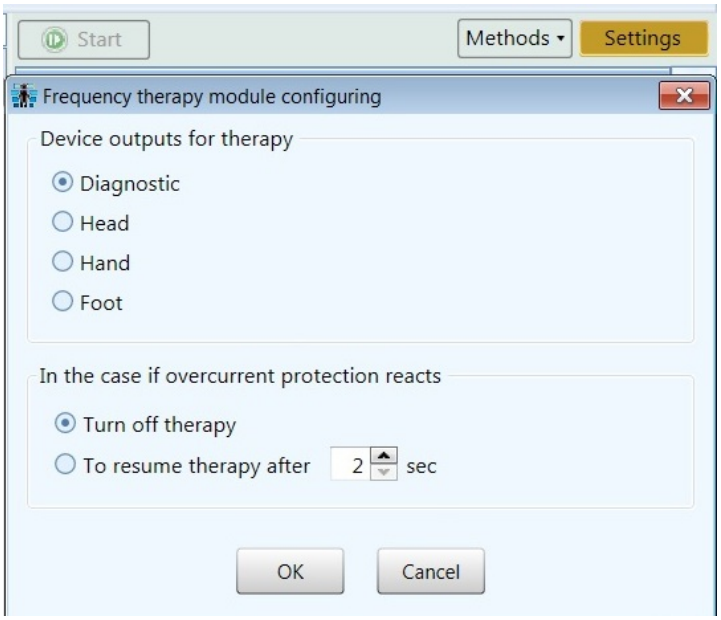
Electrode placing and therapy process is similar to that is described in the "**Electropuncture**" section. BAPs for the frequency therapy are rarely used. General type of therapy is carried out by "hand–hand", "hand-foot" or "foot-foot" leads. Some authors advise to choose the electrodes placement in a way that an organ or body system locates between them, in projection. In that case you can use black electrodes for electrotherapy placing them in the organ projection and fixing on a patient's body with Bentley adhesive tape.

Working with the program

Select a patient from the database or register him/her in the **Registry** menu. Go to the **Treatment** menu, click the **Therapy** button and select **Frequency therapy** in the drop-down menu. Click the **Start reception** button.

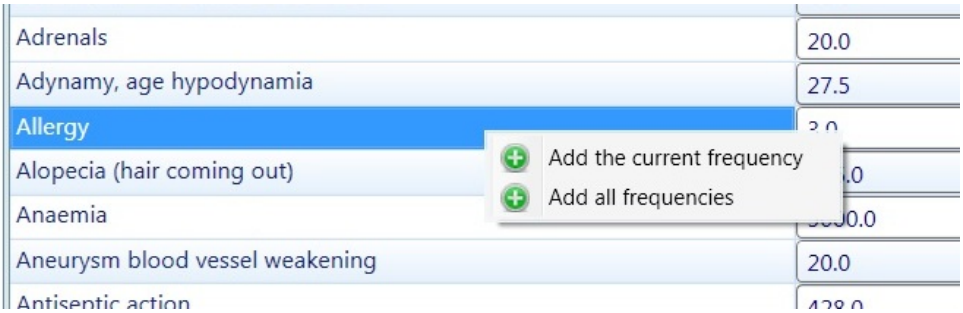


Click the **Settings** button on the right. Choose the output for therapy on the front panel of the *Medscanner* ("BAP" (diagnostic), "Head", "Hands" or "Feet). LEDs are lighted up above the corresponding sockets on the front panel. Choose a program action in case of activation of overcurrent protection of the *Medscanner* (either stop therapy or continue after a certain amount of time).

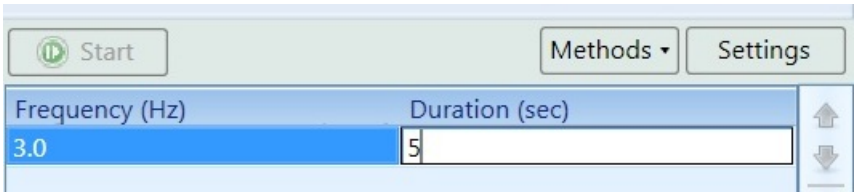


Connect the patient wires to the appropriate sockets on the front panel of the *Medscanner*, connect them to electrodes.

Add a new frequency to the therapy list. You can do this in several ways:
a) Double-click the therapy list with the left mouse button.
b) Click the needed item on the nosology list with the left mouse button and holding the button down, drag it to the therapy list (*Drag-and-drop* function).
c) Click the needed item on the nosology list with the right mouse button and select **Add the current frequency** or **Add all frequencies** item.



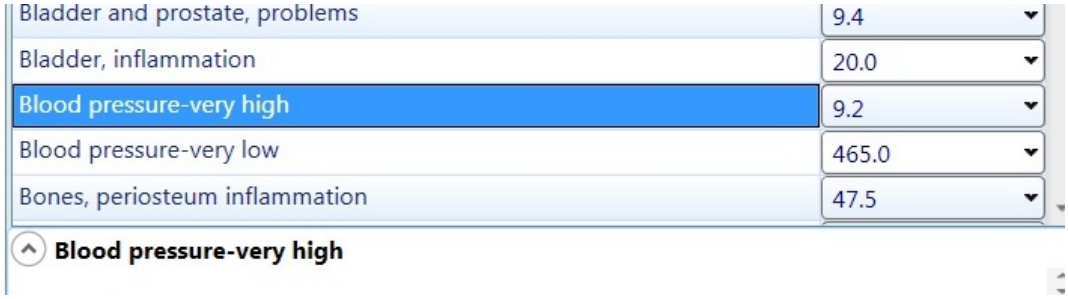
A frequency or duration of therapeutic session can be edited in the appeared field on the therapy list. To do that, double-click the selected line. Zero (“0”) frequency indicates a pause in a therapy session.



The maximum possible frequency value to set is 2 MHz (2,000,000 Hz) with an accuracy of 0.1 Hz. The maximum amplitude of output voltage is 10 V. Pulse shape, polarity, amplitude and number of repeats of the entire set are displayed in the right bottom corner of the program window.

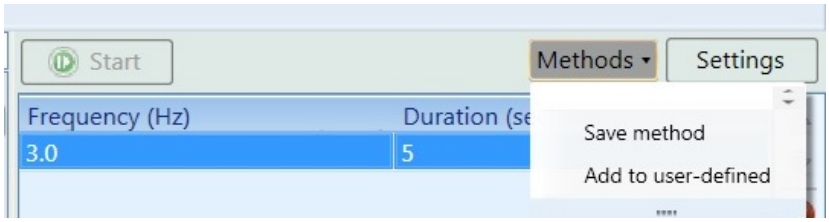
After the therapy list is ready, place corresponding electrodes on a patient's body and click the **Start** button. The program sequentially goes through all selected frequencies on the therapy list and repeats them a preset number of times.

The Help Tip with information about indication for a frequency, therapy procedure, electrode placing, etc. can be called up under the list of frequency names.

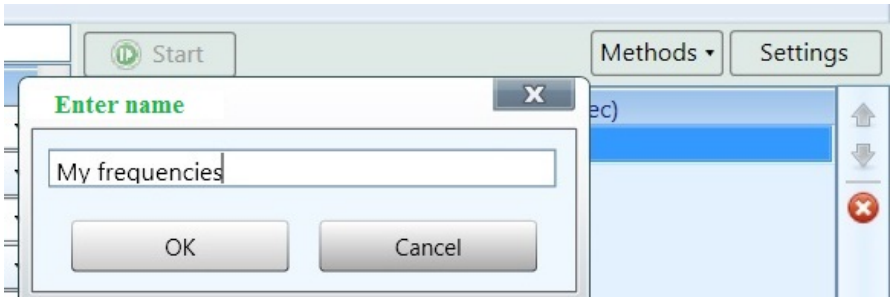


Personal techniques creation

It is possible to create your own frequency sets for the therapy. To do that, select the **Save method** item in the **Methods** menu.



Enter the name of a technique in the appeared dialog box, click the **OK** button. The next time you can select the saved therapy technique from the list.



To delete a technique from the technique list, click it with the right mouse button and select **Delete** item in the appeared menu.

If you need to specially add the created technique to the custom technique list, select **Add to user-defined** menu when you save your technique.

ELECTROPHYSIOTHERAPY

Electrotherapy consists in dosed effects on the body of current flows and electrical, magnetic and electromagnetic fields. Used for electrotherapy electrical current works as anesthetic and tranquilizer for neuralgia, cramps, paralyses, or as irritant and stimulator for neuromuscular system in case of muscular atrophy, articular rheumatism , some female diseases, neurasthenia, hysteria and others.

ATTENTION: The improper use of the device for electrotherapy or using it for other purposes can lead to undesirable consequences for a patient's health. Therefore, carry out procedures only under observation of an experienced physician.

Main types of electrotherapy

Galvanization is a method of using for treatment purposes the direct weak current of low voltage and not varying in time. Under the influence of external electromagnetic field the conduction current arises in tissues, that causes changes in the ions interrelation in cells and in intercellular space.

Therapeutic effects: anti-inflammatory (draining-dehydrating), anesthetic, sedative (on the anode), vasodilatory, myorelaxing and secretory (on the cathode).

Parameters: for treatment purposes the direct weak (up to 50 mA) current of low voltage (up to 80 V) and not varying in time is used. For galvanization, the maximum current is used for extremities (20–30 mA) and trunk (15–20 mA). For galvanization of face, the current magnitude usually does not exceed 3–5 mA, and for treatment of mouth and nose mucosae is 2-3 mA.

Electrophoresis is a combined influence on a body of the direct current and the medicine that is taken into the body with that current.

Therapeutic effects: potentiation of galvanization effects and specific pharmacological action of a medicine taken into the body with the current.

Parameters: the same current parameters as for galvanization and impulse electrotherapy. The total amount of electricity passed through the tissues should not exceed 200 C (coulombs). The amount of medicine usually does not exceed its single dose for parenteral or peroral administration.

Electrostimulation is a form of stimulation when pulse currents are used for restoration of activity of injured nerves and muscles as well as internal organs having the smooth muscles in their walls (bronchi, gastrointestinal tract).

Therapeutic effects: myoneurostimulating, trophostimulating, vasodilatory, catabolic, plastic.

Parameters: for electrostimulation it is necessary to choose a shape of impulse current and pulse recurrence rate, as well as adjust the amplitude so as to reach the intense painless rhythmic contractions of patient'smuscles. Duration of impulses for electrostimulation is 1–1000 ms. For facial and hand muscles the current intensity should be 3–5 mA, for muscles of shoulders, shins and hips it should be 10–15 mA.

Diadynamotherapy is a therapeutic influence on a body of diadynamic pulse currents.

Therapeutic effects: myoneurostimulating, anesthetic, vasodilatory, trophostimulating.

Parameters: The diadynamic currents are used, i. e. impulses of the semisinusoidal shape with exponentially lengthen trailing edge, frequency of 50 and 100 Hz and amplitude in the range between 2–5 and 15–20 mA. To decrease adaptation of excitable tissues to such currents,

the sequential order of pulses and the character of their combinations should be changed. Currently 5 main combinations (types) of these currents and 2 types of their wave modulation are used. For carrying out diadynamotherapy procedures, the specific devices are used. They generate 8 types of pulse currents of various duration, frequency and shape with various polarity and duration of pauses between pulses. Besides, there is a constant component intensifying effects of diadynamic currents.

Amplipulse therapy is influence of sinusoidal modulated currents on a human body.

Therapeutic effects: neuromyostimulating, anesthetic, vasodilatory, trophic.

Parameters: for amplipulse therapy the alternating sinusoidal (harmonic) currents with frequency of 5 kHz, modulated by frequency in the range of 10–150 Hz are used. Depth of their amplitude modulation reaches 100%. For medical purposes alternating and constant generation modes are used. In the first case the amplitude current pulsations are formed, in the second case — the monopolar sinusoidal pulses. Amplitude of modulating current should not exceed 50 mA. Amplipulse therapy is carried out with delivering of separate series of current oscillations, which follow in certain sequence defining an operation mode (five main operation modes are distinguished).

ATTENTION: The electrode for electrotherapy should be as large as possible. Be sure that electrodes are placed in such position that the widest part of lining is in touch with the skin. Attach electrodes so that they stick to the skin tightly, without unsticking. Always remember that a patient may have skin sensitivity disorder, therefore a person can inadequately assess intensity of current. Be particularly careful using currents with high galvanic component (G, UR, IG 30, T/R, DF, MF, CP, LP, and others in monopolar mode with pulse duration over 50 ms and pauses shorter than 200 ms). Never exceed recommended current density of 0.1 mA/cm^2 on the surface of the active electrode. If during the procedure you use electrodes of different size, choose current intensity as for the smallest one.

Many kinds of therapy are preferably applied in two-phase mode as it allows avoiding risk of chemical burns even at high current intensity. Two-phase currents are more easily tolerated, that is very important for patients with high sensitivity.

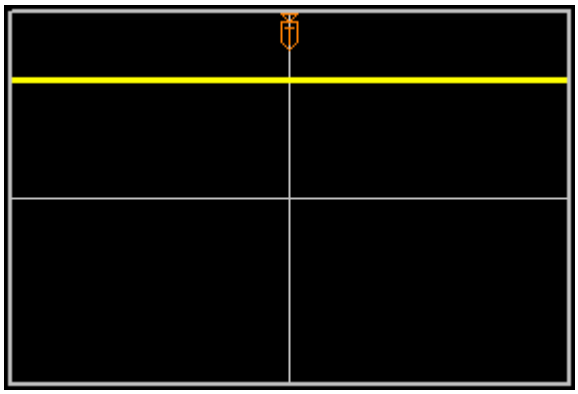
Different sizes of electrodes and maximum current intensity used:

The electrode area (cm^2)	Maximum current intensity (mA)
10	1
50	5
100	10
200	20

Main types of current implemented in the *Medscanner*:

(G) Galvanic current

Direct current without any fluctuations and interruptions.



