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J11506-001

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BASED ON THE CONCEPT OF A RATIONAL DIET
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Introduction. Ensuring food production in quantity and range sufficient to sustainable food supply of the population - the task set as Russia priority national projects in the field of agriculture. However, sufficiency and abundance of food does not mean the basic principles of management, proper nutrition in everyday life. In an era of scientific and technological progress due to changes in working and living conditions there is a problem preventing diseases associated with excessive and unsustainable consumption of food and lack of exercise or hypodynamics (physical inactivity). Increasingly, there are diseases that result from metabolic disorders (obesity, diabetes, and others.). Also on the quality and quantity of food consumed affected by the sharp decline in income much of the population of Russia. As a result of increased number of diseases associated with inadequate and low-calorie foods, as well as the respective diets energy costs and the physiological needs of the body. Sustainable food consumption, with the exception of overeating and malnutrition, contributes to better health.

The concept of a rational diet. Rational diet - it's food, sufficient in quantity and in quality fully satisfying energy, plastic and other needs of the body and provides the necessary level of metabolism. One of the basic rules of good nutrition is variety of food, which has a positive effect on its nutritional value, complementing each other missing components.

Efficient power - is, first of all, well-organized and timely supply of the organism is well prepared nutritious and tasty food. Food - it's a habit that can be managed. The formation of this habit is influenced by the following factors:

- Psychological - personal preferences of a particular food, family food traditions, philosophy of life (such as vegetarianism);
- Geographical and environmental - food production and climate, traditional crops;
- Physiological - growth and development of the organism, the degree of movement activity, the need for compliance with the diet for health reasons.

It is important to match the sound power produced by energy consumption and needs of the body. It is known that a miner spends more energy than a programmer, so his food diet should contain more protein, carbohydrates, fats, vitamins and minerals. When you take into account a rational diet tips of nutritionists:

- Do not add to the finished dish an extra portion of oil;
- Prepare steamed vegetables;
- Do not salt vegetables during cooking, do it when they are already on the table;
- Whenever possible, replace butter with olive oil;
- Frequently use oven or grill. Baking - one of the best ways of cooking.

Previously it was thought that the value of the products is in their caloric content. Then priorities have changed, and now increasingly there is talk not only about the relationship of proteins, fats and carbohydrates, but also about the balance

of minerals and vitamins, the need to intake of essential amino acids, polyunsaturated fatty acids, fiber. In dietetics coined the term "rational diet" (from the latin. ratio - «mind, intelligence").

There are three main dietary pyramids. Experts from Harvard University have proposed a new approach to the division of products into groups. For clarity, they built the pyramids. At its base are the foods in the diet which should be the most, and at the top - are those which should be as small as possible.

The structure of the pyramid (from bottom to top):

- 1) grains, cereals, pasta;
- 2) fruits and vegetables (in equal shares);
- 3) meat, chicken, fish, eggs, legumes, nuts, dairy products (in equal shares);
- 4) fats and sweets.

Cereals and grains should occupy 40% of the total amount of food, fruits and vegetables - 20%, meat, poultry, fish - 20%, eggs and milk - 20%. Fats and sweets are suggested to be minimized. Recently, it is proved that the vegetable fats are of undoubted importance for the health, however they must be in the diet. This version of power was approved by the US at the state level, but the attempt to cure people suffering from obesity failed.

Pyramid-like (with some modifications) offered by European nutritionists.

Menu for adults:

- Water, milk, yogurt, juice - 1 cup;
- Fruits and vegetables whole - 1 pc., Shredded - 200 g canned or processed culinary - 100 g dried - 30 g;
- Bread - 1 piece;
- Pasta, wholemeal or rice - ½ cup;
- Cereals or whole meal, dry cereals - 30 g;
- Legumes - ¾ cup;
- Cheese - 30 g;
- Fish, poultry, meat - 100 g to choose from;
- Olive oil - 1 tbsp .;
- Medium-sized nuts - 15 pcs .;
- Egg - 1 pc.

There is also a vegetarian pyramid (it excludes meat and chicken, all the rest - no change). At the base of this pyramid - whole and coarsely ground grain, bread and cereal from the same grain or seedlings.

Most nutritionists agree that a daily diet must necessarily include any cereal (1 time), fish, meat or poultry (100 - 200 g), dairy products (2 times), cottage cheese, fruit and vegetables (2 times). Vegetables, herbs, fruits help balance the diet and prevent overweight. The first breakfast should be 25 - 30% of the total diet, lunch - 10 - 15%, lunch - 40 - 45%, dinner - 10 - 15%. Drink water before a meal, it is desirable: in an empty stomach it is not delayed, and in a full one it dilutes the contents, making it difficult for digestion.

If you love eating baked products, especially do not forget the fruits and vegetables. Among the fruits one should select apples, oranges, grapefruit, kiwi, while bananas and grapes are not to be selected. Fresh fruit, seasoned with pepper

and salt, as well as soaked cranberries, spiced with a little sugar, you can even cook side dishes with fish, meat and game.

Some high-value products for the season it is desirable to include in the daily menu: garlic, onions, berries (cranberries, lingonberries, blueberries, strawberries, gooseberries, black currant, viburnum, mountain ash, red, rose, hawthorn), pumpkin, lemon, dried apricots, prunes, figs, dates, raisins, nuts of all kinds, sunflower and pumpkin seeds, honey, pollen, celery, green tea, seaweed, unrefined vegetable oil, vegetable and fruit juices.

European Association of experts made seven golden rules of proper nutrition. Compliance with them is necessary for correcting the violations of fat metabolism:

- 1) to reduce by 10% the total fat intake;
- 2) in the diet to reduce the proportion of saturated fatty acids (animal fats, butter, cream, cheese, eggs, meat);
- 3) Increase the intake of foods rich in polyunsaturated fatty acids (vegetable oils, fish, seafood);
- 4) increase the proportion of fiber and other complex carbohydrates (vegetables, fruits, cereals);
- 5) Do not use margarine in homemade food;
- 6) to reduce the consumption of foods rich in cholesterol;
- 7) significantly reduced consumption of salt.

Last meal should be no later than 3 hours before bedtime - it is one of the mandatory requirements for those who want to normalize body weight.

The complexity of the problem of a rational diet is that it is impossible to develop one type of food for all healthy people at once, as each organism has individual characteristics.

