BIORS

HSC Bioscanner Wellness automatic report

17.07.2019

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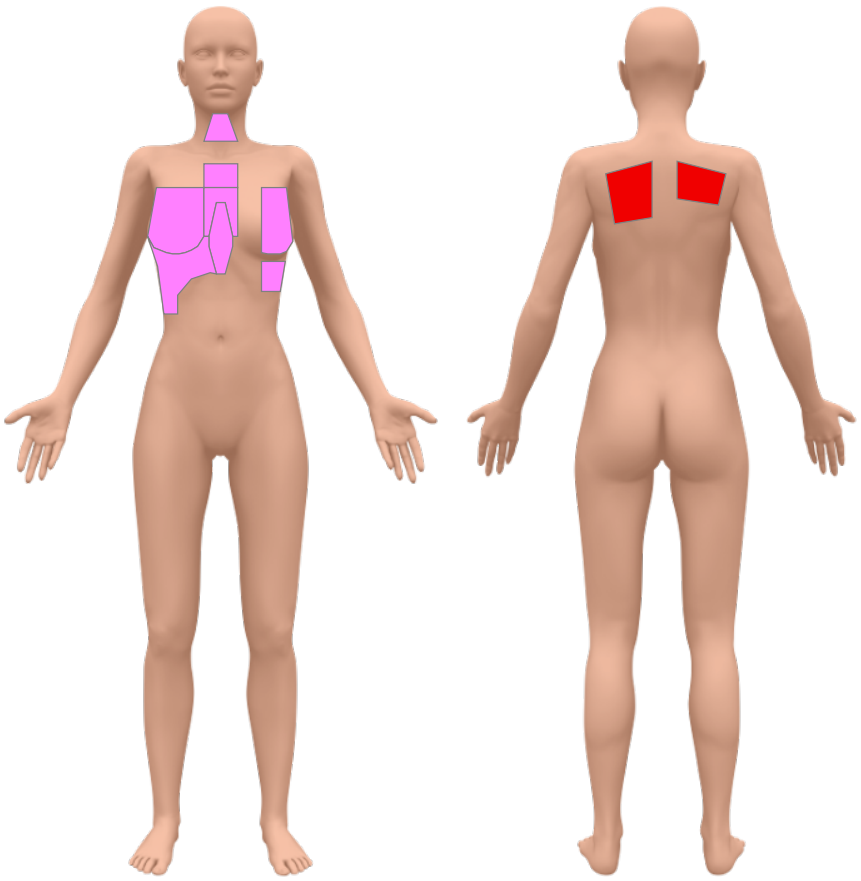
Age: 26

Attention! The obtained automatic reports are not a reason for the establishing clinical diagnosis. In case the stable abnormalities are revealed it is necessary to see a doctor for the detailed examination.

Electrosomatogram

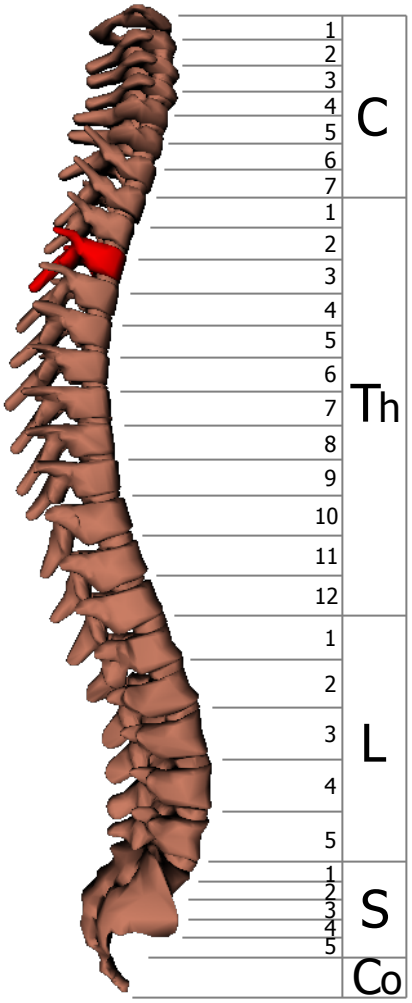


- overstrain
- stress state
- hyperactivity
- normal range
- fatigue
- over-fatigue
- body reserve depletion

☑ Show only areas with deviations from the norm

Target zones	
45%	Superior lobe of left lung region
35%	Superior lobe of right lung region
27%	Right breast region
27%	Left breast region
27%	Liver region
14%	Thyroid region
8%	Spleen region

Lesions in spine



	Probable symptoms
Th 3	Bronchitis, asthma, pleuritis, pneumonia

hyperactivity
fatigue

Assumed pathology

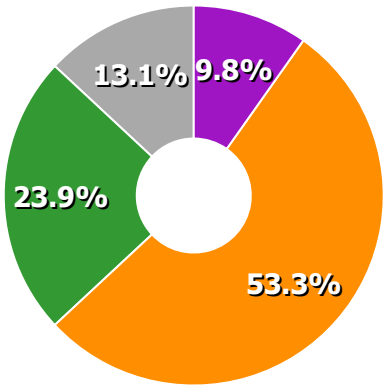
Pneumosclerosis. Mastopathy. Steatohepatitis.