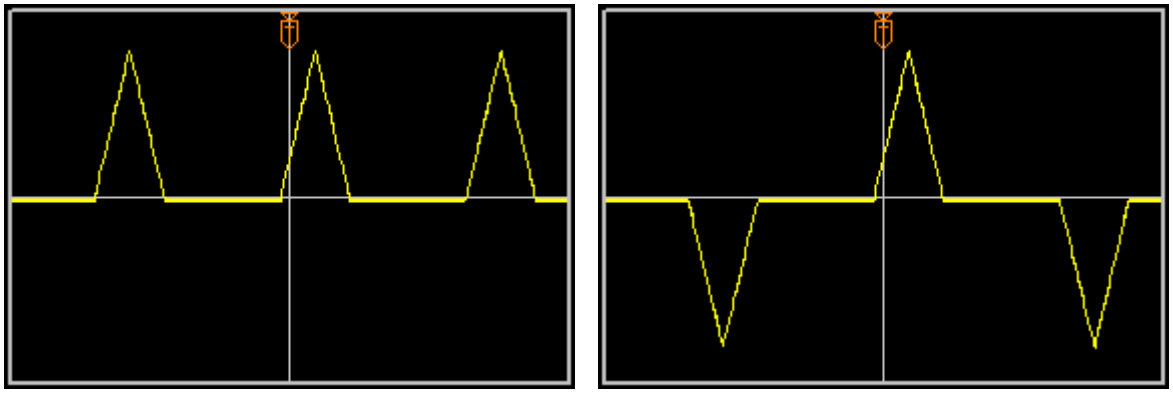
Application: ionophoresis, background therapy of paralyzes and atrophy, hyperemic effect.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm

Attention	Be careful when you apply galvanic current. Put slightly wet viscose bandage on patient's skin. Apply the bandage firmly. Current intensity should not exceed 0.1 mA/cm² on electrode work surface!

(IG 30) Galvanic impulse current (30)

Pulse shape: triangular; impulse duration (T) is 10 ms. Pause duration (R) is 50 ms. Stimulation frequency is about 12 Hz. Monophasic/biphasic.

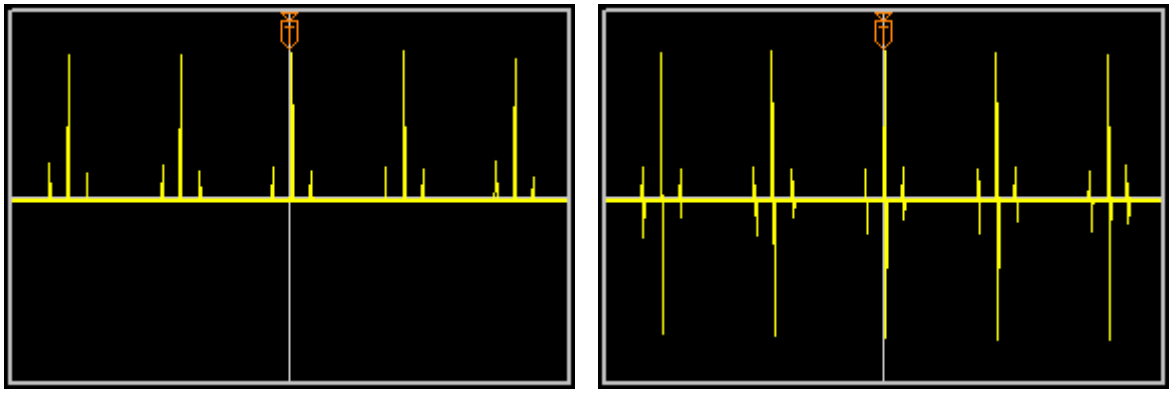


Application: stimulation of blood circulation, pain treatment.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm

(IG 50) Galvanic impulse current (50)

Pulse shape: triangular; impulse duration (T) is 1 ms. Pause duration (R) is 20 ms. Duration of amplitude modulation wave is 50 ms. Duration of amplitude modulation pause is 70 ms. Stimulation frequency is about 8 Hz. Monophasic/biphasic.

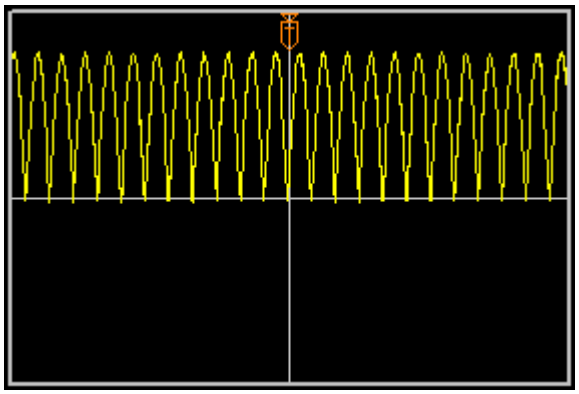


Application: induction of muscle tremor for stimulation of blood circulation, for pain treatment, muscle tension relief and hematoma resorption.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm

(DF) Two-half-period continuous (TH) diadynamic current

Pulse shape: sinusoidal half-waves following one after another continuously, without pauses. Pulse duration (T) is 10 ms. Galvanic noise is 5%.

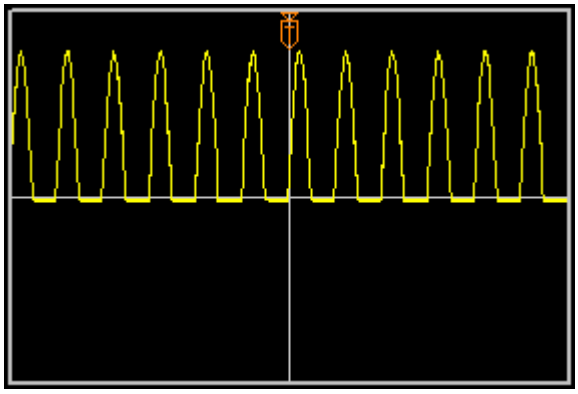


Application: classical current for the pain treatment in neuralgia and chronic pain, for sympathetic block. It has prominent analgesic and vasoactive effect, causes fibrillar muscle twitching, fine and diffuse vibration.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm

(MF 1) One-half-period continuous (OH) diadynamic current

Pulse shape: half-sine impulses alternate with pauses at regular intervals. Pulse duration (T) is 10 ms. Galvanic noise is 5%.

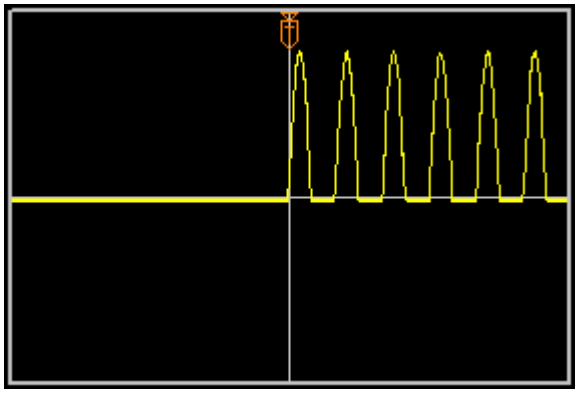


Application: pain treatment. It has prominent irritative and myostimulating effect, up to tetanic muscle contraction. It causes large unpleasant vibration in a patient.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm

(MF 2) One-half-period rhythmic (OR) diadynamic current

Pulse shape: OR signal consists of one-half-period continuous signal (OC) followed by the pauses at regular intervals. Duration of signal/pauses is 1 s. Galvanic noise is 5%.

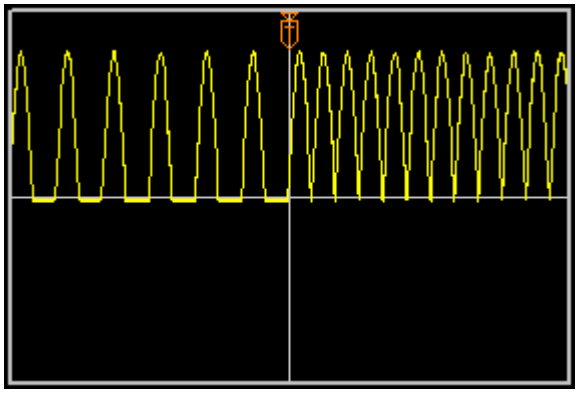


Application: It has the most intense myostimulating effect when the current pulses are sent. That period is followed by full muscle relaxation during a pause.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm

(CP) Diadynamic current modulated by a short period (SP)

Pulse shape: sequential combination of two-half-period continuous (TC) and one-half-period continuous (OC) signals that follow as a pulse delivery consisting of 1 s pulses. Pauses between TC and OC parts of SP signal are absent. Galvanic noise is 5%.

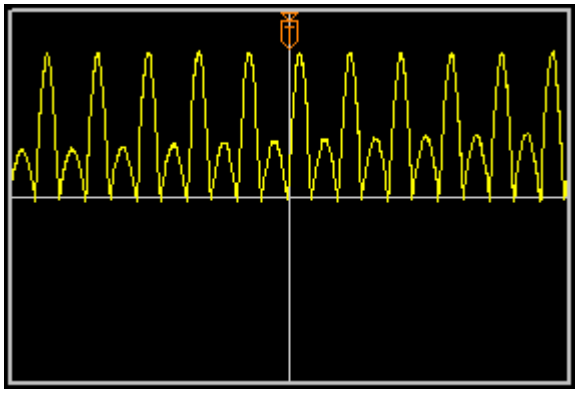


Application: pain treatment, facilitation of absorption. At the beginning of a treatment session this current has neurostimulating effect, and in 1–2 min it causes analgesia. It causes periodic sensations of large and gentle vibration in a patient.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(LP 1) Diadynamic current modulated by long period (LP)

Pulse shape: simultaneous combination of the following pulse deliveries: one-half-period continuous (OC) current with duration of 4 s and two-half-period continuous (TC) current with duration of 8 s. The impulses of OC current during 4 s are supplemented by smoothly rising and descending (during 2 s) pulses of TC current. Galvanic noise is 5%.

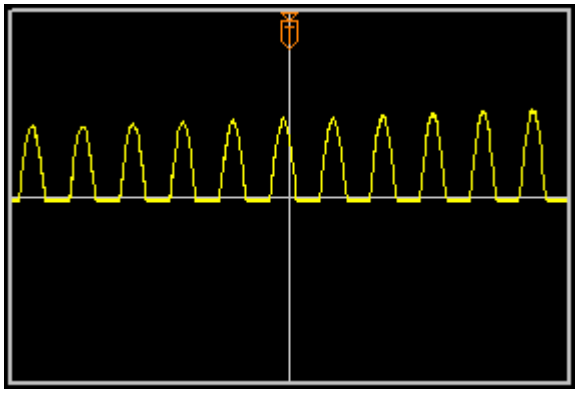


Application: neuromyostimulating effect of such currents decreases and its analgesic, vasoactive and trophic effects smoothly increases. Patient's sensations are similar to those of SP exposure.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm or similar.

(LP 2) One-half-period wave (OW) diadynamic current

Pulse shape: pulse deliveries of one-half-period continuous current with frequency of 50 Hz and duration of 4 s, with gradual amplitude increase and decrease. Pulse deliveries are followed by pauses with duration of 4 sec. Galvanic noise is 5%.

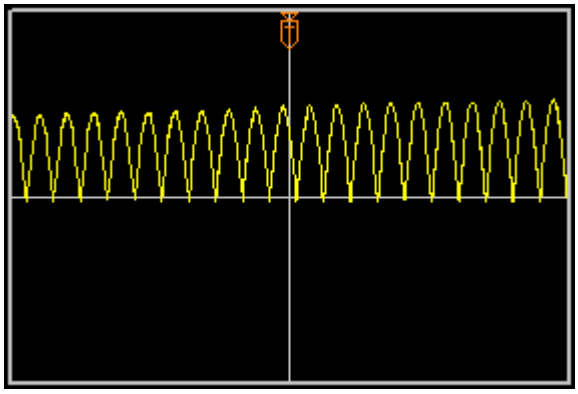


Application: It has prominent neuromyostimulating effect.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(LP 3) Two-half-period wave (TW) diadynamic current

Pulse shape: pulse deliveries of two-half-period continuous current with frequency of 100 Hz and duration of 4 s, with gradual amplitude increase and decrease. Pulse deliveries are followed by pauses with duration of 4 s. Galvanic noise is 5%.

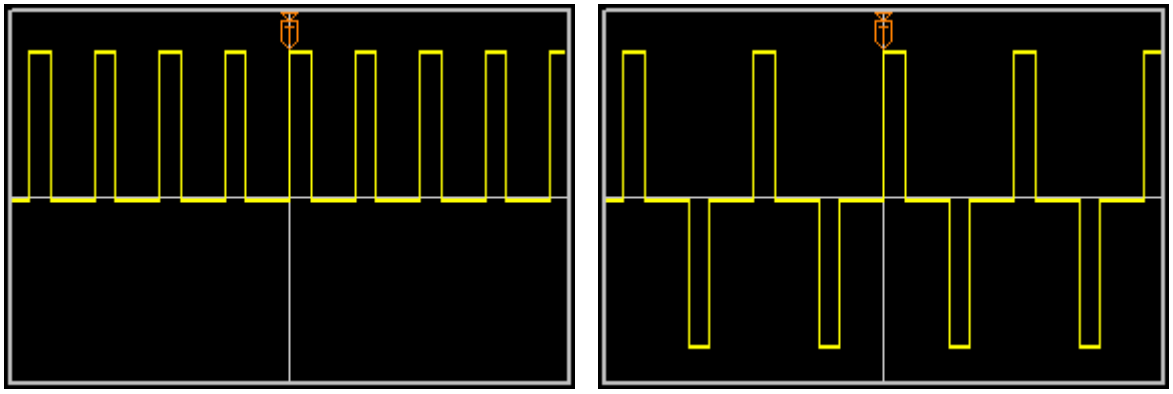


Application: It has prominent neurotrophic and vasoactive effect.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(UR) Trabert hyperstimulation current

Pulse shape: rectangular. Pulse duration (T) is 2 ms. Pause duration (R) is 5 ms. Stimulation frequency is about 143 Hz. Monophasic/biphasic.