Rational diet satisfies the body's need for energy and essential (indispensable) vital substances. To achieve the effect of respecting the principles of a rational diet, you must consider several factors.

Due to neuro-emotional stress and general pace of life, the body of a modern man is often in a state of stress. This complicates and weakens the work of its main systems - the central nervous, cardiovascular, excretory, digestive and others. Especially adverse effect on the functional capacity of these systems is produced by a lack of motor-visceral reflexes, coming only from intensively working muscles and internal organs (motor reflexes - reflexes of the muscles, visceral - from the internal organs). Sedentary lifestyle - the scourge of our century, the human body is deprived of motor-visceral reflexes, the functional efficiency of the heart, kidneys, liver, stomach, intestines weakened. Heart supplies less blood to vessels, it has to contract more often, worse separation of bile, the conditions for the formation of stones are created, not complete cleaning of the kidneys, there are malfunctions on the part of the digestive system. It creates a persistent lack of exercise - the first obstacle to the effectiveness of a rational diet, so it is first necessary to maintain daily feasible muscle load (walking, physical activity, do housework, etc.).

A positive effect on the efficiency of a rational diet and a favorable, calm nervous and emotional background, avoiding stressful situations.

Under the influence of nervous and mental irritability, aggression, conflict and stressful conditions, functional ability of the digestive system breaks down, and sometimes is distorted: worse quality of digestive juices and their chemical composition changes, enzyme activity is reduced. As a result of this there is an intensification of putrefaction processes in the intestine, it induces a strong bloating - flatulence, often accompanied by severe pain, dramatically increases the amount of toxic substances absorbed from the intestine, leading to persistent autointoxication (self-poisoning).

In international organizations, FAO and WHO dealing with the food problem, conducted a lot of work on the synthesis of the principles of good nutrition:

1) moderation in eating, exclusion of overeating, meeting the needs of the organism in calories according to energy consumption;

2) the balance of power that best meets the needs of the body in vital, essential nutrients. With a rational diet optimal conditions are created for metabolism;

3) four meals, providing a meal each time in small quantities;

4) a variety of food that gives the body a chance to select the necessary biologically active substances. Each food product has its own characteristics in the structure, the combination of the components and interconnections of its biologically active components;

5) high biological nutrition, which is emphasized in the present conditions of increased pace of life and the neuro-emotional overload. The main thing - the daily, systematic consumption of fresh, if possible raw fruits and vegetables, especially greens.

Previously, the principle of balance of proteins, fats and carbohydrates are in the ratio 1: 1: 5. Now that the nature of work has changed dramatically decreased muscle, physical activity due to the launch into production a variety of means that affect the value of energy and the formation of the physical status of modern man, there was a correction in the direction of a reduction of the share of fats and carbohydrates: 1: 0.8: 3.5-4. Thus, if we take the daily requirement for an adult human protein per 100 g, the daily rate of fat and carbohydrates and 80 respectively will be 350-400 g is very important in a rational diet protein. More than half of the world's population suffers from protein deficiency, so the protein component in a rational diet is subjected to the most careful and thorough study.

As part of animal protein the body receives a complex of unsynthesized in it essential amino acids: methionine, lysine, tryptophan and others that provide the optimal level of metabolic (metabolic) processes. Modest but adequate intake of animal protein in the body is essential. It is important to establish and develop a strictly evidence-based standards of protein intake for people of different ages and different physical workload. Recently, it was shown that the biological effect of animal protein exhibits its anabolic properties when combined with vitamin C. Thus, important for a rational diet is a combination of sufficiently sustainable protein supply and C-vitamin background. Adult human needs of protein and ascorbate on average 80 - 100 grams of protein and 80 - 100 mg of ascorbate, i.e. for each 1 g of protein fed 1 mg of vitamin C. If the protein to reduce the rate of 70 g / d., The daily

rate of ascorbate should be increased to 120 mg. In all cases, for adults the amount of animal protein should be at least half of the total protein content in the daily diet.

Fats, which are not recommended for consumption by adults in the second half of life, as they contributed to the development of atherosclerosis, according to the latest published data, are also necessary for a rational diet.

There was a desire to increase the amount of oil consumed by adults, up to the entire daily requirement of replacement of fat. It has been proven that an adult needs 25 - 30 grams of vegetable oil a day, and animal fats that contain solid saturated fatty acids exhibiting atherogenic properties are to be consumed only in normal quantity. In addition, animal fats (butter, pork lard, bacon, etc.) are sources of arachidonic acid, which is not present in vegetable oils. In the body receives enough vitamins when using only enough food.

There is an optimum consumption of fat: adults, for example, recommended 80 - 100 g including 25 - 30 g of vegetable oil. The daily requirement for carbohydrates, until recently, was determined at the amount of 500 g. This norm was designed primarily for people engaged in non-mechanized labor. It is now reduced to 350 - 400 g / d., and for some professional and age groups - even up to 300. Of carbohydrates in the diet there should be 75% of the bread products (baked goods, cereals, pasta, etc.) and 25% sugar, including honey, jam and fruit.

Thus, if we take the average daily intake of protein, carbohydrate and fat, respectively 80, 80 and 350 g, the optimum caloric intake under current conditions are indicated by numbers "2353" (kcal).

For a normal rational diet and vitamins are needed, especially in late winter and early spring, when the person is weakened. First of all, food supplement should be ascorbate (vitamin C), because in the human body it is not synthesized. By reducing the activity of vitamin foodstuffs there is a real danger of often hidden and sometimes explicit vitamin deficiency. It negatively affects the state of the organism, its resilience to shocks, various intoxications, some diseases, its efficiency. Three months of the year - in February, March and April - people are especially in need of vitamins, so you need to eat early vegetables - onions, cucumbers, radishes, spinach, parsley. It is advisable to supplement the daily diet of 50 mg of ascorbate. This will greatly enhance the effectiveness of nutrition. In spring there is a growth in demand also in other vitamins: B1, B2, B6, E, etc. Some produced complex vitamins are balanced and appropriate for the enrichment of the diet in the spring.

A rational diet should be maintained in the body acid-lye balance and prevent the development of acidotic shifts, manifesting themselves as lower acidity. It is enough to increase the share in the diet of vegetables, fruits, milk and dairy products. Thus, a rational diet - is a physiologically rational diet of healthy people based on their sex, age, nature of work, climatic habitat conditions. It contributes to the preservation of health, resistance to environmental hazards, high physical and mental health, active longevity.