Measurement table of bioimpedance

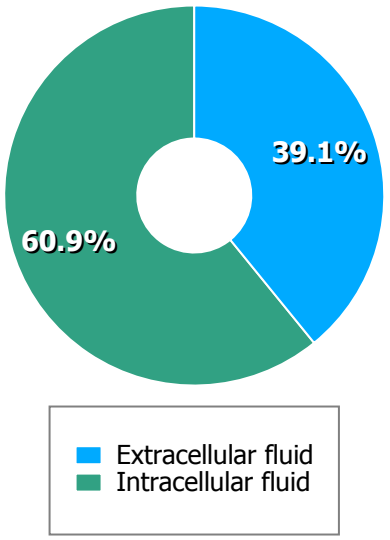
	50000 Hz
Right hand - Right foot	
Left hand - Left foot	R 586 Xc 98

Parameter	Value	Normal value
Height (cm)	168	
Weight (kg)	49	
Waist circumference (cm)	65	
Hip circumference (cm)	98	
Body mass index (kg/m2)	17.4	19.5 - 26.0
BMI classification	Underweight	
Waist-hip ratio	0.66	0.60 - 0.85
Phase angle (degree)	9.52	5.64 - 8.55
Fat mass (kg)	4.8	12.3 - 19.9
Proportion of fat mass (%)	9.8	25.2 - 40.5
Lean body mass (kg)	44.2	42.4 - 62.4
Cell mass (kg)	26.1	27.5 - 38.3
Proportion of cell mass (%)	59.0	50.0 - 56.0
Skeletal muscle mass (kg)	22.5	11.9 - 14.8
Proportion of skeletal muscle mass (%)	50.9	26.9 - 33.6
The total liquid (kg)	29.9	30.5 - 34.2
Extracellular fluid (kg)	11.7	7.4 - 11.3
Intracellular fluid (kg)	18.2	19.2 - 26.8
Basal metabolism (kcal/day)	1379	

Body mass distribution



Body fluid distribution



Calculation of body composition

	Deficiency	Normal value	Overage
Body mass index (kg/m2)	19.5	26.0	17.4
Waist-hip ratio	0.60	0.85	0.66
Phase angle (degree)	5.64	8.55	9.52
Fat mass (kg)	12.3	19.9	4.8
Proportion of fat mass (%)	25.2	40.5	9.8
Lean body mass (kg)	42.4	62.4	44.2
Cell mass (kg)	27.5	38.3	26.1
Proportion of cell mass (%)	50.0	56.0	59.0
Skeletal muscle mass (kg)	11.9	14.8	22.5
Proportion of skeletal muscle mass (%)	26.9	33.6	50.9
The total liquid (kg)	30.5	34.2	29.9
Extracellular fluid (kg)	7.4	11.3	11.7
Intracellular fluid (kg)	19.2	26.8	18.2

Explanations corresponding to the calculated values

Body mass index (kg/m2) BMI is a weight to height ratio of a person. This value makes it possible to evaluate how well these measures relate to each other. It is used for the assessment of obesity or cachexia level. The body shape and bone tissue thickness have direct impact on BMI. The same BMI value (depending on the availability/ conditional absence of muscle mass) can relate to a person of solid build/obese or athletically built/fit person.
Observed value: 17.4 *kg/m2 (Normal range: 19.5 - 26.0 kg/m2)*

Phase angle (deg) It can be considered as a score of muscle tissue state and performance capability as well as a score of metabolic activity. Healthy people are characterized by phase angle score in the upper range of the interval of allowed values. When the person is healthy, high values point to the good state of cell membranes as well as high activity and high proportion of musculoskeletal mass. Sick people (especially with chronic illnesses) are characterized by phase angle score in the lower range of the interval of allowed values. As a general rule, the lower the values, the more unfavorable prognosis for a disease.
Observed value: 9.5 *deg (Normal range: 5.6 - 8.6 deg)*