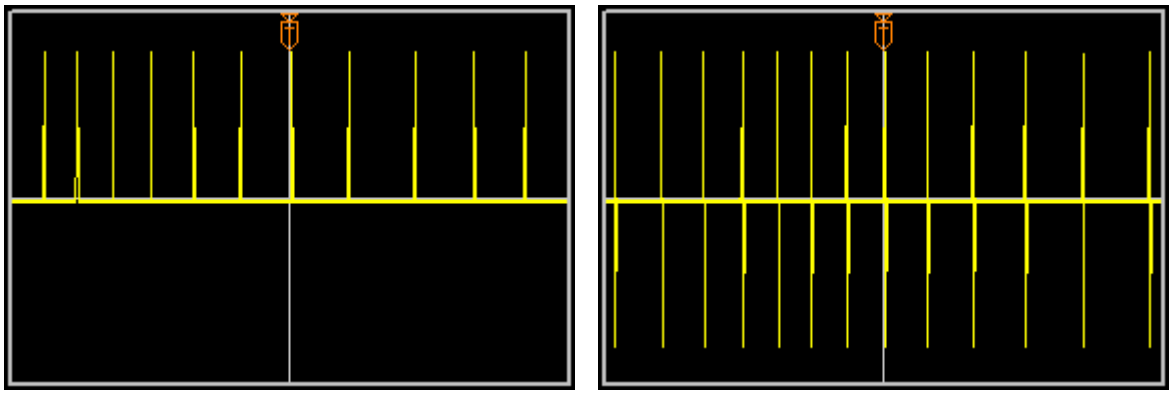


Application: pain due to increased muscle tension, arthrosis and degenerative disc disease.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(FM) Frequency-modulated current

Pulse shape: triangular; impulse duration (T) is 1 ms. Pause duration (R) is 70–142 ms. Stimulation frequency is 7–14 Hz. Monophasic/biphasic.

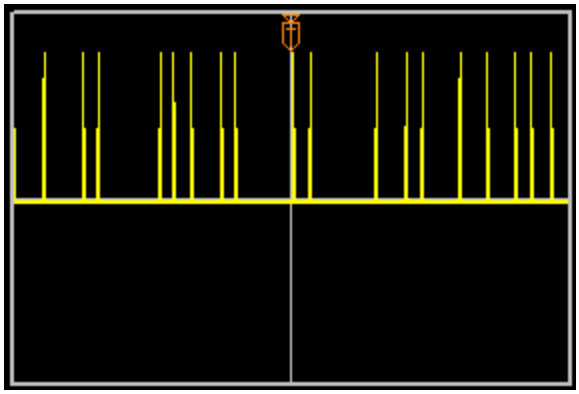
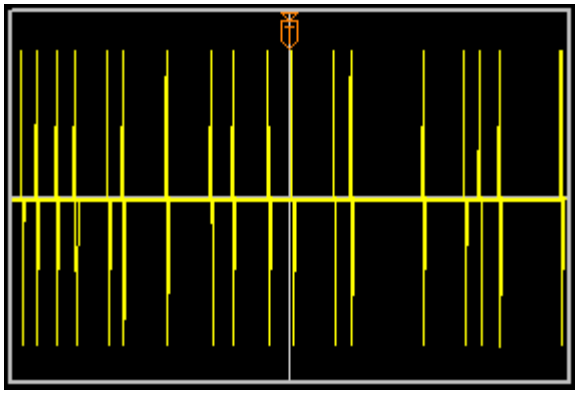


Application: induction of muscle tremor with automatically changed stimulation cycles for improving of blood circulation, reduction of muscle tension, for the pain treatment and physiotherapy for athletes having slight pain.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(STOCH) Stochastic current

Pulse shape: triangular; impulse duration (T) is 1 ms. Pause duration (R) is 10-100 ms. Stimulation frequency is 10–100 Hz. Monophasic/biphasic.

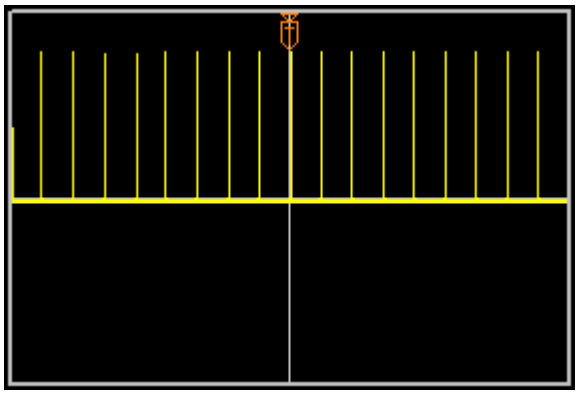
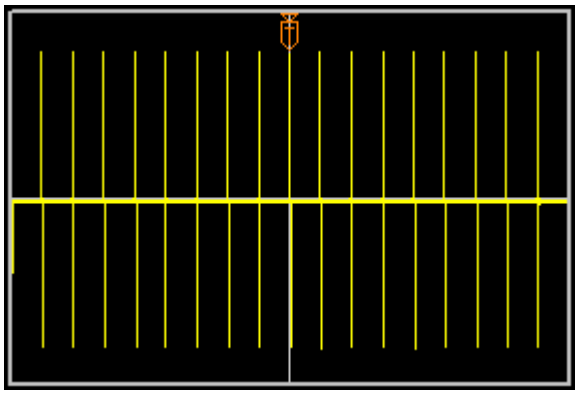



Application: electrical stimulation with random generation of impulses. For stimulation of blood circulation and pain relief; minimum adaptation to therapy.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(TENS) Transcutaneous electrical nerve stimulation

Pulse shape: rectangular. Pulse duration (T) is 250 µc. Frequency bands are 1–150 Hz, 70–150 Hz. The fixed frequency is 1–200 Hz. Monophasic/biphasic.

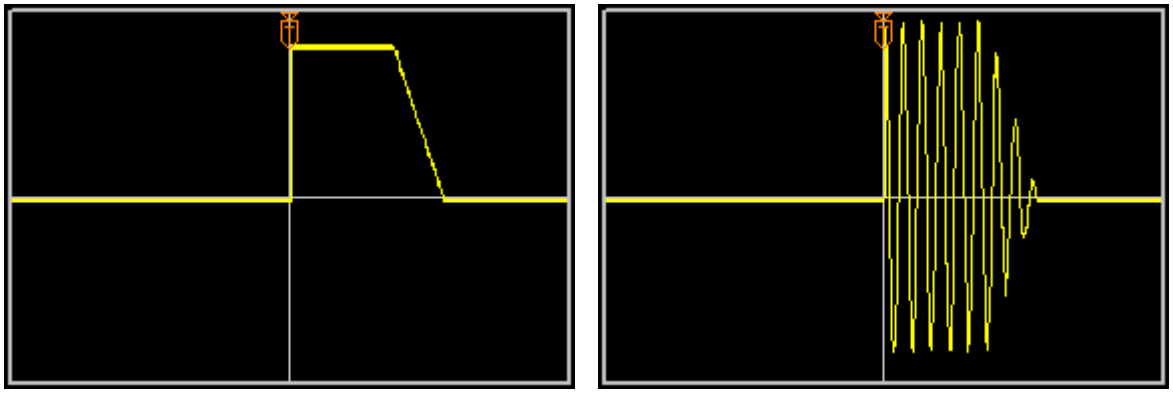



Application: pain treatment in chronic neuralgia and myalgia; rheumatic pain relief.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(T/R) Impulse current with adjustable parameters

Pulse shape: square, 3 trapezoid, triangular. Carrier frequency (Fbas) is 2–10 kHz. Pulse duration (T) is 10–500 ms. Pause duration is 1–7 sec. Monophasic/medium frequency.

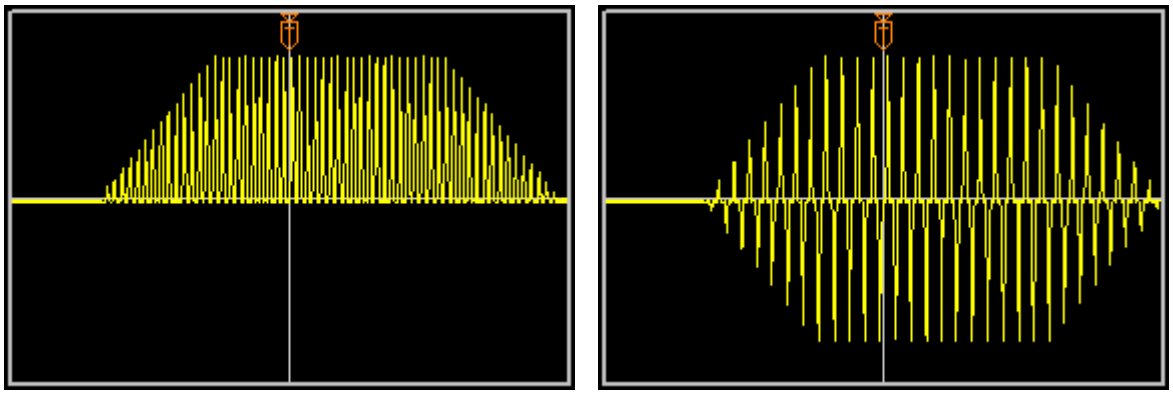


Application: treatment of peripheral paralysis, selective muscle stimulation.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(FaS) Faradic current with amplitude modulation

Pulse shape: triangular; impulse duration (T) is 1–10 ms (classical duration is 1 ms). Duration of contraction is 1–60 s. Pause duration is 1–60 s. Monophasic/biphasic current.

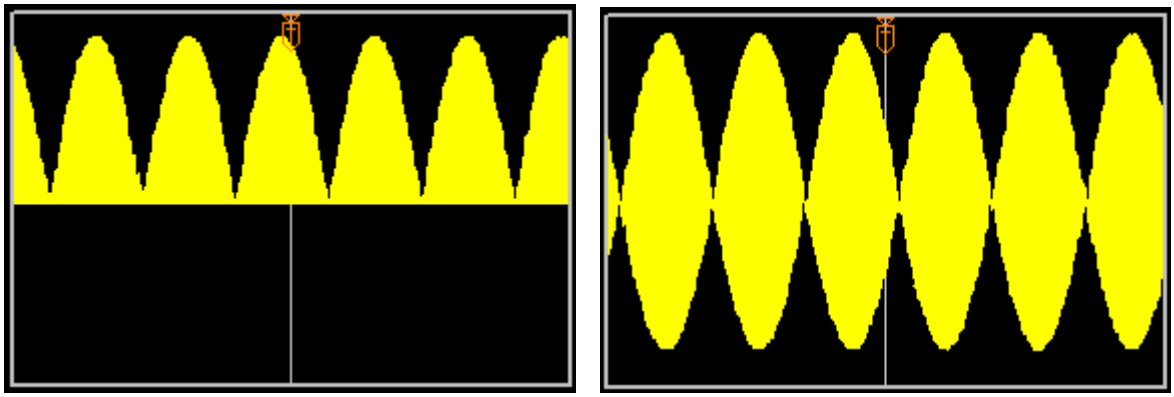


Application: treatment of muscular atrophy, Ferster gymnastics for muscles, electrogymnastics, muscle training for athletes, coordination of movements training.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(AMF 1) Amplitude-modulated current of average frequency (1st operation mode)

Pulse shape: sinusoidal waves. Carrier frequency (Fbas) is 2–10 kHz. Modulating frequencies are 0–250 Hz. Modulation depth is 0%, 50%, 100%. Pre-defined frequency bands are 1–50 Hz, 1–250 Hz, 100–250 Hz. Monophasic/biphasic.

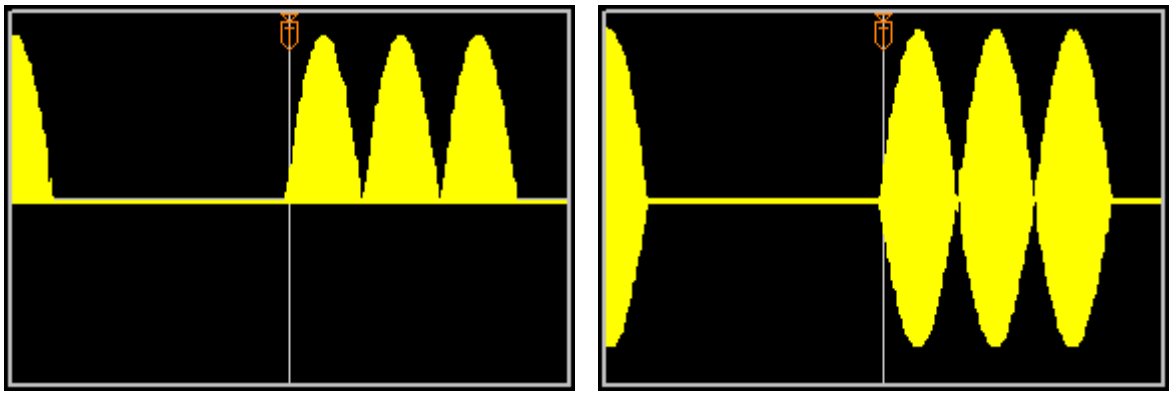


Application: depending on the chosen parameters: pain treatment, blood circulation stimulation, muscle tension relief, etc.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(AMF 2) Amplitude-modulated current of medium frequency (2nd operation mode)

Pulse shape: sinusoidal waves. Carrier frequency (Fbas) is 2–10 kHz. Modulating frequencies are 0–250 Hz. Modulation depth is 0%, 50%, 100%. Monophasic/biphasic. Combination of electric current pulse deliveries of a carrier frequency, modulated by one frequency, with pauses. Duration of electric current pulse deliveries is discrete within 1–6 s.