The essence of a rational diet consists of three basic principles:

1) the balance of energy supplied with food, and energy consumed during the life of a man;

2) meets the needs of the body in a certain amount, the qualitative composition and ratio of nutrients;

3) Compliance with the diet.

The energy balance

All the necessary human energy comes from food, and is spent by internal organs, during the metabolism, body temperature at a constant level and muscle activity. One has developed physiologically proven norms of calorie needs based on the nature of professional activity, sex, age and sports. Calorie characterizes the amount of heat generated.

According to the intensity of labor adult population is divided into five groups:

1) a person whose work is not related to the expenditure of physical labor or requires little physical effort (knowledge workers, employees);

2) persons whose work requires considerable physical effort (workers on automated processes, electronic industry, communication, telegraph wires, sellers and others.);

3) persons whose work involves considerable physical effort (machine, textile, transport drivers, shoemakers, postmen, laundry workers, foremen of tractor and field teams, staff and catering etc.).

4) persons engaged in non-mechanized hard work (casters, carpenters, construction workers, farm workers, steelworkers, blacksmiths and others.);

5) persons engaged in a particularly heavy physical labor (miners employed directly on underground work, steelworkers, excavators, lumberjacks, masons, porters, whose work is not mechanized).

In addition, there is a difference in the daily energy needs, measured in kilocalories for adults living in large or small communities with a strong public service.

Calorie characterizes the quantitative aspect of power, which is determined by the need for energy. Knowing the chemical composition of food it is easy to count on special tables of chemical composition of basic foodstuffs how much energetic material is received by people a day. All foods according to their calorific value (stated per 100 g of edible portion) can be divided into five groups:

1) with a very high-calorie (450 - 900 kcal) - butter, vegetable, nuts, chocolate, halva, cakes layered with cream, pork fat, smoked sausage;

2) with high-calorie (200 - 400 kcal) - cream, sour cream, cottage cheese, fat, cheese, ice cream, pork, boiled sausages, frankfurters, meat, goose, duck meat, fat herring, Pacific saury, salmon, eggs, cereals, bread, sugar, honey, jam, jelly, candy, fondant;

3) with moderate calorie (100 - 199 kcal) - cottage cheese bold, ice milk, mutton, beef, rabbit meat, chicken, eggs, horse mackerel, mackerel, sardines, herring, lean, sturgeon;

4) with a low-calorie (30 - 99 kcal) - milk, yogurt, cottage cheese, low-fat, cod, hake, perch, flounder, carp, pike, pasta "Ocean", fruits, berries, potatoes, beets, carrots, green peas;

5) with a very low calorie (less than 30 kcal) - zucchini, cabbage, cucumbers, radishes, lettuce, turnips, tomatoes, squash, peppers, cranberries, fresh mushrooms.

Reduced calorie (malnutrition) leads not only to the consumption of carbohydrates, fats and proteins, to a decrease in skeletal muscle mass. This reduces the working capacity and increased susceptibility to infectious diseases. Excess calorie diet leads to the deposition of fats and carbohydrates in the form of fat in fat cells, weight gain, obesity. For normal functioning of the body must not only meet the energy supply, but also a constant supply of it all nutrients: proteins, fats, carbohydrates, vitamins, mineral salts. Some nutrients (minerals, some amino acids, vitamins) are formed in the human body. They are indispensable factors in food and ingested only with food. For good digestion it is important to ensure an optimal ratio between the consumption of proteins, fats and carbohydrates. Normally, it should be 1: 1.1: 4.1 for young adults engaged in mental work, and 1: 2.3: 5 - engaged in heavy physical labor. The diet of healthy young adults living in temperate climates and is not engaged in physical labor, proteins should be 13%, fat - 33% carbohydrates - 54% of daily caloric intake. Proteins of animal origin should be 55% of the total protein and vegetable oil - up to 30% of the total fat in the diet. In nature there are no products that would contain all essential nutrients, so the products should be combined.

The diet must meet the following requirements:

- Energy value should cover the energy consumption;
- Balanced between a number of food nutrients must be optimized;
- Good digestibility of food (it depends on the composition and method of preparation);
- High organoleptic properties of the food (appearance, texture, taste, smell, color, temperature) that affect the digestibility and appetite;
- Variety of food due to the wide range of products and different ways of cooking;
- Optimal composition, volume, perfection cooking (the ability of food to create a feeling of fullness);
- Strict observance of sanitary-epidemiological integrity and safety of food.

Diet includes the time and number of meals, the intervals between them, the distribution of diet on caloric, chemical composition, and the weight of food packages for meals.

In the course of his life should be guided by the following rules of a rational diet regime:

- Four meals (breakfast, lunch, dinner, a glass of kefir before bedtime); one or two meals a day is dangerous to health (the threat of myocardial infarction, acute pancreatitis);
- Exclusion of food in between meals;
- The time between breakfast and lunch, lunch and dinner should be 5 - 6 hours, and between dinner and sleep onset - 3 - 4 hrs .;
- A set of products at every meal should provide the optimal ratio of all the necessary nutrients for a healthy person breakfast and lunch should receive more than 2/3 of total calories daily diet, and for dinner - less than 1/3;

- Reception write in a strictly fixed hours: the time factor plays an important role in the formation of conditional reflex reactions (saliva, gastric juice); if the body is preparing to receive and digest food;
- Meal in a calm pace; for lunch need to spend at least 30 minutes;
- Thorough, leisurely chewing food (good dental health);
- The last meal (not less than 1.5 - 2 hours before bedtime) to include only low-calorie foods (milk, dairy drinks, fruit juices); prohibited fried foods, foods rich in fat, crude fiber, spices, table salt;
- Clean, cozy dining room, a nice table setting; exclusion of distractions from food (talk, radio, television, reading, etc..).

Failure to comply with the rules of a rational diet regime - one of the main causes of diseases of the digestive organs (stomach ulcer, chronic gastritis, colitis, and others.). By changing the nature and diet can have a positive effect on metabolism, the adaptive capacity of the organism and have a positive impact on the pace and direction of the aging process. Poor nutrition and a violation of his regime - an important source of various diseases, such as malnutrition, obesity, vitamin deficiency, atherosclerosis, coronary heart disease, hypertension, diabetes, gout, gallstones, liver disease and pancreatic cancer.