Fat mass (kg) The total mass of the body fat cells. Standard levels of the body fat mass are varied between men and women. Normal levels are defined depending on height and age. Too high proportion of fat mass results in the negative changes of metabolism, which make further fat gain easier. Guarding health and body shape throughout a long period of time is only possible when values are set in the normal range. Each kilogram of fat is about 7000 kcal. Such a high level of energy explains why it is much harder to degrade fat than muscle mass (1100 kcal per kilogram).
Observed value: 4.8 *kg (Normal range: 12.3 - 19.9 kg)*

Lean body mass (kg) The part of the body mass including all tissues which are not fat: muscles, all organs, the brain, nerves, bones and all body fluids.
Observed value: 44.2 *kg (Normal range: 42.4 - 62.4 kg)*

Cell mass (kg) This part of the lean body mass depends on the age, height and genetic characteristics. Body cell mass includes muscles, organs, the brain, and nervous cells. Therefore fat degradation and maintenance of cell mass (fat loss occurs in this particular tissue) are very important aspects of weight loss. Cell mass loss is a main reason of failure with maintaining the weight loss because the progress is hindered after the first successes. Consequently, it is necessary to keep an adequate nutrition of the cell mass. The proteins should be included in the diet. They are 'building blocks' for all the body cells, enzymes, hormones. Exceptionally proteins can be a source of energy. The body constantly needs proteins because it is essential for the cell mass maintaining. Dietary fats are the source of fat-soluble vitamins A, E, K, D, essential fatty acids, lecithin. The fats are vital source of energy. The fats are part of cells and cell organelles, they are involved in the metabolic processes. Normal proportion of body fat is an important condition of a good health, performance capability, and well-being. Excess of dietary fat can be a threat of liver and pancreas illnesses, obesity, atherosclerotic vascular disease, cholelithiasis. Carbohydrates are the source of energy for all body cells. They form certain enzymes, hormones and other biologically important compounds when paired with proteins. Complex carbohydrates satisfy the appetite perfectly. Carbohydrate-rich foods are potatoes, whole grains, macaroni products from durum wheat, legumes. When the cell mass gets enough energy from the carbohydrates it helps maintain the basal metabolic rate and calorie intake by the body. Simple carbohydrates (sugars) are contained in sweets, juices, honey, fruits. You should eat them only as an addition to complex carbohydrates, in limited quantities.
Observed value: 26.1 *kg (Normal range: 27.5 - 38.3 kg)*

Proportion of cell mass (%) Too low or too high percentage of body cell mass leads to esurience. Low percentage of cell mass can point to malnutrition.
Observed value: 59.0 *% (Normal range: 50.0 - 56.0 %)*

Skeletal muscle mass (kg) It is the measure of body's adaptive reserve.
Observed value: 22.5 *kg (Normal range: 11.9 - 14.8 kg)*

The total liquid (kg) Total body water includes intracellular and extracellular fluid.
Observed value: 29.9 *kg (Normal range: 30.5 - 34.2 kg)*

Extracellular fluid (kg) The part of the total body water. The fluid outside the cells (blood, lymph, spinal and synovial fluid).
Observed value: 11.7 *kg (Normal range: 7.4 - 11.3 kg)*

Intracellular fluid (kg) The part of the total body water. The fluid inside the human cells.
Observed value: 18.2 *kg (Normal range: 19.2 - 26.8 kg)*

Basal metabolism (kcal/day) This is the amount of energy required to sustain the body's vital functions while resting in a neutrally temperate environment when the digestive system is inactive. It reflects how much energy the body spends for the constant activity of the heart, kidneys, liver, breathing muscles and some other organs and tissues. The heat energy released during metabolism is spent on maintenance of the constancy of body temperature.
Observed value: 1379.0 *kcal/day (Normal range: 1322.9 - 1946.9 kcal/day)*

Recommendations

Diagnosis	Underweight
Main risks	Systemic dystrophic changes, dystrophic changes of certain internal organs with further emergence of organ dysfunction. 1. Immunodeficiency (decrease in anti-infectious and antitumor immunity) 2. Hormonal dysregulation of the body including fertility. 3. Disturbances in mineral metabolism (including decrease in the density of the bones with further emergence of osteoporosis). 4. Protein malnutrition leading to enzyme deficiency and disturbance of biochemical reactions which results in insufficient formation of synthesis products, energy failure and metabolite excess. All of that even greater slows down metabolism and sometimes can have toxicological effects.
Suggestion	 It is necessary to take vitamin C supplements together with iron rich foods due to the need for converting ferric iron (Fe3+) into the ferrous form (Fe2+) which is more easily absorbed.  Calcium and phosphorus rich foods should be included in the diet at presence of disturbances in calcium and phosphorus metabolism.
Recommendations	High-calorie protein and carbohydrate diet. Proteins 120-140 g/day  Animal proteins (poultry meat: chicken, turkey meat; beef; egg white) - 70%.  Adding carbohydrates to the diet - 400-500 g (easily digested carbohydrates as sugar, jam or honey in small amounts as well as confections excluding cakes with fatty cream). Fats 100-110 g (1/3 of them are foods of plant origin).  All foods in boiled, stewed, baked form. It's possible to use appetite-stimulating foods (broth, bitter principles).