Application: This mode provides intense contrast of action of sinusoidal modulated currents against pauses. It has the most significant neuromyostimulating effect.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(AMF 3) Amplitude-modulated current of medium frequency (3rd operation mode)

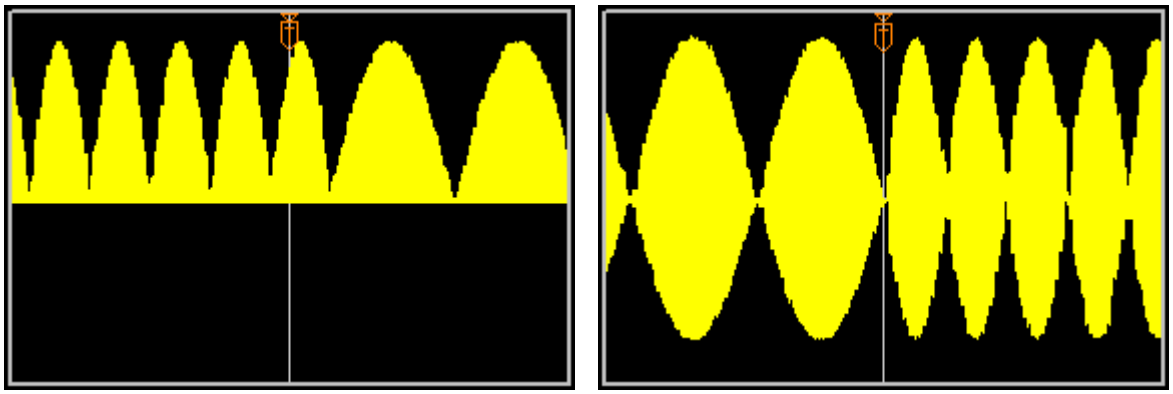
Pulse shape: sinusoidal waves. Carrier frequency (Fbas) is 2–10 kHz. Modulating frequencies are 0–250 Hz. Modulation depth is 0%, 50%, 100%. Monophasic/biphasic. Combination of electric current pulse deliveries modulated by a certain frequency and unmodulated electric current pulse deliveries. Duration of electric current pulse deliveries is discrete within 1–6 s.

Application: stimulating effect of sinusoidal modulated currents in such combination is expressed less than in 2nd operating mode, but analgesic effect starts to develop.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(AMF 4) Amplitude-modulated current of medium frequency (4th operation mode)

Pulse shape: sinusoidal waves. Carrier frequency (Fbas) is 2–10 kHz. Modulating frequencies are 0–250 Hz. Monophasic/biphasic. Combination of alternating electric current pulse deliveries with modulation frequency of 150 Hz and different modulation frequencies (the range is 1–250 Hz).

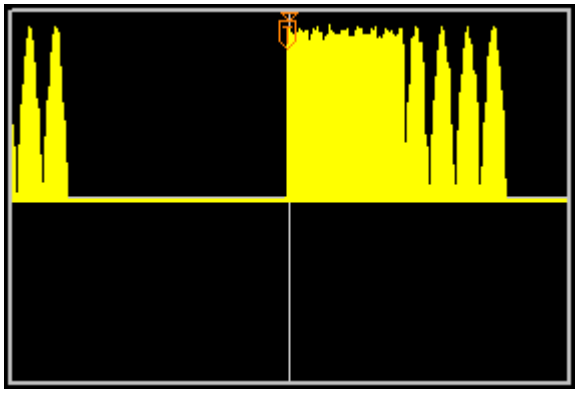
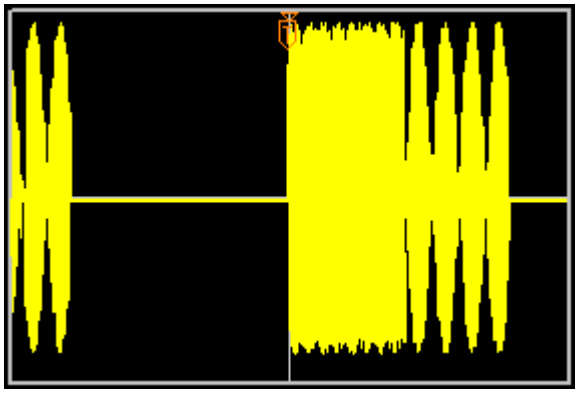


Application: in that case sinusoidal modulated currents have the most significant analgesic effect which increases as the difference between selected first and second modulation frequency decreases.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(AMF 5) Amplitude-modulated current of medium frequency (5th operation mode)

Pulse shape: sinusoidal waves. Carrier frequency (Fbas) is 2–10 kHz. Modulating frequencies are 1–250 Hz. Monophasic/biphasic. Combination of alternating electric current pulse deliveries with different modulation frequencies within the range of 0–250 Hz and pauses between them.

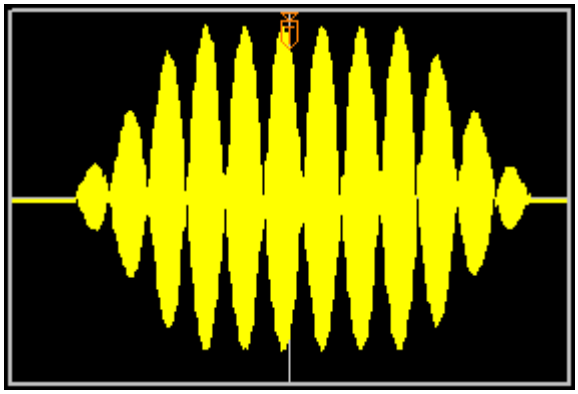



Application: such mode provides mild contrast of sinusoidal modulated currents against pauses and has mild neuromyostimulating and trophic effect.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(MT) Current of medium frequency for muscle training

Pulse shape: sinusoidal waves. Carrier frequency (Fbas) is 2–10 kHz. Modulating frequencies are 1–150 Hz. Biphasic. Duration of contraction is 1–60 s. Pause duration (R) between contractions is 0–60 s.

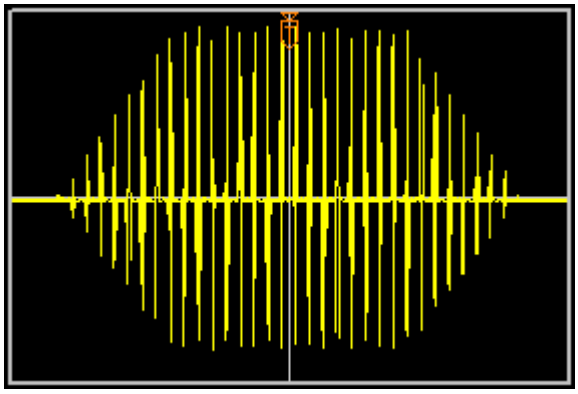


Application: muscle training.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(KOTS) Current of medium frequency for Kots muscle training

Pulse shape: sinusoidal waves. Carrier frequency (Fbas) is 2–10 kHz. Biphasic. Pulse duration (T) is 10 ms. Pause duration (R) is 10 ms. Duration of contraction is 1–60 s. Pause duration (R) between contractions is 0–60 s.

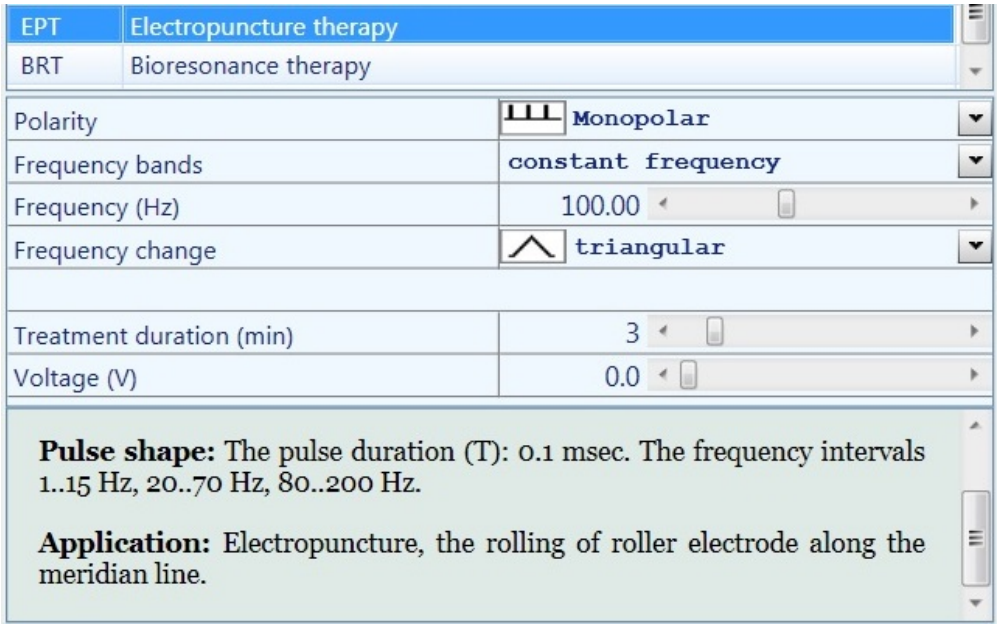


Application: muscle training.

Used electrodes: reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.

(EPT) Electropuncture therapy

Pulse shape: rectangular. Monophasic/biphasic. Pulse duration (T) is 0.1 ms. Frequency bands are: 1–15 Hz (for sympathetic nerves stimulation); 20–70 Hz (for vasodilation); 20–100 Hz (for parasympathetic nerves stimulation); 80–200 Hz (for the effective pain treatment). For optimal therapeutic effect, the pulse polarity is set for every patient by a physician individually. A frequency scanning mode: triangle or sawtooth scanning.

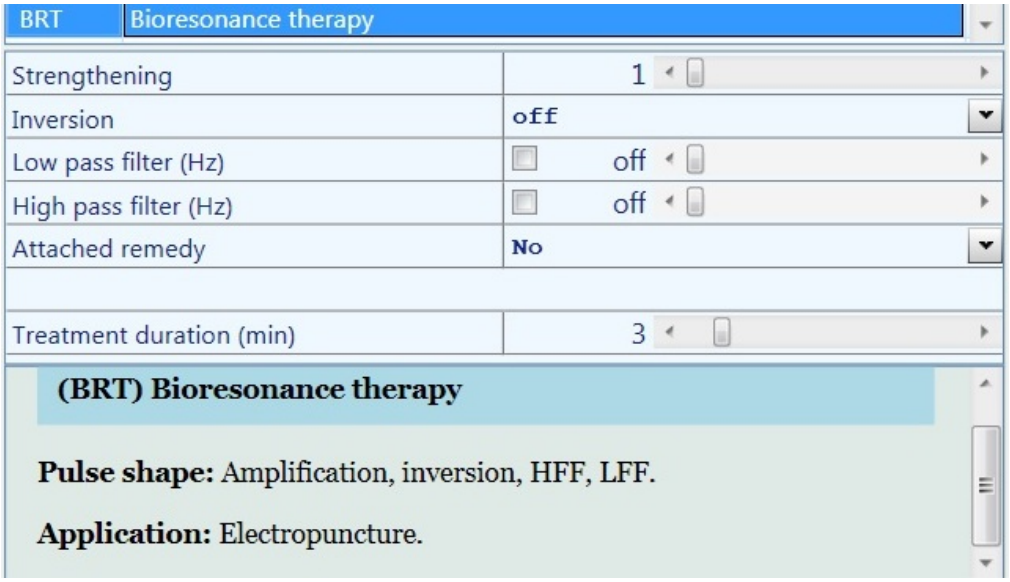


Application: BAP and BAZ electrotherapy.

Used electrodes:
For BAZ therapy — reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.
For BAP therapy — cylindrical electrode, electrode probe with a corresponding attachment.

(BRT) Bioresonance therapy

Amplifier settings: amplification: 1–32. Possibility of inversion. High- and low-frequency filter. Including a medicine from the selector.

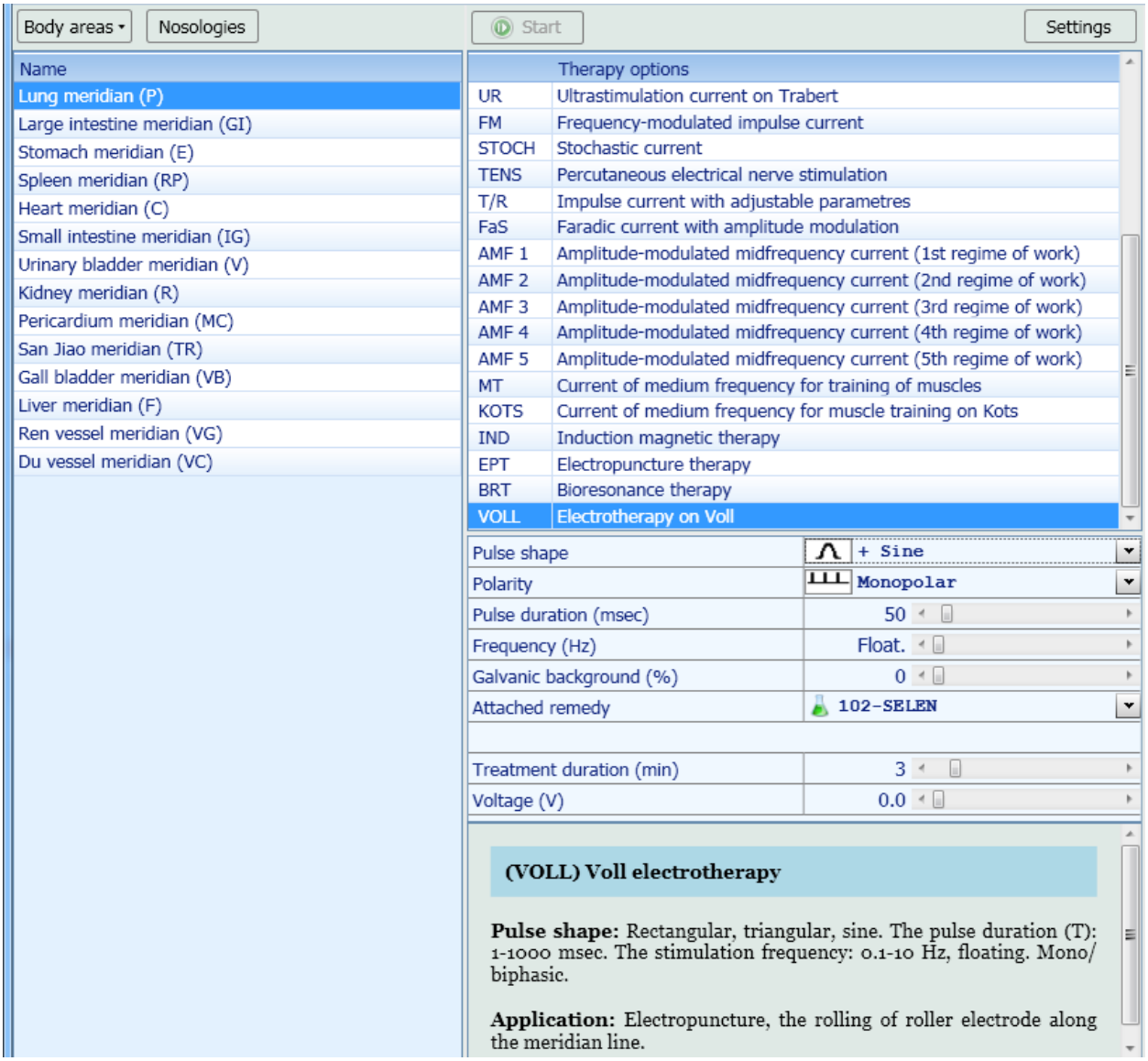


Application: BAP and BAZ therapy.