A rational diet should be balanced - it provides optimal balance of nutrients and biologically active substances in the human body. Particular importance is attached to a balance of more than 50 essential food components (amino acids, most vitamins and mineral substances, polyunsaturated fatty acids). Metabolic disorders cause any deviation from the long-term balance. Lack and excess of certain essential nutrients harmful to the body. Human needs for nutrients can vary with the fallen, age, nature of work, the climate, the physiological state of the organism, its individual characteristics and other factors. In nature, there is a product that would be absolutely necessary body substances, except breast milk for newborns. Only a combination of different products can provide the body with essential nutrients. Monotonous diet reduces appetite, disrupt metabolism, can cause failure of individual organs and body systems. The absence in the diet of vegetables, fruits and berries will inevitably lead to a shortage in the body of vitamins C and E, carotene, minerals, organic substances, pectic compounds, fiber and others. The preferential use of refined foods: sugar, products made of high-grade flour, refined rice and et al. drastically reduces the intake of vitamins B1, B2, PP. Prolonged feeding on plant food body entirely depleted underfunded valuable proteins, vitamins B2, B12, A, calcium, zinc and others. Decreased intake of fats reduces the absorption of fat-soluble vitamins from the intestine, and several minerals. In case of insufficiency in the diet of complete proteins may be a deficiency of vitamins C, A, B2, PP, folacin and others.

Varied food provides the optimal ratio of nutrients, promotes the release of digestive juices and increases the appetite. Food made from different foods (meat, fish, dairy products, vegetables, fruits, berries, cereals) is absorbed well enough: proteins - by 84.5%, fat - 94%, carbohydrates - by 95.6%.

Vegetable food is absorbed worse than animals. This is due to the presence in it of roughage, which hinders uptake and accelerating the passage of food through the intestines.

Large fat content in the diet affects the absorption of other nutrients. Food should be not only highly digestible, but digestible. Mr. Pavlov I.P. described the digestibility of food as the degree of tension of the digestive system to its assimilation. Poorly digestible dishes are legumes, mushrooms, unripe fruit, and refried products. Such food is a long time in the stomach and creates a feeling of heaviness in the stomach. Using various cooking methods (grinding, heat treatment, etc..) can influence its absorption and digestibility, which is especially important for clinical nutrition.

So, soft boiled eggs are more digestible than hard boiled ones. Of largely grated carrot 5% carotene is digested, of finely grated carrot -20%, adding thereto vegetable oil or sour cream - 50% and of carrot puree with milk - 60%. Digestibility of nutrients depends on the functional state of the digestive organs, gustatory habits, environment, appearance, color, smell, taste, texture, temperature, and other organoleptic properties of food that can cause excessive secretion of digestive juices and appetite. Also to excite the appetite one uses seasonings and spices - vinegar, pepper, mustard, onion, garlic, horseradish, parsley, dill, cilantro, celery, bay leaf, cinnamon and others. Flavors should be used in a reasonable amount and systematically changed. Prolonged use of the same flavors in large quantities leads to the opposite effect - inhibition of stomach juice production and breakage of "appetite center" in brain.

Food of soft consistency causes weaker secretory and motor effect than usual food. At a temperature of food around 37 ° C, there is most pronounced secretory activity of the digestive tract. Potent stimulator of digestive secretions are extractives (nitrogen and nitrogen-free) contained in the broth when cooking meat, poultry, fish, bones, and other fungi. Eat food should cause a feeling of fullness, which depends on its chemical composition (fat, animal protein and et al.), volume and cooking methods. Good satiating power is possessed by meat diet with plenty of fat, grain products, milk and others. Products containing less than 25% fat calories, relatively quickly lead to feelings of hunger, and very fatty foods, with more than 40% fat calories, causing a sharp slowdown activity of digestive glands, which is harmful to the body. Fried foods create a feeling of fullness for longer than boiled or steamed. The volume of food also is important in creating and maintaining satiety, but its overall amount at one time should be such as not to encumber the digestive tract, i.e. not more than 1500 kcal or 1.2 - 1.5 kg for adults.

In a rational human diet it is recommended to maintain an average fat content of meat, including connective tissue elements. As in the higher grades of flour there is little fiber, so in the higher grades of meat there is little connective tissue. Limiting the use of bread, you must remember that any products can not be excluded from the diet of healthy people, especially bread, as it causes great damage to the physiological structure of power and violates the normal process of digestion. Bread has a positive effect on the digestion and absorption of vegetarian food. The daily rate of bread can be reduced to 200 g (100 g of a white and black). When organizing the human nutrition it is important to consider the characteristics of individual products and their compatibility. Thus, in the first half of the day it is recommended to eat meat and fish dishes. As a side dish to them there must be vegetables. If the first meal consists of vegetables, as a side dish one can eat cereals or pasta. Breakfast is better to start with

a glass of freshly brewed tea, then there is a second dish. In all cases, it is recommended in the morning to prepare a salad of raw vegetables with herbs. Necessarily involves a complete meal: soup daily use even in case of low physical activity, lack of motor activity and excess weight. Physiological studies confirm the important role of the first dishes to ensure optimal secretion of the gastrointestinal tract and better digestion. Physiologically unacceptable and inappropriate to start dinner with a main dish, as it leads to gastritis or peptic ulcer. Lunch should consist of small snacks (vegetable salad, salad, eggplant caviar, stuffed peppers, herring with vegetables et al.); it is desirable to four times a week the first dish was a vegetable (borsch, cabbage soup, beetroot soup, hash), twice a week - cereal (rice soup with tomato and barley with mushrooms), and only once a week - broth with patty; for the second course it is useful to serve vegetable garnish; for the third course one prepares compotes, jelly, juice, jelly, coffee (or tea should be avoided). As regards fruits, they may be recommended in 1 - 2 hours after eating the dessert as optional. For dinner, it is not recommended to eat hard-to-digest products (legumes, fats, fried meat, poultry), tonic beverages (tea, coffee, cocoa) and dishes that have a pronounced juice-exciting effect (smoked herring, mushrooms, pickles, strong broth). Dinner should contain nutrients that cause a decrease in excitability of the cerebral cortex. Their digestion and absorption in the gastrointestinal tract must end in a relatively short time and proceed with the least expenditure of energy by the body. These requirements are better suited to dairy products, which combine well with cereal porridges, flour products, vegetables. One can cook vegetable salads, vinaigrettes, fruit, berries and juices from fruits and vegetables. With a rational diet a person should consume in a day not less than 1 kg of fresh vegetables, fruits and berries, very useful on any sandwich to put a piece of cabbage, parsley or dill. Every day, even in winter, it is recommended to use at least 200 g of vegetables (cabbage, carrots, beets, greens), 300 g potatoes, 100 - 150 g of fruits and berries. In the mixed use of vegetarian diets in products one must take into account the biological properties and their ability to the reciprocal besides compatibility of individual products on the basic properties and biological lye acid equivalent, consider their proportional relationship, as each product is optimally combined with other only in a certain amount. In any dish set of certain products should be combined in the appropriate proportions, the violation of which leads to the deterioration of the finished dish - taste, smell, texture, color, nutritional and others.