Folates should be included in the diet: green leaf vegetables (spinach, brussels sprouts, broccoli, asparagus), french bean, avocado, cauliflower, fresh cabbage, oranges and fresh-squeezed orange juice, wheat germs as well as B and C vitamins.

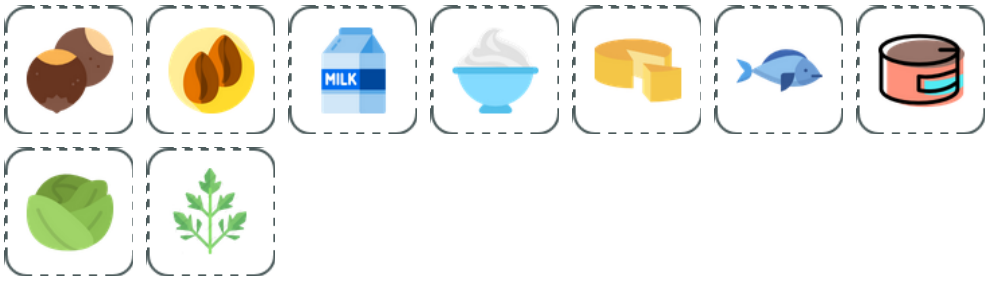
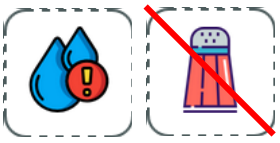
B1: whole-meal bread, nuts, asparagus, corn, kidney bean, bran, buckwheat, yeast, wheat and barley germs. Note: prolonged heating should be avoided; do not consume together tea, coffee and pastry.

B2: foods of animal origin (milk and dairy products, chicken eggs, fish, cheese, poultry meat; chicken, turkey and beef liver), yeast, green vegetables, grains, nuts, whole-meal bread, bananas. Notes: the exposure of foods to direct sunlight should be avoided.

B6: beef, eggs, nuts, poultry meat, whole-meal bread, bananas, cabbage, green pepper, fish, milk. Notes: pyridoxin is destroyed by any alcoholic beverage.

C: dried rosehips, barberry, sea buckthorn berry, black currant, honeyberry, sweet green pepper, parsley.

B12: seafood, cheese, soya bean, poultry meat, fish, liver, kidneys, meat (beef, heifer beef), yeast, and wheat germs.

	Iron rich foods should be included in the diet (if there are signs of the iron-deficiency anemia). Foods of animal origin: duck, veal, pork, chicken, beef liver (in descending order). Foods of plant origin: wheat bran, pumpkin seed, sesame, leguminous, flaxseed, pistachio, chanterelle mushrooms. Calcium and phosphorus rich foods should be included in the diet at presence of disturbances in calcium and phosphorus metabolism.  Calcium: nuts and seeds (poppy seed, sesame seed, almonds); dairy products (cottage cheese, milk, yogurt), hard cheese (it helps to improve the tooth enamel remineralization); seafood: fish (canned sardine, salmon, mackerel), vegetables (basil, parsley, leaf celery, white cabbage).  Phosphorus: hard cheese, kidney bean, oat, pearl barley, beef liver, cottage cheese, chicken, codfish, herring, perch, mackerel, beech wheat, pea, millet. Splitting meals should be used (small frequent meals) due possible intestinal mucosal atrophy and impaired intestinal absorption.
Additionally	 It is necessary to undergo a medical examination urgently (thyroid, liver, and renal function tests) and visit a physician for low active cell mass.  Salt consumtion should be reduced to a minimum. It is necessary to avoid of adding more salt to ready-made foods and salt consumption in its pure state. Evaluation of the probability of developing heart diseases and urinary system pathology should be made.  Proper state of hydration of the body should be made (increase in water intake, restoration of water and electrolyte balance) due to the dehydration (lack of water in the body), pre-coagulant state. It is necessary to eliminate the causes of dehydration (fluid loss). Higher metabolic rate against the background of the increasing physical activity.