Used electrodes:
For BAZ therapy — reusable electrodes for electrotherapy made of conductive rubber, 50 × 60 mm.
For therapy by leads ("Hands–Feet–Head") — head electrodes, cylindrical electrodes, footpad electrodes.
For BAP therapy — cylindrical electrode, electrode probe with a corresponding attachment.

(VOLL) Voll electrotherapy

Pulse shape: Rectangular, triangular, sinusoidal, exponential, spike. Monophasic/biphasic. Pulse duration: 1–1000 ms. Frequency: 0.01–200 Hz. A medicine is included from the selector.



Application: BAP and BAZ electrotherapy.

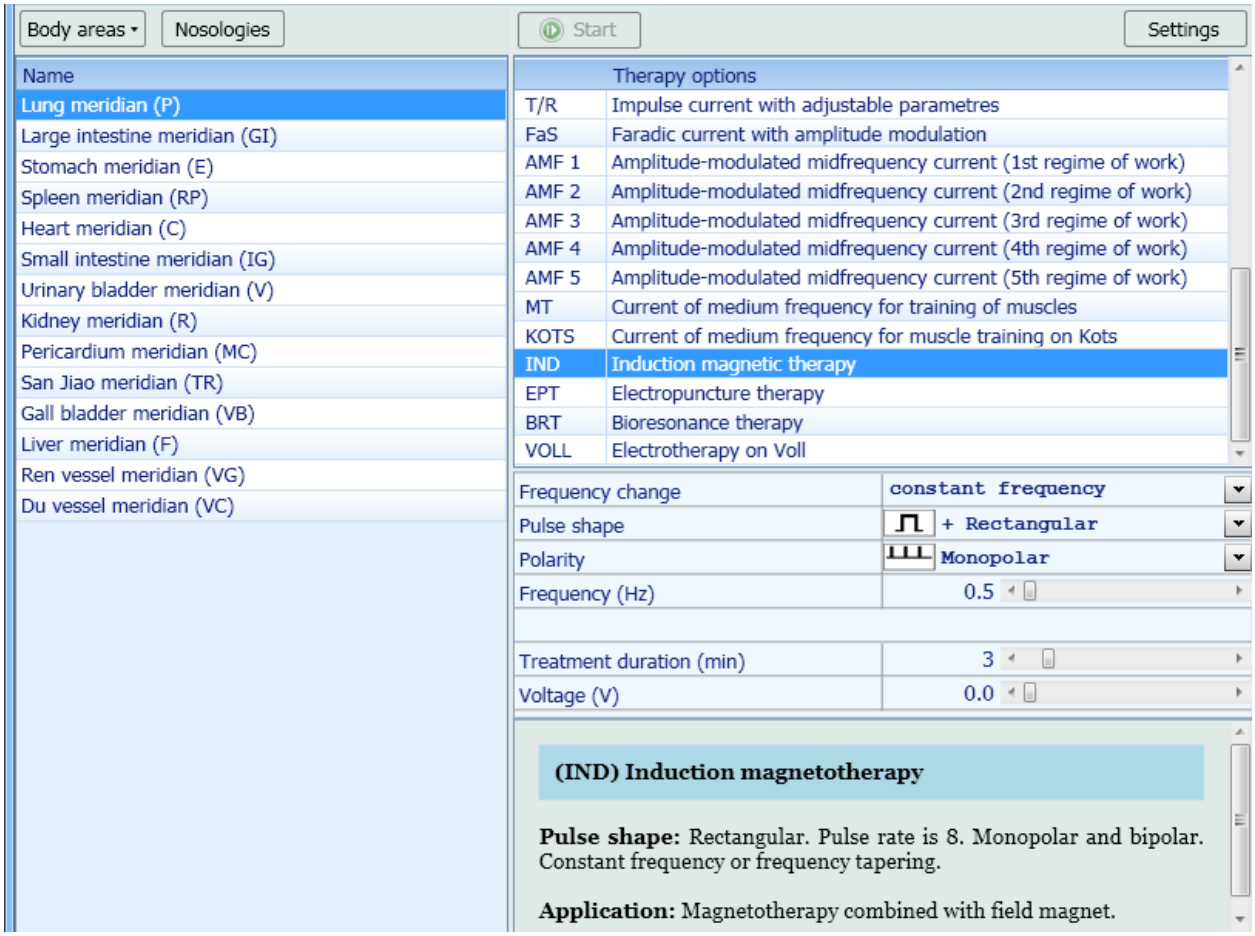
Used electrodes:
For therapy by leads ("Hands–Feet–Head") — head electrodes, cylindrical electrodes, footpad electrodes.
For BAP therapy — cylindrical electrode, electrode probe with a corresponding attachment.

Magnetotherapy

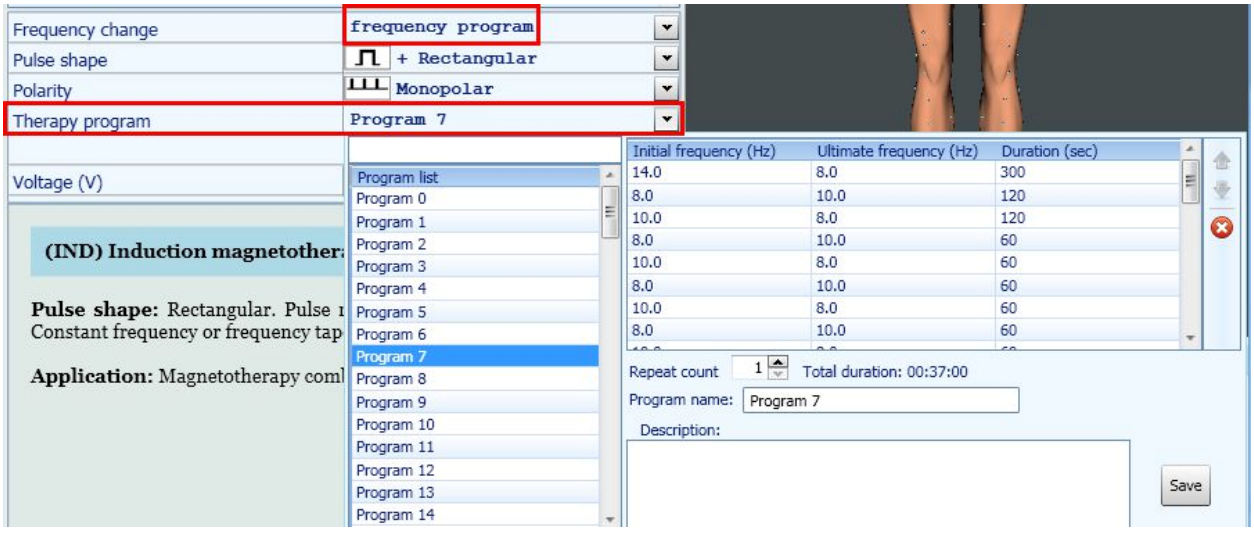
To carry out magnetotherapy, the magnetic inductor should be connected to outputs of the device.

Pulse shape: rectangular, triangular, sinusoidal, exponential, spike. Monophasic/biphasic. Interpulse period: 8. A constant frequency or smooth frequency change. A possibility to set a therapy program from the list of consecutive frequencies.

To apply magnetotherapy programs, select the **Frequency change** item in the **Frequency program** menu.



Select the **Therapy program** item. Add a new item in the appeared window by double-clicking the frequency list. Set an initial and end frequency, a period length. If initial and end frequencies are identical, a frequency during the period process does not change. Set a number of repeats and a program name. Click the **Save** button. The program is displayed in the list and can be selected for the therapy. To delete a program, click it with a right mouse button.



Application: BAZ induction magnetotherapy.

Used electrodes: a magnetic inductor.

Methods of magnetotherapy application

For different types of electrotherapy the appropriate electrodes are used. Electrodes should be of an appropriate size, as large as possible. It is unacceptable to use electrodes of too small size. Never exceed a current density of **0.1 mA/cm^{2}**! It is prohibited to use dry electrodes because it can cause pain! To provide better contact between electrodes and patient's skin, pads for electrotherapy are usually used. They should be wet with water or sodium chloride solution 1%. Pads are expandable material, please replace used ones timely. Place electrodes to provide the best contact between patient's skin and the whole surface of electrodes. Check for correct polarity of electrodes! Patient's skin under electrodes must be without skin lesions or scars.

Attention! Before treatment a patient must be informed that there should not be burning or shooting sensations under electrodes. If there is a sense of discomfort, it is necessary to check an impact area and electrode position. Be particularly careful if a patient has a skin sensitivity disorder: check his/her skin surface and adjust current intensity during a procedure.

Therapeutic session duration

Therapeutic session duration depends on a certain disease and type of current chosen. Therapy duration in galvanization (for example, for ionophoresis or for the treatment of circulatory diseases) should be within the range of 10–30 minutes. Pain treatment with pulse current of low or medium frequency is relatively shorter (5–8 minutes). Even using different therapy methods, the total duration of one therapeutic session should not exceed 12–15 minutes. Chronic conditions require a longer treatment period, while acute conditions should be treated for shorter period.

In case of electrical muscle training and treatment of paralysis, treatment duration is based on the number of contractions performed or signs of fatigue.

Electrode placement

In galvanization, the same as in treatment with monopolar currents of low frequency, electrodes have the different stimulating effects.
+ ANODE (red plug) has less pronounced stimulating action. It has relaxing and analgesic effect.
– CATHODE (black plug) is more active electrode, it has more pronounced stimulating effect and more aggressive action. In treatment with monopolar currents of low frequency, the cathode has partially analgesic effect.

Generally, there are two ways of electrodes placement.

The monopolar placement implies the use of electrodes of different sizes. The small (active) electrode is placed on the target for stimulation, the large (indifferent) electrode is placed near the impact area. An indifferent electrode should be quite large not to have a stimulating effect. As an active electrode the point electrode probe (the electrode probe with corresponding attachment) can be used. As an indifferent electrode the cylindrical electrode or the footpad can be used.

The bipolar placement implies that both electrodes (usually they have the same size) are placed on the impact area. This method is usually used for pain treatment or to cause longitudinal muscle contractions enabling many muscle fibers. Chosen electrode size should correspond to patient's anatomical proportions.

Electrokinesis

Electrokinesis is a treatment with stimulating currents using removable electrodes. For electrokinesis a spiked roller electrode can be used. Before treatment the brass electrodes should

be wet. You should rub the treated area gently, without heavy pressure. It is necessary to impact only with weight of the roller, pressing it lightly. By changing of an electrode surface size it is possible to change an intensity and effects of electrical current. Electrokinesis is used for therapy of muscle tension and pain treatment.

Ionophoresis

Ionophoresis is a percutaneous introduction of substances into the body by electrical current. Due to electrical voltage between two poles (electrodes) the migration of positive and negative ions of body fluid and used medicines occurs. Ions migrate from the pole with the same polarity to the pole with the opposite polarity. Positive ions (cations) migrate to the negative pole (cathode). Negative ions (anions) migrate to the positive pole (anode). Active drug substances are introduced in tissue between electrodes and patient's skin according to their charges. Galvanization is the most appropriate for ionophoresis. Besides, other currents with rectified current characteristics (for example, monophasic diadynamic current DF) can be used. Currents composed of very short pulses (high-voltage current, FM, stochastic current as well as interferential or alternating currents) is not possible to use for ionophoresis.

Ionophoresis procedure

a) It is desirable to clean an area of skin with alcohol to increase blood circulation.
b) Ionophoresis is not carried out on wound surfaces or areas of skin lesions.
c) Apply some ointment or filter paper soaked in medicine solution on the skin.
d) Cover ointment with cellophane to prevent its particles from getting on a viscose pad. Put an electrode and a viscose pad over the medicine and place second electrode near to it or on the other side.
e) If the active drug substance contains positive ions, connect a positive cable to the active electrode (the negative cable is for substances that contain negative ions).

A dose of the active drug substance introduced into the body depends on its concentration, current intensity, procedure duration and electrode size. Current intensity in galvanization must not exceed 0.1 mA for 1 cm^2 of electrode surface!

Procedure duration: 15−30 minutes.

Ionophoresis is not only a drug treatment, but also a combination therapy with medicines and electric current. There are all effects of using currents.