It is also necessary to comply with the compatibility of products. In nature there are well-defined proportions compatibility, the violation of which leads to underutilization of natural and biological potential of products, and at the wrong combination - undesired loss. Seasonings, spices, sugar and herbs are added to taste, salt - in a ratio of 0.5 (1.5): 10. For each dish there is only one optimal combination of the number of its constituent products. And as countless dishes and each of them is almost impossible to scientifically establish the optimal share, we have to rely on approximate figures.

Enough to have such basic products like milk, eggs, butter and vegetable oil, margarine, potatoes, cabbage, noodles, bread, peas, sugar, salt, tea, coffee. When a scientific approach to the preparation of breakfast menu can be fed egg, coffee, bread,

sugar and butter. At lunch - peas with potatoes in margarine, pasta, tea or coffee with milk and bread. At dinner - cabbage salad with vegetable oil, bread and milk. As we can see, for breakfast one should use more complete product. Coffee and tea stimulate neural activity. With a hearty breakfast one gets less hungry by dinner, and eaten food will be more fully utilized.

It is irrational to serve at once the dishes made of related products. For example, at lunch pea soup with potatoes, and the second - fried cabbage. Technological compatibility of the products in the manufacture of certain foods is important. Thus, fish and legumes are incompatible with milk. Milk is better to eat vegetables, fruits and berries. Legumes are incompatible with the grain in the production of bread, but compatible with conventional cooking dishes. Legumes do not mix well with the egg, mushrooms and fish. But the egg is compatible with the grain. Yeast compatible with wheat and rye, but they can not be combined with other grains and legumes, vegetables, berries, fruits, although they create the effect of fermentation, as well as when added to wheat or rye flour. Vegetable fats increasingly combined with vegetable and fish products than with egg or dairy products, and animal fats, on the contrary - with products of animal origin. Butter has universal compatibility.

An important element of a rational diet - the correct mode: hours and the number of meals, intervals and quantitative distribution of the daily diet provides the rhythm and efficiency of the digestive system, normal digestion and absorption of food, for optimal metabolism, good health and high performance. The basic principle of proper nutrition - regular and compliance during the day time meal, as it is accompanied by a certain reaction. It is accompanied by the release of saliva, gastric juice, bile, pancreatic juice, etc. This happens at a specific time. In the process of digestion an important role is played by conditional-reflex reactions in saliva and gastric juice in response to the smell and sight of food. In the chain of conditioned reflex reactions is an important factor of time, that is, to develop the habit of man is at a certain time of day.

In modern conditions the most useful four meals. Between meals there should optimal intervals. Too long can lead to overstimulation of food centers ("hunger center" and "satiety center"), which are located in the cerebral cortex of the brain, which entails the allocation of a large number of active gastric juice. Coming into contact with the mucosa of an empty stomach, it may be irritating, until the formation of gastric inflammation (gastritis). Short intervals are not advisable either, as adopted by the food does not have time to be fully digested and absorbed, which can lead to the disorder of bowel function (secretory and motor activity of the alimentary canal). Mosoptimal intervals of 4 - 5 hours with night break of up to 10 hours. The interval between light meals may be reduced to 3 hours. Last meal we recommend to be for 2 - 3 hours before bedtime.

Breakfasts, lunches, dinners should take place in a calm atmosphere, without "sharp" conversations, otherwise you lose all the benefits of proper nutrition, it is of little use. It is important to chew food well because it is better digested then. For breakfast and dinner it is recommended to spend 20 - 25 minutes for lunch - twice as much time. Afternoon tea or lunch is better to eat for 10 - 15 minutes. The distribution of the daily diet in calories and chemical composition during the day

should depend on the nature of work and daily routine. With four meals for breakfast it is recommended to allocate 25% of the daily diet, lunch - 35%, afternoon snack - 15%, dinner - 25%. Retirees and vacationers' ration daily distribution may be even more uniform, designed for four - five-time meals in small portions. Food must have time to pass from the stomach into the intestine, as digestion in the stomach is accompanied by a large excitation of the brain, causing sleep disturbance. These medical requirements to nutrition and diet are common to every human being. However, it should be remembered that the organization of a rational diet begins with the organization of a healthy lifestyle, correcting nervous reactivity. People should try to suppress irritability, prevent neuropsychiatric breakdowns, rudeness and insensitivity in relationships with others. Those who adhere to medical recommendations maintain high efficiency during the day, are less tired, less sick.

With the development of the theory of adequate nutrition one can deduce several laws of nutrition.

1. It is necessary to maintain a balance between incoming food and food energy (caloric intake) and energy consumption of the body.

Under conditions of peace and a comfortable temperature the level of energy consumption by an adult, that is, the basal metabolic rate is 1300 - 1900 calories a day. It can be calculated for each individual. Basal metabolism is 1 kcal per 1 kg of body weight in 1 hour. Its basal metabolism male weighing 80 kg is at rest is 1920 kcal. Any physical or mental work will require additional energy. For people involved in sedentary labor, energy consumption is 2500 - 2800 kcal, for persons engaged in heavy physical work, it is 4000 - 5000 kcal.

The main energetic material given to the body fats, proteins and carbohydrates. Believe that 1 g protein food, as well as 1 g of carbohydrate provides organism 4.0 kcal (16.7 kJ) and 1 g fat - 9.0 kcal (37.1 kJ). Hence, knowing the chemical composition of the food one can calculate calorie diet or any product.