Indices of heart rate variability

	Indicators of cardiac rhythm		Normal value	
HR	Heart Rate	67.9	60.0 - 85.0	bpm
mRR	Mean value of RR intervals	883	700 - 1000	ms
sdRR	Standart deviation	59.3	40.0 - 90.0	ms
RMSSD	The root mean square deviation of RR-intervals	55.2	30.0 - 65.0	ms
pNN50	The ratio of pairs of RR-intervals (>50 ms) to the number of all RR-intervals	40	2.0 - 30.0	%
VAR	The coefficient of variation	6.7	3 - 8	%
Mn	The minimum value of the length of the RR-interval	751	700 - 1000	ms
Mx	The maximum value of the length of the PR-interval	1006	700 - 1000	ms
MxDMn	The Difference Mx-Mn	255	150 - 300	ms
Mo	Mode	890	700 - 900	ms
Amo	Amplitude mode	30	30 - 50	%
SI	Stress index	66.1	50.0 - 200.0	conv.un.
TP	Total power	3990	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	535	355 - 1175	ms2
LF	Low-frequency power in domain HRV spectrum	1341	754 - 1586	ms2
HF	The power of a high frequency domain HRV spectrum	2114	772 - 1178	ms2
LF/HF	The power ratio of the low - and high-frequency domains	0.6	0.5 - 2.0	conv.un.
VLFmx	The maximum power of the waves range VLF	36.8	-	ms2
LFmx	The maximum power of the waves range LF	29.6	-	ms2
HFmx	The maximum power of the waves range HF	22.3	-	ms2
VLFav	The average power of the waves range VLF	44.6	-	ms2
LFav	The average power of the waves range LF	40.6	-	ms2
HFav	The average power of the waves range HF	27.8	-	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	300.4	-	sec
LFt	The dominant period component LF	9.1	-	sec
HFt	The dominant period component HF	3.6	-	sec
VLF%	The relative value of the power of the waves range VLF	13	17 - 40	%
LF%	The relative value of the power of the waves range LF	34	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	61.2	40 - 59	n. u.
LFnu	The relative value of the power of the waves range LF in normalized units	38.8	41 - 60	n. u.
(LF/HF)nu	The ratio of LFnu to Hfnu	0.6	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	0.3	0.3 - 1.5	conv.un.
VB	The index of autonomic balance	0.6	0.6 - 2.0	conv.un.
IARS	The activity index of regulatory systems (IARS)	2	0 - 2	conv.un.
SPO2	Level of blood saturation	96	94 - 99	%

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. Low hormonal modulation of regulatory mechanisms. Adaptive capacity of the organism increased (good level of fitness, provisioning adaptation).

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	

Adaptation level is high. The autonomic regulation is normal. The optimal energy supply of the body. The level of the psycho-emotional activity is high. Health status is normal.

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.

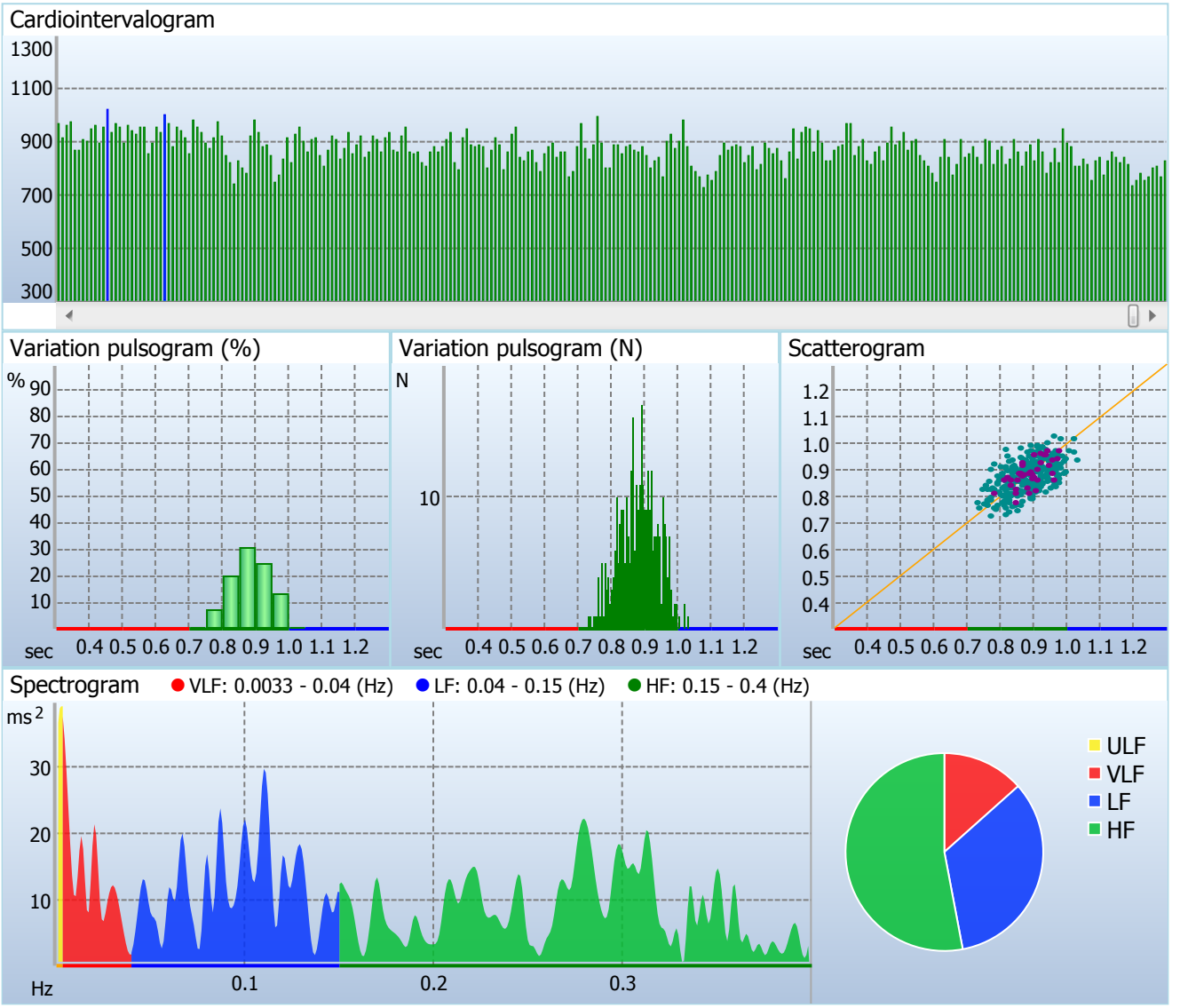
The organism constantly adapts to the changes of internal or external environment. When there is an additional load (stress) it is required to use (mobilize) so-called functional reserves, i. e. increase energy expenditure. The high level of body functional capabilities relates to the slight stress of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