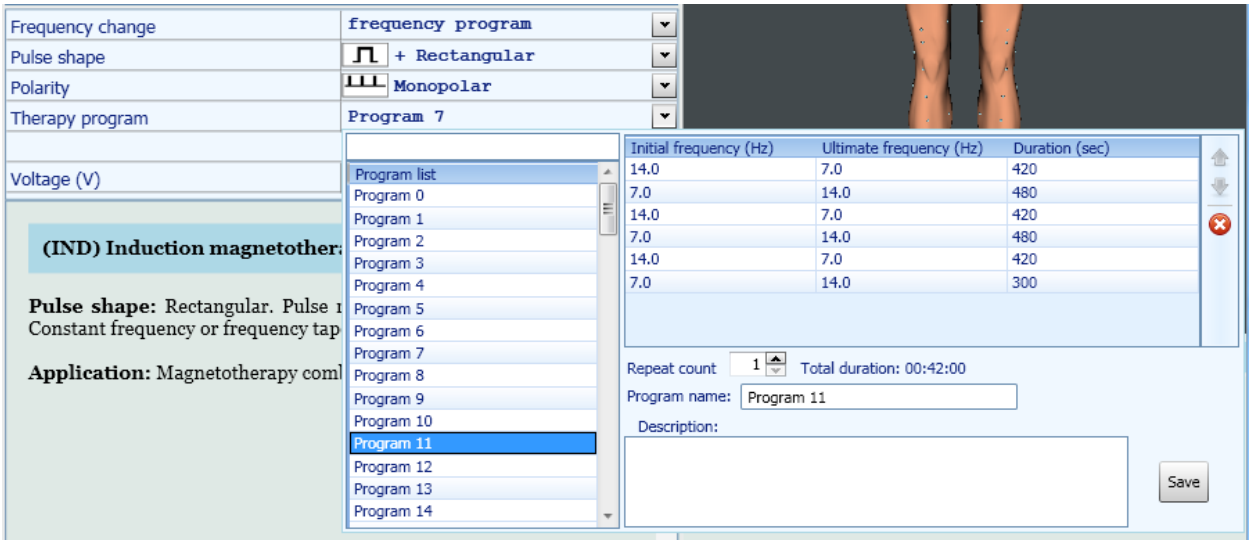
Magnetotherapy

Inductive (pulse) magnetotherapy is application of magnetic field pulses of low and very low frequency for medical purposes. The active factor of this method is eddy electric fields induced in tissues with the magnetic field of high amplitude. Due to rapid strength increase of magnetic induction vector, arising eddy electric fields cause the circular motion of charges. Inductive eddy electric currents of high density are able to stimulate peripheral nerve fibers and cause rhythmic contractions of myofibrils of skeletal muscles, smooth muscles of vessels and internal organs (magnetic stimulation phenomenon).

Therapeutic effects:

- myoneurostimulating,
- vasoactive,
- trophic,
- analgesic,
- anti-inflammatory.

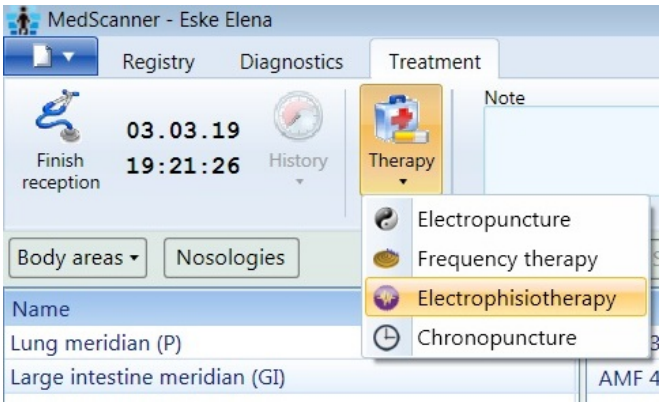
To carry out the magnetotherapy, you can use an embedded programs of frequencies by selecting **Frequency change** in the line instead of **Constant frequency — Frequency program.** Then select the corresponding number of the treatment program in the appeared **Therapy program** item.



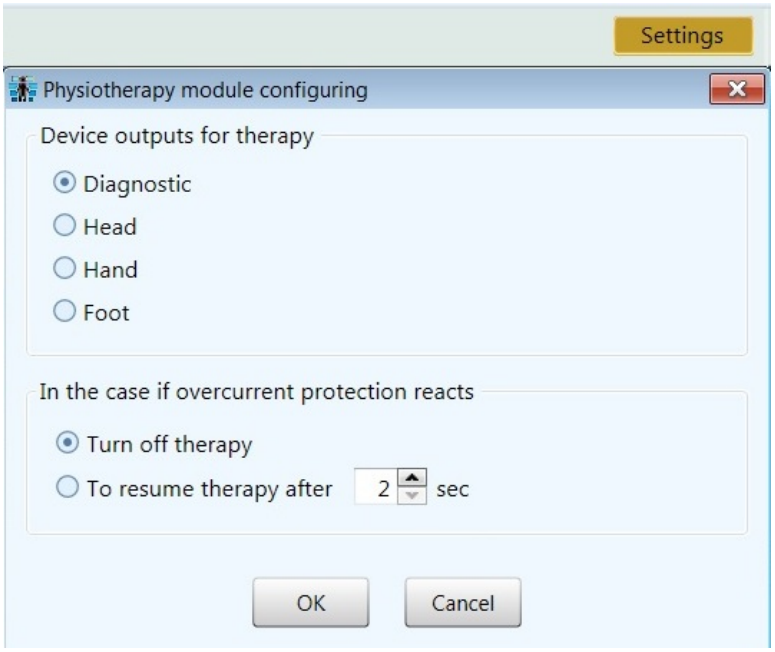
Working with the program

ATTENTION: Do not use the Medscanner for the electrotherapy if you have not the professional knowledge in this field. The improper use of this mode may be harmful to health!

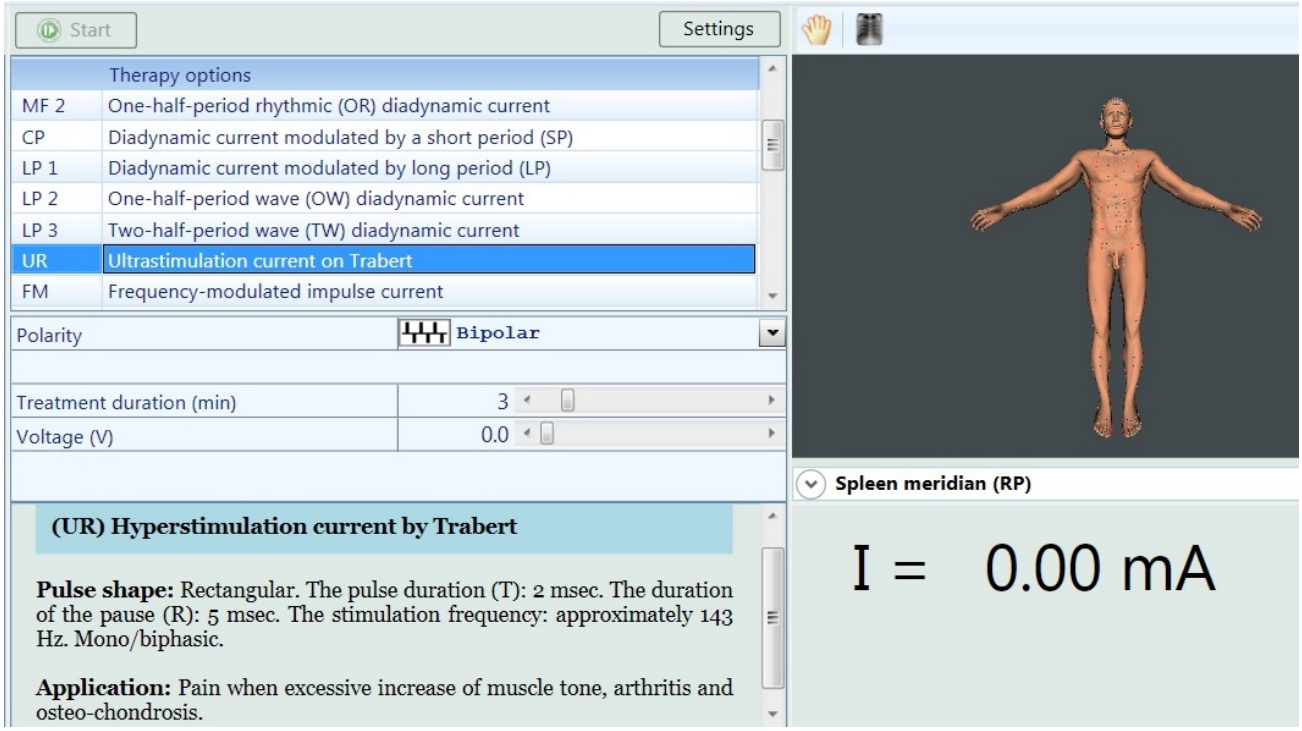
Select the **Treatment** tab. Select the **Electrical physiotherapy** item in the **Therapy** menu.



Click the **Settings** button. Choose the output for therapy on the front panel of the *Medscanner* ("BAP" (diagnostic), "Head", "Hands" or "Feet). LEDs are lighted up above the corresponding sockets on the front panel. Choose a program action in case of activation of overcurrent protection of the *Medscanner* (either stop therapy or continue after a certain amount of time). Connect the patient wires to the appropriate sockets on the front panel of the *Medscanner*, connect plugs to electrodes.



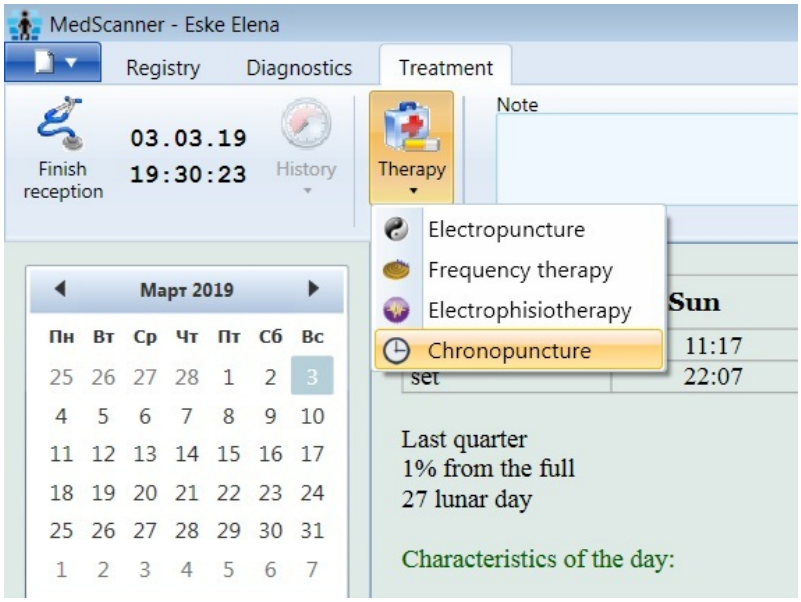
Select the needed item on the list of therapy methods. Make necessary physiotherapy settings and set a duration of a therapy session.



Place corresponding electrodes on a patient's body and click the **Start** button. Smoothly increasing amperage by the slider, achieve required value for the therapy. The sense of discomfort or burning in a patient should be avoided. Wait for the end of therapy.

CHRONOPUNCTURE

The Chronopuncture module is intended for recommendations about conducting of the zhen jiu therapy in certain days depending on lunar, Jupiter and solar calendar, as well as patient location (coordinates on the surface of the Earth).



In ancient times, special attention was paid to understanding of impact of space on the human body. No one was ever allowed to heal living beings without understanding and knowledge of aspects of astronomy and cosmology. In ancient China a lunar calendar was developed and implemented. Instructions, restrictions and preferences in regards to conducting of the zhen jiu therapy were determined under that calendar. Besides, 60-phase luni-solar calendar was invented. It is largely used for calculation of opening and closing time of biologically active points.

In ancient times people also could tell time at night by the northern Plough location. According to its location, people in ancient China determined a direction of the heaven Qi flow. The ability to work with energy was given particular emphasis in zhen jiu therapy and massage. Primarily, a skill to feel the Qi was taken into account, as well as understanding of a direction of the energy flow, considering eight sides of horizon at different times of day and at different seasons. Therapist position (his/her hands and back) in regards to direction of the heaven Qi flow allowed carrying out the high-quality correction of Yin (Earth) and Yang (Space) energies of a patient. It also allowed a therapist to save his/her own energy and achieve an optimal restoration of the body functions in a short time. Thus, the Big Dipper plays a role of the indicator of space and time. It indicates the changes of Yin and Yang energies during one day and a year, that is important to consider for practical and creative activities.

The program calculates the following day characteristics that may be required for practice:

- time of sunrise and sunset
- time of moonrise and moonset, lunar day characteristics
- a possibility of solar or lunar eclipse on a particular day
- a day cycle in 60-day cycle according to Chinese calendar calculated for the particular location
- the element of the day

- Heavenly Stem of the day in 10-day cycle according to Chinese calendar calculated for the particular location
- activity time of meridians, considering time of sunrise and sunset
- recommendations on the day according to lunar calendar
- the northern Plough location on a particular day depending on time of day and cardinal directions
- the order and time of antique points opening on a particular day depending on time of sunrise and sunset

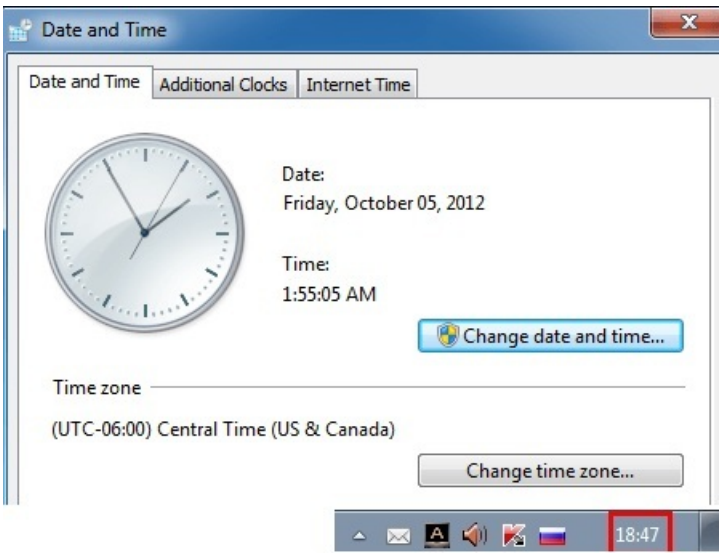
The following methods of open points calculation are provided:

- Method of intercreation of elements (Zi U Liu Zhu)
- Method of combined flows (Liu Zhu)
- Method of one open point (Wai Nei)
- Eightfold method of the Sacred Tortoise (Ling Gui Ba Fa)
- The Eight Methods To Get the Qi To Rise Skywards (Fei Teng Ba Fa)

It should be noted that each of these methods is individual. For practice only one method should be chosen; you should not mix or combine them in your mind.