2. It is necessary to adhere to the balance between entering the body proteins, fats, carbohydrates, vitamins, minerals and dietary fiber.

Under this law, a person does not need any of the products, and in a certain ratio contained therein nutrients.

Each food product can be characterized in terms of bioavailability. Some products may predominate essential amino acids (for example, milk), other essential fatty acids (e.g., vegetable oils).

Nutritional product depends also on the content of the physiologically active substances, such as extractives and capsaicinoids and various plant essential oils of spices, affecting the digestive process, and many others.

It can be assumed that the more factors essential in the diet, so it is useful. But an excess of them as harmful as negative, and a surplus - toxic.

Optimal in the daily diet of a healthy person is the ratio of proteins, fats and carbohydrates, which is close to 1: 1.2: 4. This ratio is most favorable for the maximum satisfaction of the energy needs of the body and plastic. Protein should make up about 12%, fat 30 - 35% sheathe caloric intake. On carbohydrates account for 56 - 58% of the total caloric diet.

3. It is necessary to comply with diet - regular and optimal distribution of food during the day.

Most useful to man mode where breakfast and dinner, he gets more than 2/3 of total calories daily diet, and for dinner - less than 1/3.

In the parable of the Persian writer and thinker Saadi, who lived in the twelfth century, the sage asked:

- How much food to take in a day?

- This is the amount of food - said the sage - which will carry you and all that you add to that, you will wear himself.

This response is the Arabic sage will be alive at all times.

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THE ROLE OF WATER IN METABOLISM
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Water is the essential component of all organisms. Water acts in the organism as the solvent for organic substances. There are various chemical reactions in the aquatic medium. The hydrolysis of complex organic substances comes with the involvement of water. Water is formed as the product of organic substances oxidizing reaction. Most of the chemical transformations that underlie the organism functioning, is related to the presence of water to any extent. From this it follows that it is impossible to live without water. The organism of adult person is made of 65% water. More water is contained in the succulent parts of plants and microorganisms.

Maximal water content in different organs and tissues of vertebrates is not equal. There is much water especially in the most functional organs.

Water content (in %):

In the organism of adult person	65
In cinerea	84
In alba	72
In liver	75
In muscles	75
In cordis	78
In nephros	81
In adipose system	25
In bones	20-40
In whole blood	80
In blood plasma	92
In erythrocytes	65
In embryo (human) bimestrial	97
In embryo (human) trimestrial	94
In embryo (human) four-month	92
In embryo (human) five-month	87
In the organism of perinate	70-74

Without water animals die in a short period. Drinking water stall-fed dog can withstand a starvation up to 100 days, but without water it dies in 10 days.

The state of water in the tissues

The question of the water state in the body tissues is of great interest. Despite the fact that the tissues of animals and plants contain a lot of water, at the dissection of organs it does not leak away. Water is binded hydrationly by cells elements, mainly proteins. And even more it is closed between fibrillar molecules and diaphragms. Most tissue proteins are capable of binding about 50 g water per 100 g protein by the hydration process. Some water in the body tissues exists in the form of hydrates $[Na(H_2O)_x]$ or $[Cl(H_2O)_y]$. Other ions are also binded.

Hydration water by its properties has some differences from the usual one. It does not freeze when the temperature drops to zero degrees or even lower. It does not

act as a solvent on the usually water-soluble substances. It is known that the seeds and bacteria spores withstand the low temperatures without any damage. It can be explained by the fact that the water in them is in hydration state and does not form ice crystals, able to damage mechanically the structure of cells.

Hydration water is a small part of the total quantity of body tissues water: in 100 g of muscles contains 20 g of protein substances and 75 g of water. Such quantity of proteins is able to bind 10 g of water. Therefore, 65 g of water are not binded by proteins. This part of water enclosed between the molecules of the fibrous structure, microscopic fibers and diaphragms. Water can not leak away at the dissection of muscle. Even if the muscle is disintegrated, water is immobile. Immobile water by its properties differs from hydration one: it freezes at the temperature lower than zero degrees and it can dissolve salts and other substances.

In line with hydration and immobile water there is free one. Body fluids such as blood plasma, lymph, cerebro-spinal fluid, luminal fluids, urine contain free water.

Also it is present in the intercellular spaces of tissues (interstitial water), but in such small quantities that it does not leak away at the dissection of tissue. It is held between the cells by capillarity. The number of intercellular water is greatly increased in pathological conditions, especially with kidney diseases. In this case kidneys are unable to remove water excess from the body. Water accumulates in the subcutaneous tissue, muscles and other organs, causing edema (accumulation of several litres of free water in the organism). Edema diseases are possible with a deep violation of the functions of the cardiovascular system. Water leaks out when thin metal tube is immersed in edematous muscle. Swollen organs lose their elasticity, become soft, doughy. The deepening which slowly disperses keep on the swollen skin when pressed.

Thus, the water constituting $\frac{2}{3}$ of the body weight has various states in it. Hydration water causes swelling of colloids in the gel formation. Colloids return hydration water; this process is called syneresis.

There are hydration and dehydration processes in the body tissues. In that case the quantity of hydration water in them almost does not change. It is reduced only with age increment and as a result the tissues shrink.

Water enclosed between the fibrous molecules, fibrous structures and cells diaphragms differs in its properties from hydration one. This kind of water is easier involved to the hydrologic circle. Nutritional substances are delivered to the tissues and cells with the help of free water. In this case metabolic-waste products outflow from the cells and tissues.

Changes in the hydration water composition influence on the immobile water composition as the immobile water is in conjunction with the free water.

The average amount of water allocated and consumed daily by the adult body, given in table 1.

Table 1**Isolation and water consumption of adult**

Water allocation, smi		Water consumption, smi	
With urine	1500	Drinking	900
With faeces	150	In liquid products (milk, soup, coffee)	650
Evaporation through the skin	600	In solid products	700
Exhaled air	350	Endogenous (water formed during the oxidation of organic substances in the cells of the body)	350
Total	2600		2600

The role of water for human

Back in the 60s Nobel laureate, leading authority in the field of bioenergy A. Szent-Gyorgyi said: "Biology has forgotten the role of water, or did not think about it." The main body substance - water – is usually considered as almost neutral solvent in which biochemical reactions occur as a substance which carries a variety of substances through body. The importance of water for man has been underestimated: it was believed that it is contained in the body in sufficient quantities, and the one that is lost through sweat, urine and exhaled air, is easily offset by any beverages containing water. Only in recent years it has come to an understanding of the role of water for the person, that there is no water as it is, that it is presented in many different forms, and that its diversity allows it not only to sustain life, but also substantially be the source of life.