Low level of hormonal modulation of regulatory mechanisms points to the low involvement of hormones in the nervous regulation. Hormones are essential body resources so the low level of hormone involvement means that the nervous system works enough well. It relates to the high level of body adaptation.

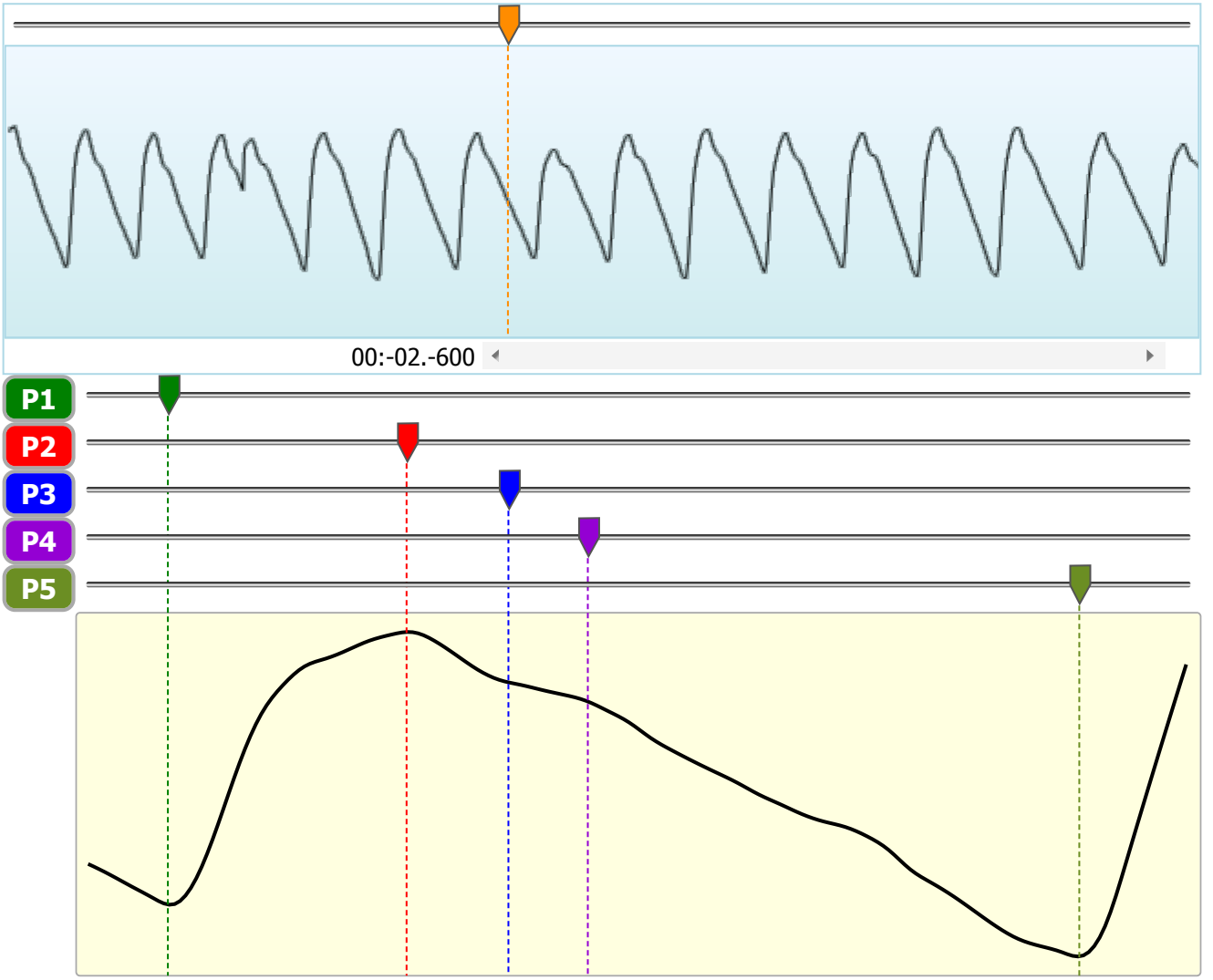
The organism adapts to the changes of internal or external environment by nervous system with the involvement of hormones produced by endocrine glands. For example, adrenal glands produce stress hormone adrenaline, thyroid produces thyroid hormones etc.