Working with the program

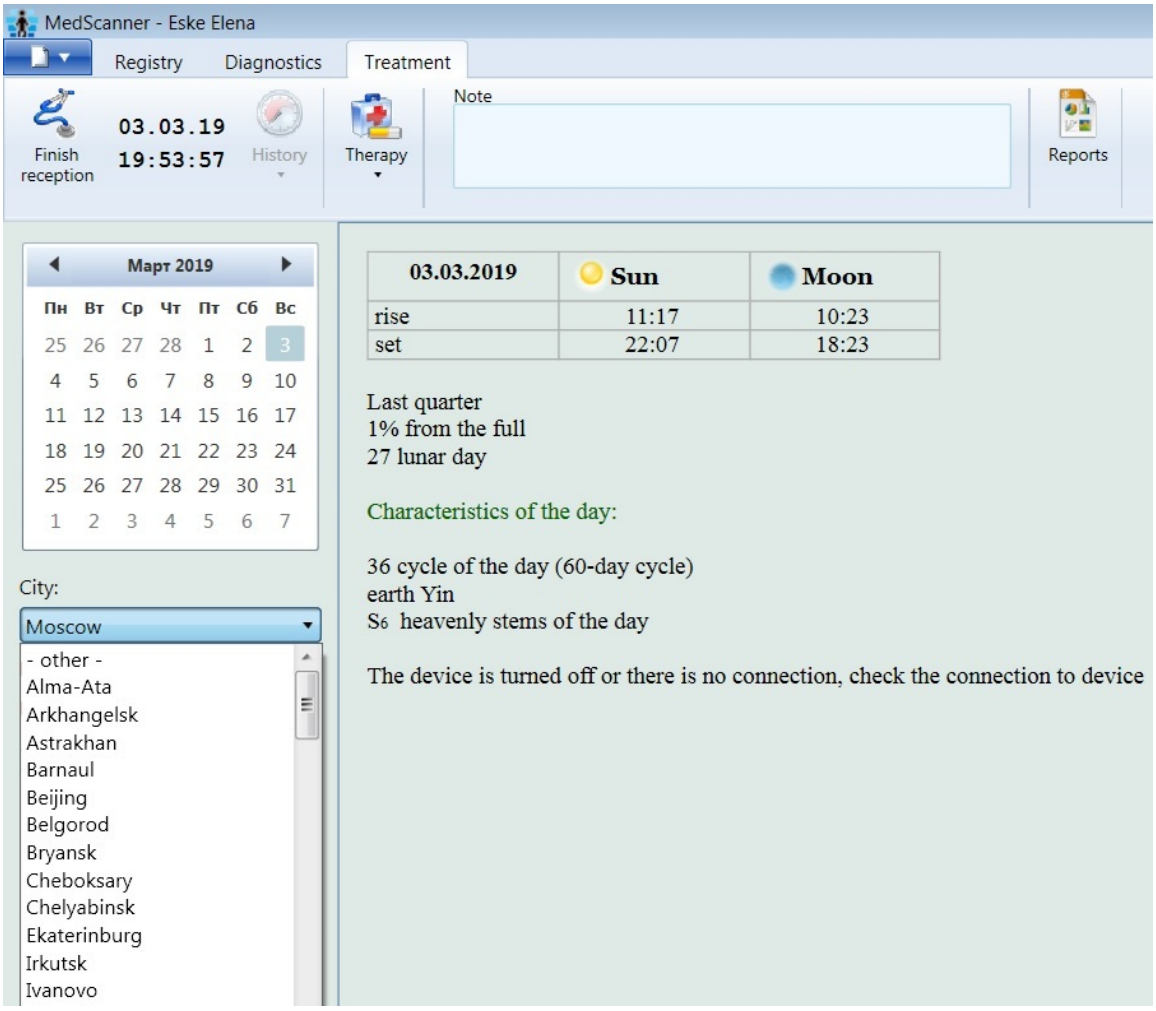
1. It is necessary to set time and time zone in *Windows* system correctly. You can find these settings in the *Windows Control Panel*, in the **Date and Time** section. Click the clock icon in the right bottom corner of the screen with the left mouse button, then click **Change date and time settings**.



Make sure that Time zone settings in the program correspond to your location. Besides, the authorities can change the rules of switching to the summer time, so it is necessary to follow updates of operating system relating to the summer time switching. The latest updates can be downloaded on the site of *Microsoft*: http://support2.microsoft.com/kb/2998527

Note. The *Windows XP* operating system is no longer supported, but that does not mean that it is not possible to set it up for correct work. You just need to set GMT Offset parameters (a time zone) correctly. In that case a city name will be different.

2. Select from the list your city where you are. If your locality is absent on the list, select the "-other-" item.



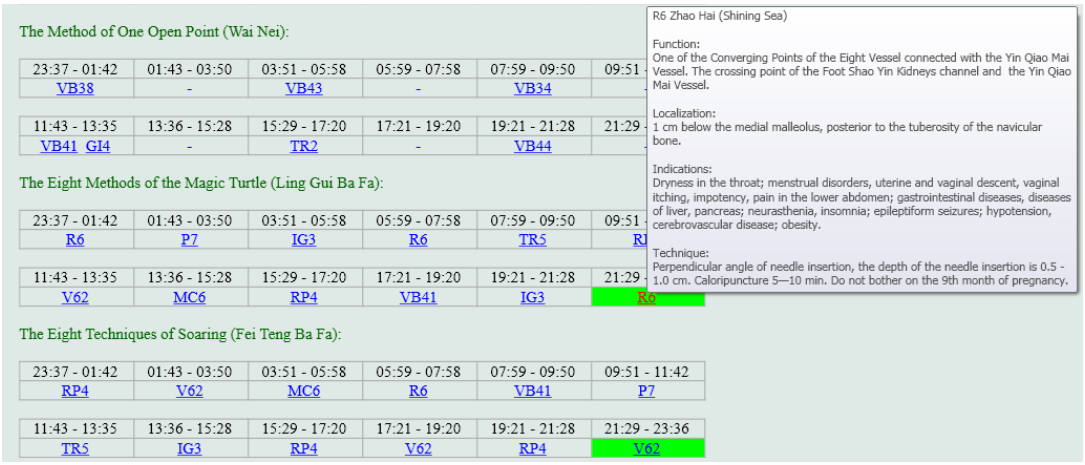
3. If the "-other-" item is selected, it is necessary to enter your coordinates (latitude and longitude) in degrees to within a tenth of a degree.

Manual entry is more preferable because allows more accurate calculation of the open point. For example, coordinates for Moscow are 55 degrees, 8 minutes northern latitude and 37 degrees, 6 minutes east longitude. You can find coordinates on a location map (with some error) or use a GPS navigator. Sometimes the local authorities provide information on municipal web sites. For the Western Hemisphere (for example, Northern America) the longitude coordinates are negative (it is necessary to put a minus sign before number). The program does not display data for the Southern Hemisphere (Ancient Chinese were unaware of its existence).

4. If the *Summer time* box unticked, the program calculates data according to astronomical time. If it is daylight-saving (summer) time in the locality at the day of calculation, you should tick this box to make the time clock corresponding to the program calculation time. As the clocks are switched to summer time differently in different countries (it also can be approved or canceled by the legislature), you should follow the changes on your own.

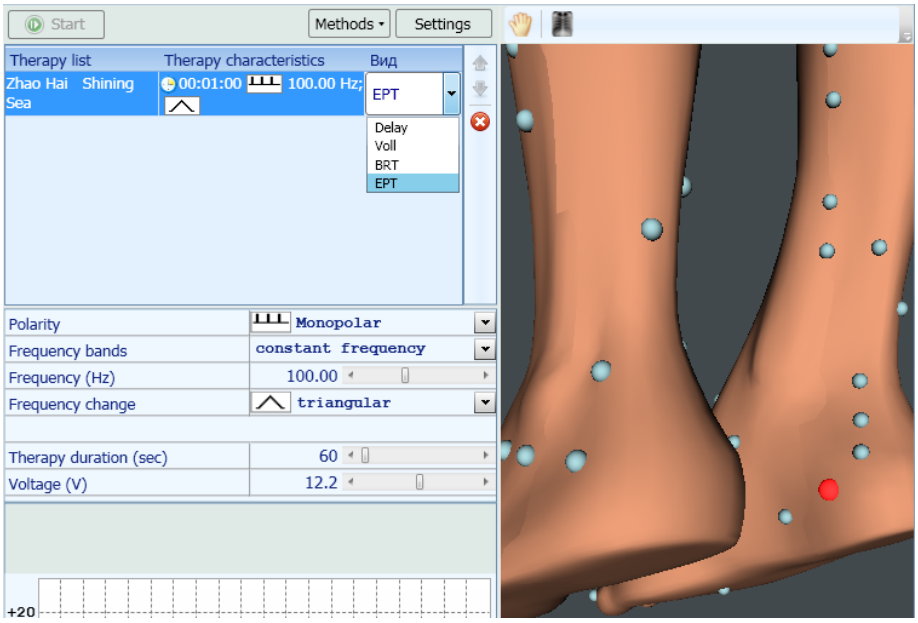
5. Once all settings are selected correctly, the desirable day for calculation in the program calendar should be chosen. After the date is selected, the program displays the day characteristics (sunrise, sunset, moonphase, etc.).

6. An open point is highlighted in the table. If you put the mouse cursor over it, a help tip with the information about acupuncture procedure appears.



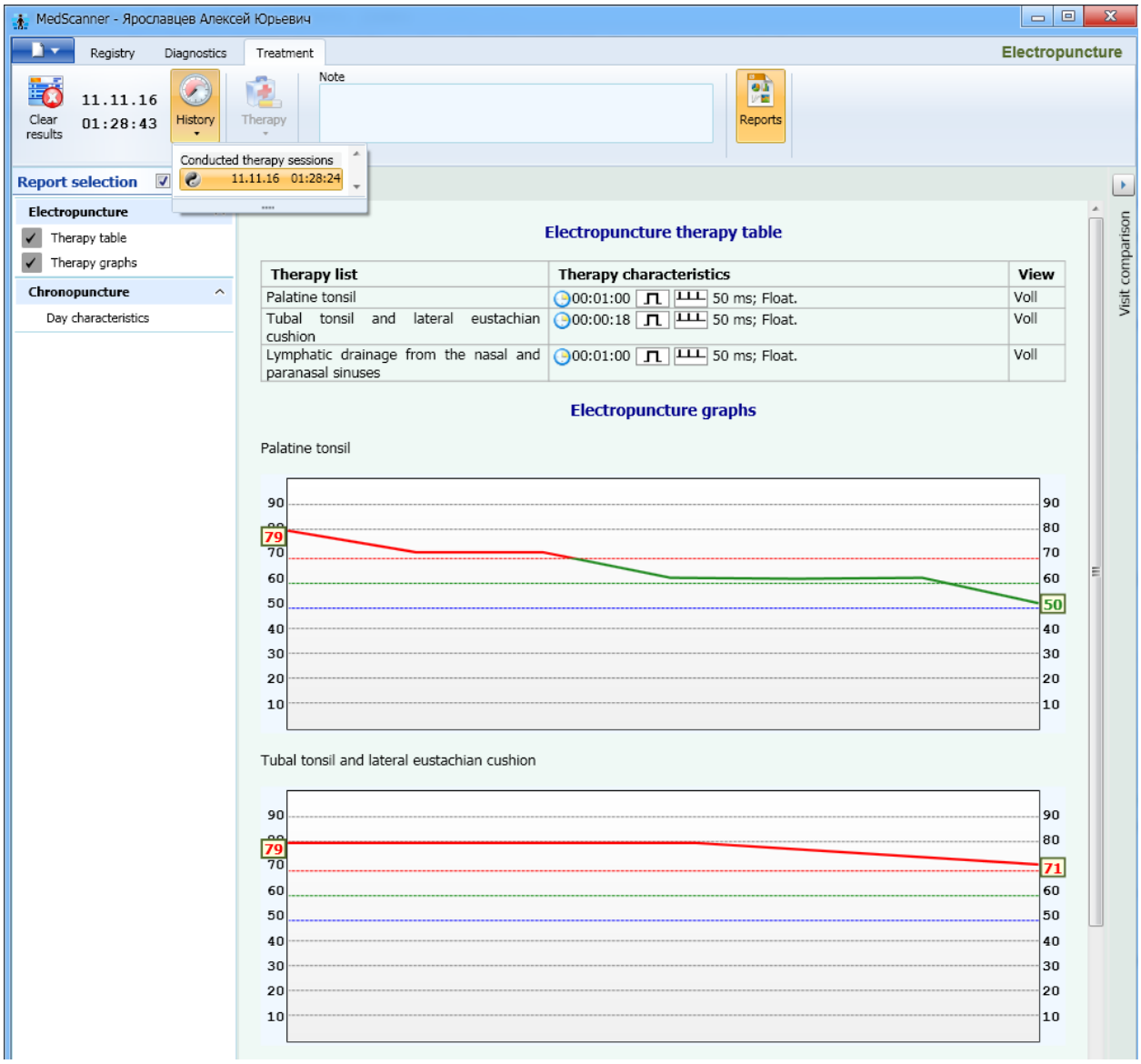
7. To carry out electrotherapy, click the highlighted open point with the mouse button and add it to the therapy list.

8. Then go to the **Therapy** — **Electropuncture** and carry out therapy by any proposed method (electropuncture, BRT or Voll electrotherapy). For more details about this procedure see the **"Electropuncture therapy"** section of the present Manual.