In recent years, research on the role of water and its structural features has been started. It has been found that water in a living organism is highly organized, i.e. a significant part of it is connected with biological molecules forming the multilayer structure.

Water plays an equally important role in the dynamic of the structural organization of living matter - the cells and the surrounding joining elements, as well as biological molecules that live in it. It is directly involved in metabolism, which is the basis of all the processes of life. Metabolism is a continuous replacement of one molecule to another, i.e. the collapse of some and the synthesis of the same or different molecules, which the body needs at this moment and in this place. Implementation of metabolism requires a continuous supply of energy, and it requires water.

The role of water in the main biochemical reactions has long been known, but until recently it was not paid too much attention, believing that the water in the body

is always enough for its normal flow. If you look closely, it becomes clear that for some processes there is a need of one water, for others - is quite different, for the third - the other, etc.

For each process in the human body it is required different types of water (see. "Condition of water in the tissue"). Sometimes there are situations in which the body can suffer due to the scarcity of the water that it needs at the moment. For example, to the nutrients ingested with food, proteins and carbohydrates must be broken into small fragments. This is due to the hydrolysis - the cleavage of polymers with water.

But for the hydrolysis activation, water molecule itself should be divided into two parts. Hence, the efficiency of cleavage of the food polymer molecules depends not only on their composition and structure, not only from the enzymes that break down, but also on whether there is sufficient where there is hydrolysis, quantity of water that has the necessary for the implementation of the hydrolysis of structural organization. The hydrolysis takes place in the internal environment of the body, where some polymers are continuously replaced by others, where constantly being rebuilt intracellular and extracellular structures. Hydrolysis helps to remove old, "spent" biopolymers.

In place of the "deal" biopolymers must be received the new ones. They gather in the cell of the molecular building blocks, which are joined in the correct sequence to each other. When the growing biopolymer chain is sewn new link, one water molecule is released. This chemical reaction is called polycondensation, and it is opposed to hydrolysis.

Water performs the role of the construction industry. It is known that a significant portion of energy processes in the cells of any organism is provided by ATP molecules. ATP molecules carry easily accessible energy, and, by splitting, bring to pass the process of life. The energy is released during the decay of the conjugate molecules of ATP and water molecules. In order to store energy in a molecule of ATP, it is necessary to be synthesized by connecting with the remainder of the molecule of ADP phosphoric acid, wherein the water molecule is released. At the point where ATP is synthesized and in the place where it breaks the water must be differently coupled.

Another well-known source of energy is electric potential difference between the cell and its environment due to the uneven distribution between potassium and sodium ions. Potassium concentration in living cells is much higher than in the environment, and there is much more sodium in the medium than in the cell. This difference is particularly large in the nerve cells, where it reaches tens of millivolts. Nerve impulse - it is an electrical discharge, in which potassium ions are released from the cell and sodium ions enter into it. Then the cell directs the energy metabolism to restore the capabilities and follow its discharge. Redistribution of potassium and sodium ions is accompanied by redistribution of water between the cell and its environment and natural change its properties. As each ion is surrounded by several water molecules, the water is distributed to a much larger number than the number of the ions themselves. Thus, the water in the cells and in the extracellular environment, should determine the effectiveness of nerve impulses, i.e. the

functioning of the nervous system. The same can be said of other excitable cells, such as muscle, and, above all, of cardiac muscle cells.

Water plays a decisive role in bioenergetics processes, although until recently this role has remained out of sight of the majority of biologists and physicians.

At the turn of the new Millennium in several laboratories around the world, it was found that under normal conditions (normal temperature and pressure), the water can be directly oxidized by the active oxygen with the formation of other active forms. One of them is hydrogen peroxide H_2O_2 , which can be represented as H-O-O-H. A. N. Bach predicted the possible existence of polioxide hydrogen type H_2O_3 (H-O-O-O-H) and H_2O_4 (H-O-O-O-O-H), which should have an even higher "pilot" activity than the hydrogen peroxide. Under proposed in 1897 theory with activation of oxygen, in particular, in the formation of peroxide compounds, begins any of oxidative processes in the body, living at the expense of the energy derived from respiration.

Although the peroxide theory of Bach was created in the XIX century, only in 2000, American scientists found that water can oxidize activated oxygen (singlet oxygen), resulting in the formation of hydrogen peroxide. Intermediate products are H_2O_3 and H_2O_4 . Under certain conditions they may even accumulate in the water, making it valuable source of energy.

American scientists have shown that the oxidation of water oxygen (essentially, its burning) is constant in human blood. It is well known that circulating in the blood of protective proteins - antibodies - contact with alien organism molecules for their subsequent elimination. The invention was consisted of the fact that antibodies contribute to the combustion of water. They organize the water in the space in such way, that it catalyzes its own oxidation by singlet oxygen to hydrogen peroxide. This property antibodies, obviously, contributes to the effective implementation of their protective functions. Because reactive oxygen species - strong disinfectants, therefore, water is a strong disinfectant against viruses and bacteria.

Antibodies protect the body from his own molecules, if they do not meet the established "standard". So, the received biopolymers are removed by hydrolysis. Another way of removing them is the burning of active forms of oxygen. When the hydrolysis of the high polymer "waste" metabolism is obtained low molecular weight compounds that can be used to build new biopolymers, which the body needs in the moment. Waste incineration is released encased in their energy. The efficiency of both processes requires, among other important factors (e.g., availability of appropriate enzymes), a sufficient supply of active oxygen, specific structural organization of water. If optimal conditions of waste disposal is not provided, "non-standard" molecules in the organs and tissues are accumulated, essentially, toxins, and in extreme cases it comes to neoplastic transformation of cells. The system is not always able to cope with this phenomenon, the development of chronic inflammatory conditions or other violation of immunity (e.g., autoimmune diseases, when the antibodies begin to fight not only with non-standard molecules, but also with quite a normally functioning molecules in the body that leads to its destruction).