Low level of hormonal modulation of regulatory mechanisms relates to the good level of physical training and the adequate level of functional resources.

Graphical view of heart rate variability



Photoplethysmogram



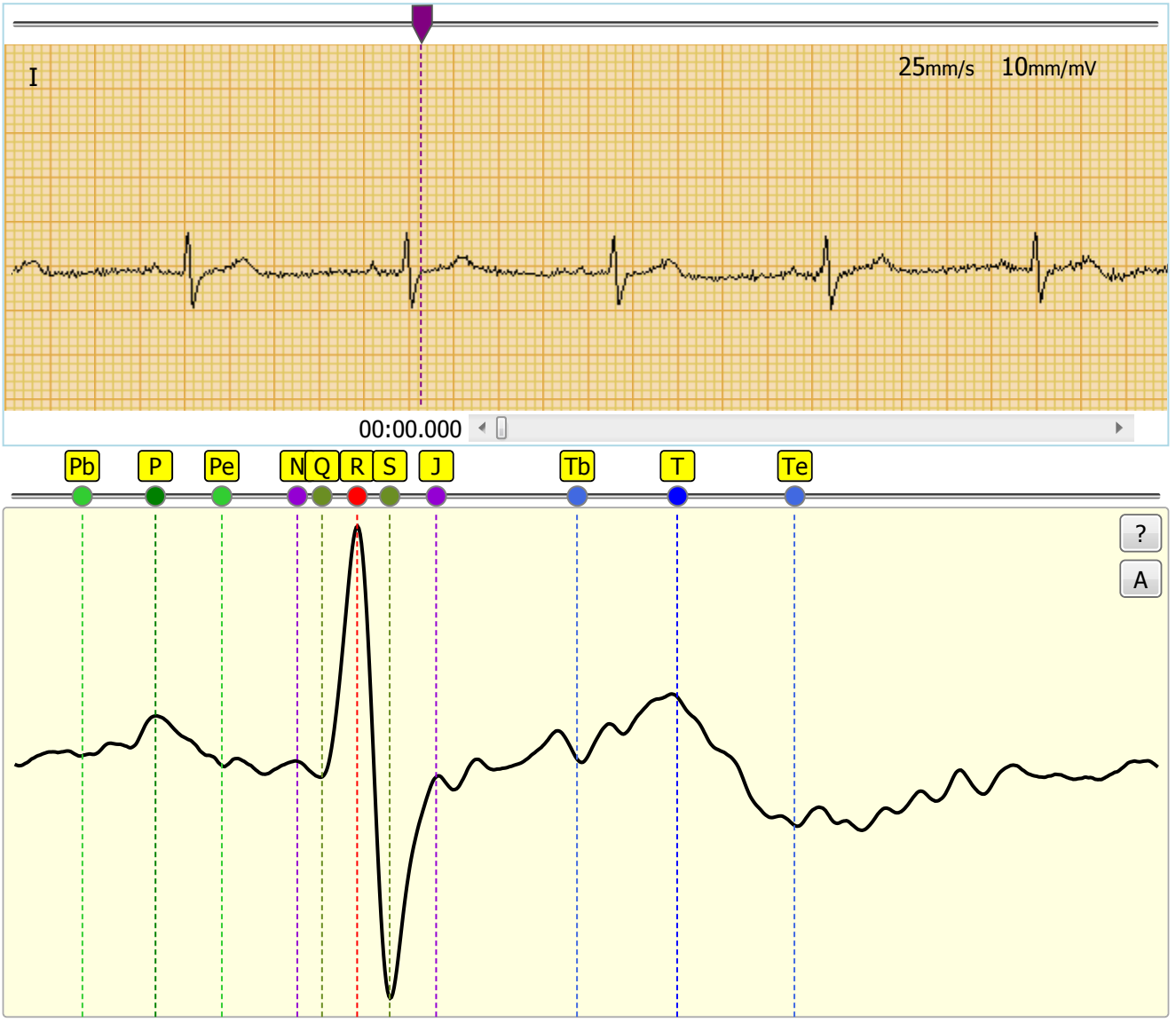
	Photoplethysmogram parameters		Normal value	
APW	Amplitude of Pulse Wave	0.83		conv.un.
ADW	Amplitude of Dicrotic Wave	0.78	0.42	conv.un.
HI	Height of Incisura	0.84	0.56	conv.un.
IDW	Index of Dicrotic Wave	● 100	60 - 75	%
DAP	Duration of Anacrotic Phase of pulse wave	315		ms
DDP	Duration of Dicrotic Phase of Pulse Wave	525		ms
DPW	Duration of Pulse Wave	840	700 - 1000	ms
IAW	Index of Anacrotic Wave	26	15 - 30	%
DF	Duration of Filling	● 220	60 - 200	ms
DS	Duration of the systolic phase of cardiac cycle	385	350 - 550	ms
DD	Duration of the diastolic phase of cardiac cycle	455	400 - 600	ms
DBW	Duration of Backward Wave	● 165	200 - 400	ms
IS	Index of Stiffness	● 10.2	5 - 9	1/s
IBW	Index of Backward Wave	● 93	40 - 70	%
HR	Heart Rate	71	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: 10.2 *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: 93.0 *%*