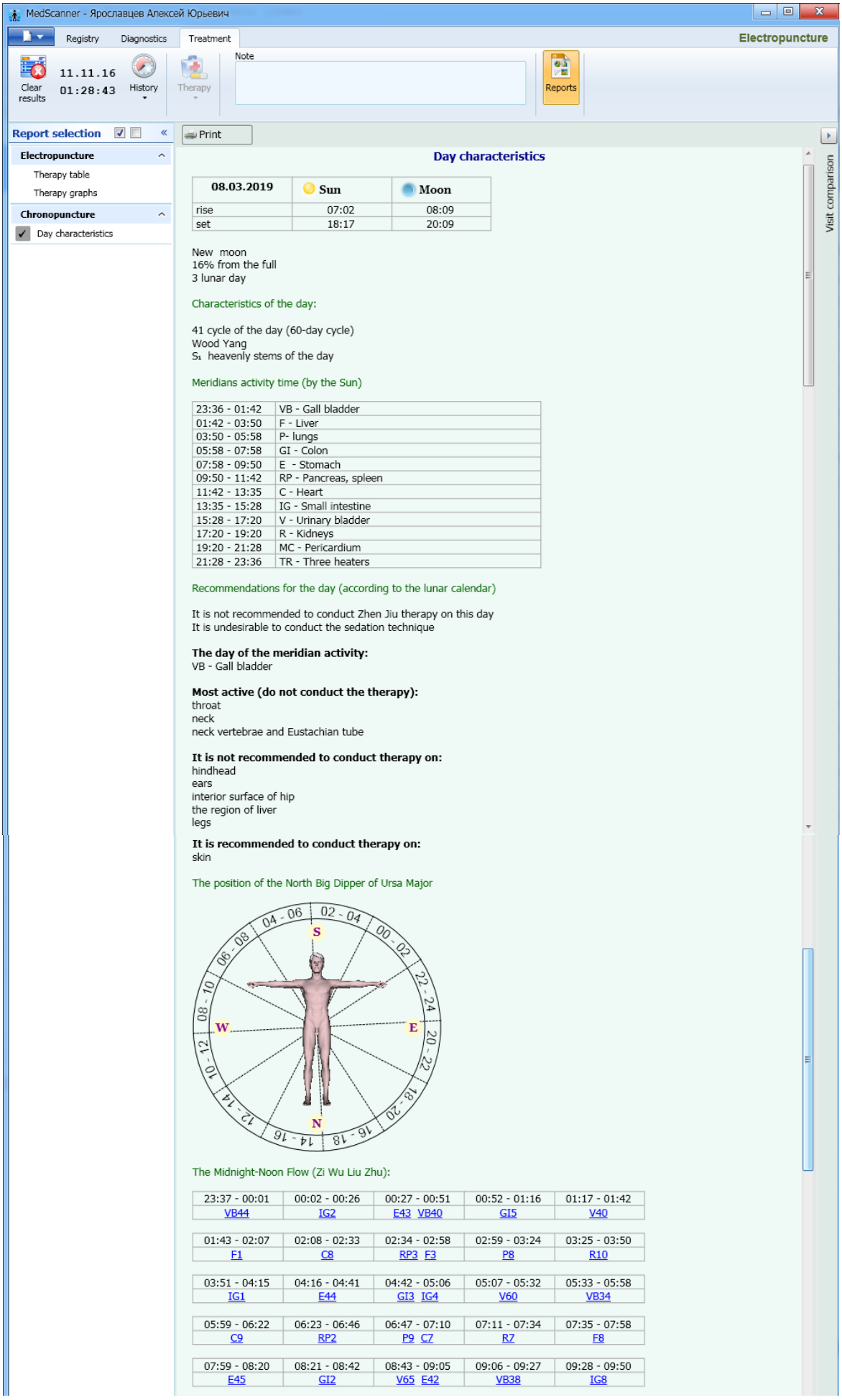


THERAPY REPORTS

To view treatment results, click the **Reports** button. Then click the **History** button, select desirable records in the **Conducted therapy sessions** menu and tick the corresponding reports about therapy conducted.



Attention! Chronopuncture calculation is made only when the *Medscanner BIORS* is connected to computer.


MedScanner - Ярославцев Алексей Юрьевич
Registry
Diagnostics
Treatment
Electropuncture
Clear results
11.11.16
01:28:43
History
Therapy
Note
Reports
Report selection
Electropuncture
Therapy table
Therapy graphs
Chronopuncture
Day characteristics
Print
Visit comparison
Day characteristics
08.03.2019
Sun
Moon
rise 07:02 08:09
set 18:17 20:09
New moon
16% from the full
3 lunar day
Characteristics of the day:
41 cycle of the day (60-day cycle)
Wood Yang
S1 heavenly stems of the day
Meridians activity time (by the Sun)
23:36 - 01:42 VB - Gall bladder
01:42 - 03:50 F - Liver
03:50 - 05:58 P- lungs
05:58 - 07:58 GI - Colon
07:58 - 09:50 E - Stomach
09:50 - 11:42 RP - Pancreas, spleen
11:42 - 13:35 C - Heart
13:35 - 15:28 IG - Small intestine
15:28 - 17:20 V - Urinary bladder
17:20 - 19:20 R - Kidneys
19:20 - 21:28 MC - Pericardium
21:28 - 23:36 TR - Three heaters
Recommendations for the day (according to the lunar calendar)
It is not recommended to conduct Zhen Jiu therapy on this day
It is undesirable to conduct the sedation technique
The day of the meridian activity:
VB - Gall bladder
Most active (do not conduct the therapy):
throat
neck
neck vertebrae and Eustachian tube
It is not recommended to conduct therapy on:
hindhead
ears
interior surface of hip
the region of liver
legs
It is recommended to conduct therapy on:
skin
The position of the North Big Dipper of Ursa Major
S
W
E
N
02 - 04
00 - 02
22 - 24
20 - 22
18 - 20
16 - 18
14 - 16
12 - 14
10 - 12
08 - 10
06 - 08
04 - 06
The Midnight-Noon Flow (Zi Wu Liu Zhu):
23:37 - 00:01 VB44
00:02 - 00:26 IG2
00:27 - 00:51 E43 VB40
00:52 - 01:16 GI5
01:17 - 01:42 V40
01:43 - 02:07 F1
02:08 - 02:33 C8
02:34 - 02:58 RP3 F3
02:59 - 03:24 P8
03:25 - 03:50 R10
03:51 - 04:15 IG1
04:16 - 04:41 E44
04:42 - 05:06 GI3 IG4
05:07 - 05:32 V60
05:33 - 05:58 VB34
05:59 - 06:22 C9
06:23 - 06:46 RP2
06:47 - 07:10 P9 C7
07:11 - 07:34 R7
07:35 - 07:58 F8
07:59 - 08:20 E45
08:21 - 08:42 GI2
08:43 - 09:05 V65 E42
09:06 - 09:27 VB38
09:28 - 09:50 IG8

EMC DECLARATION
(FOR ALL EMBODIMENTS)

The *Medscanner* requires the use of special measures to provide an electromagnetic compatibility (EMC). The device is supposed to be installed and prepared for use according to the information regarding EMC in operational documentation.

Mobile radio frequency communication devices can affect the operation of the *Medscanner*.

The use of cables other than those delivered by the manufacturer of the *Medscanner* and not presented in the list, may result in increased electromagnetic emission or decreased electromagnetic immunity of the *Medscanner*.

The *Medscanner* should not be used adjacent to or stacked with other equipment. If the adjacent or stacked use is required, the *Medscanner* should be observed to verify normal operation in the configuration in which it will be used.

Table 4. User manual and manufacturer declaration — electromagnetic emission

The *Medscanner* is intended for use in the electromagnetic environments indicated below. The user of the *Medscanner* should ensure that the device is used in such environments.		
Electromagnetic emission test	Complies	Electromagnetic environment — guidelines
Radio frequency interference in accordance with CISPR 11	Group 1	The *Medscanner* only uses radio-frequency energy for its internal functioning. The RF radiation is low and the device is unlikely to interfere with other electronic devices in its vicinity.
Radio frequency interference in accordance with CISPR 11	Class B	The *Medscanner* is suitable for use in any places, including dwelling houses and buildings which are directly connected to public low voltage power supply grids.
Harmonic component of current in accordance with IEC 61000-3-2	Class B	
Voltage fluctuation and flicker in accordance with IEC 61000-3-3	Within limits	

Table 5. User manual and manufacturer declaration — resistance to emitted electromagnetic interference

The *Medscanner* is intended for use in the electromagnetic environments indicated below. The user of the *Medscanner* should ensure that the device is used in such environments.			
Immunity test	Test level in accordance with IEC 60601	Agreed level	Electromagnetic environment — instructions
Electrostatic discharge (ESD) according to IEC 61000-4-2	±2 ±4 ±8 kV — air ±2 ±4 ±6 kV — contact	±2 ±4 ±8 kV — air ±2 ±4 ±6 kV — contact	The ground should be wood, concrete or covered with ceramic tiles. If the floor is covered with synthetic material, the relative air humidity should be at least 30%.
Fast electrical transient/burst according to IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	The main power supply quality should be equivalent to that of a typical business or hospital environment.
Surges according to IEC 61000-4-5	±0,5 ±1 ±2 kV for line-to-ground surges ±0,5 ±1 kV for line-to-line surges	±0,5 ±1 ±2 kV for line-to-ground surges ±0,5 ±1 kV for line-to-line surges	The main power supply quality should be equivalent to that of a typical business or hospital environment.
Voltage drops, temporary interruptions and fluctuations of the supply voltage in accordance with IEC 6100-4-11	Voltage drops: U < 5% for ½ cycle (10 ms); U = 40% for 5 cycles (100 ms); U = 70% for 25 cycles (500 ms) Temporary interruptions: U < 5% for 250 cycles (5000 ms) (U is the test level (%) of the mains alternating voltage prior to surge application)	Voltage drops: U < 5% for ½ cycle (10 ms); U = 40% for 5 cycles (100 ms); U = 70% for 25 cycles (500 ms) Temporary interruptions: U < 5% for 250 cycles (5000 ms)	The main power supply quality should be equivalent to that of a typical business or hospital environment.
Power frequency (50/60 Hz) magnetic field in accordance with IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic field should be equivalent to the typical values found in a business or hospital environment.
N o t e: U_T is the mains alternating voltage prior to application of the test level.			

Table 6. User manual and manufacturer declaration — immunity to interference

<table>
<tr><td colspan="4">The Medscanner is intended for use in the electromagnetic environments indicated below. The user of the Medscanner should ensure that the device is used in such environments.</td></tr>
<tr><td>Immunity test</td><td>Test level in accordance with IEC 60601</td><td>Agreed level</td><td>Electromagnetic environment — guidelines</td></tr>
<tr><td>Conducted disturbances induced by RF fields in accordance with IEC 61000-4-6</td><td>3 V (root mean square)</td><td>3 V (root mean square)</td><td>Portable and mobile radio sets should not be used any closer to any component of Medscanner including cables than the recommended separation distance calculated using the relevant emitter frequency equation.
Recommended separation distance:
$d = 1{,}2\sqrt{P}$</td></tr>
<tr><td>Emitted radio frequency electromagnetic field in accordance with IEC 61000-4-3</td><td>3 V/m in the band of between 80 MHz and 2.5 GHz</td><td>3 V/m</td><td>$d = 1{,}2\sqrt{P}$
(80–800 MHz)
$d = 2{,}3\sqrt{P}$
(between 800 MHz and 2.5 GHz)

The field strength of stationary radio frequency transmitters should be less than the agreed level[b] for all frequency bands according to a test carried out locally[a].
Interference may occur in the vicinity of equipment marked with the following symbol:
  </td></tr>
<tr><td colspan="4">[a)] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast, and TV broadcast cannot be predicted theoretically with accuracy.
To access the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Medscanner is used exceeds the applicable compliance level, the Medscanner should be observed to verify its normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Medscanner.
[b)] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 1 V/m.

N o t e s
1. At 80 MHz to 800 MHz, the higher field strength value applies.
2. These guidelines may not be applicable in all cases. The propagation of electromagnetic waves is influenced by absorption and reflection from structures, objects and people.</td></tr>
</table>

Table 7. Recommended separation distances for between Portable and Mobile RF Communications equipment and the *Medscanner*

The *Medscanner* is intended for use in an electromagnetic environment in which radiated RF disturbances are monitored. A user of the *Medscanner* can help prevent electromagnetic interference by maintaining a minimum distance between the portable/mobile RF communications devices (transmitters) and the *Medscanner* as recommended below; this minimum distance is determined by the maximum output power of the communications device.			
Maximum rated output power of transmitter, W	Separation distance according to frequency of transmitter, m		
	d = 1.2 P within a band of between 150 kHz and 80 MHz	d = 1.2 P within a band of 80–800 MHz	d = 2.3 P within a band of between 800 MHz and 2.5 GHz
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

Notes

1. At 80 MHz to 800 MHz, the higher field strength value applies.
2. These guidelines may not be applicable in all cases. The propagation of electromagnetic waves is influenced by absorption and reflection from structures, objects and people.
3. For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

GUARANTEE OBLIGATIONS
(FOR ALL EMBODIMENTS)

1. The manufacturer guarantees quality conformance to the requirements of the performance specifications if a user observes the safety rules and meets conditions of proper operation, storage and servicing. Guarantee service life is 12 (twelve) months from the date of shipping to ultimate consumer.

2. In the absence of date of purchase in the Passport, warranty period is calculated from the date of manufacture.

3. During the warranty period the manufacturer undertakes to repair or replace a damaged *Medscanner* device at no charge.

4. The guarantee does not cover consumer packaging (case with rigid frame), cables, wires, electrodes, sensors and other expendable patient-contacting materials.

5. The warranty is considered as no longer valid in following cases:

- In case the repair was made by non-affiliated, non-authorized companies or individuals;
- In case of unauthorized changes of the structural design of the *Medscanner*.
- If a user does not observe the safety rules, operation and storage conditions described in the Passport and/or in the present User Manual;
- If the factory seals on the *Medscanner* housing are broken;
- In case of external mechanical, chemical and other damages of the *Medscanner* or individual components caused by a customer;
- Absence of manufacturer's stamp and the date of manufacture in the Passport.