ECG contour analysis



Electrocardiogram parameters		Normal value	
Pulse rate	62	60.0 - 85.0	bpm
Mean duration of RR interval	953	700 - 1000	ms
Minimum duration of RR interval	829	700 - 1000	ms
Maximum duration of RR interval	● 1088	700 - 1000	ms
Electrical axis of the heart	88	0 - 90	deg
Wave P duration	106	< 110	ms
Wave P amplitude	0.07	< 0.2	mV
Duration of PQ interval	164	< 210	ms
Macruz index	● 1.9	1.1 - 1.6	conv.un.
Wave Q duration	27	< 40	ms
Wave Q amplitude	0.03	< 0.10	mV
Duration of QRS complex	● 106	60 - 100	ms
Wave R amplitude	● 0.37	0.5 - 1.5	mV
Wave S amplitude	0.35	< 0.5	mV
Deviation of the beginning of ST segment (J)	-0.03	-0.05 - 0.1	mV
Duration of ST segment	107	-	ms
Deviation of ST segment (J+60)	0.02	-	mV

Wave T duration	167	-	ms
Wave T amplitude	0.15	-	mV
Duration of QT interval	382	< 471	ms
Corrected value of QT interval	0.39	< 0.42	conv.un.

Conclusion:

Sinus rhythm, irregular. HR max = 72 bpm, HR min = 55 bpm. Vertical heart axis.

Sinus rhythm is a normal rhythm.
The vertical position of the electrical axis of the heart can point to asthenic body type.

Macruz index. Ratio of wave P duration to segment PQ duration is called Macruz Index. Normal value of Macruz Index is 1,1-1,6. This index is used in diagnosis of atrial hypertrophy.
Observed value: 1.9 *conv.un.*

Duration of QRS complex. QRS complex is a ventricular complex, that is registered during activation of the ventricles. This is a distance between the beginning of Q wave and the end of the S wave (N and J lines). The width of QRS complex indicates duration of intraventricular activation. Its normal value is 0.06–0.08 (up to 0.1) sec. The width of QRS complex decreases slightly with the heart rate increase and vice versa. QRS complex enlarges in bundle branch blocks, for example.
Observed value: 106.0 *ms*

Wave R amplitude. R wave (the main wave on the ECG) represents a ventricular activation. R wave amplitude in standard and unipolar limb leads depends on the position of the electric axis of the heart.
Observed value: 0.4 *mV*

Risk analysis

	Low	Middle	High
Heart 	25%		
Vessels 	37%		
Central nervous system 	26%		
Respiratory system 	15%		
Digestive system 	28%		
Urinary system 	20%		
Reproductive system 	27%		
Endocrine system 	26%		
Musculoskeletal system 	40%		
Lymphatic system 	15%		
Immune system 	33%		
Peripheral nervous system 	28%		