The role of water, that supports life of any organism, is great. The violation of its normal structural organization and dynamic characteristics can serve as one of the

main causes of various diseases. The prevention or cure of already diseased requires not less than careful attention to water-based body than to the state of his rigid molecules, for normal functioning of all cells, organs and tissues is possible only when water and solids in it functionate consistently. Water is excreted from the body mainly through kidneys (urine), in a small number of it is secreted by the intestinal wall, sweat glands (through the skin) and lungs (exhaled air). The amount of water excreted by the kidneys, is impermanent. With a strong perspiration from the body there could be excreted five more gallons of water. In this case, the amount of water allocated by the kidneys, reduced urine thickens. The amount of urine is decreased by restricting the drink.

However, the concentration of urine is possible to some limit, and with the further restriction of drinking is delayed excretion of end products of nitrogen metabolism and mineral substances that negatively affect the life of the organism. With an abundant supply of water in the body the urine increases.

From the body it is always highlighted some more water (about 350 cubic centimeters) than it is received, this is due to the formation of water in the body by oxidation of organic substances (metabolic water).

The water loss in the body is compensated by its intake (drinking water, tea, coffee, .milk, liquid food and solid food: bread, vegetables, meat, fruits - always containing a known amount of water).

People can not do the amount of water available in solid food, and he suffers in the absence of drinking water.

The daily requirement of the human body in water is about 40 g/kg. Infants need water 3-4 times higher than adults.

Water in live organisms not only performs as a transport, but also to some extent is used in the process of exchange, as a result it appears in the organic substances of the component parts of the body. Various organic substances during its oxidation form different amounts of water. The richer the molecule of organic matter is, the more water is formed. In the oxidation of 100 g of fat is formed 107 smi of water, 100 g of carbohydrates-55 smi and 100 g protein-41 smi.

To clarify the involvement of water in the synthesis of organic substances in the human body is not enough water balance studies, i.e. the ratio of the amount of water entering the body, and the amount of water released from it. This requires different approaches. One of such approaches is the introduction into the body along with normal water a small amount of heavy water D₂O (deuterium, heavy hydrogen), which is rapidly mixed with the free intracellular water and body fluids. Simultaneously, a significant portion of the deuterium heavy water appears in complex organic substances, for example, high molecular fatty acids and other substances.

Regulation of water exchange

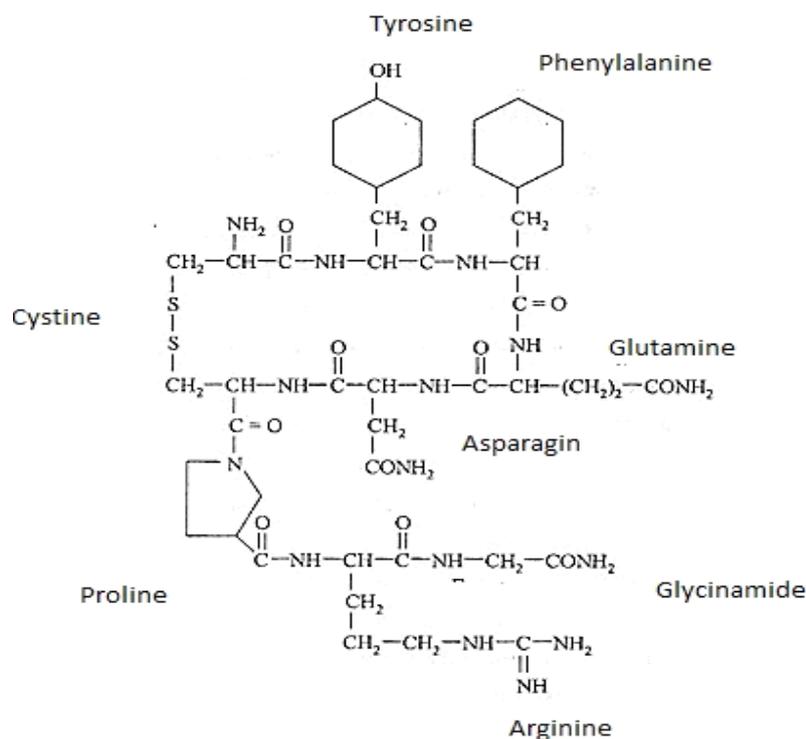
Entering the body water is absorbed into the blood through the wall of the small intestine. The much water enters the body, the more is absorbed into the blood and excreted from the body through the kidneys in the urine or through the skin in sweat. Removal of excess water requires hard work of the heart, so in hot weather and during walking is recommended to adhere to drinking regime.

Receipt of water in the body is regulated by thirst. As at the first signs of thickening of blood in the reflex excitation of certain areas of the cerebral cortex occurs thirst - the desire to drink. When the consumption of plenty of water, for example, 1.5 l, the blood is enriched with water, not diluted. The reason is that water from the blood quickly flows into the intercellular space, increasing the amount of intracellular water. Stimulate from the intestine and the blood, and partly in the lymph water in a large part enters the skin and for some time there has been delayed, so the skin can be considered as a temporary depot of water in the body. The liver also holds a number received in the body oxen.

On ingress of water and selected from an organism is influenced by the cations. Increased intake of dietary chloride sodium causes thirst. Sodium contributes to water retention in the tissues, and salts of potassium and calcium stimulate the release of water from the body.

Water is removed from the body mainly kidneys. Urinary flow function of the kidneys is regulated by the nervous system and hormones. The most important hormone involved in the regulation urinary flow function is the identity (and antidiuretic hormone from the posterior lobe of the pituitary gland. Vasopressin increases reabsorption of water in the renal tubules and thereby reduces the diuresis (urine). Lack of vasopressin leads to increased diuresis, to the disease diabetes insipidus.

Vasopressin formula isolated from the pituitary glands of the cows presented on pic. 1



Pic. 1

Vasopressin is isolated in pure form from the posterior pituitary gland. Vincent du Vigneaud studied in detail its chemical nature. Vasopressin turned polypeptide consisting of eight amino acids, with a molecular weight of 1025. The sequence of the amino acids in these vasopressin and its structure was educated.

Vasopressin is obtained from the posterior pituitary cows and vasopressin from the posterior pituitary pigs differs from each other in that the first part has arginine, as in the second part has been replaced by lysine - they both have the same hormonal activity.

Vasopressin narrows vessels arterioles and capillaries, when injected in very small doses has antidiuretic action. The maximum effect was noted at 0.0001 mg administered to human vasopressin. In this released when excreted urine increases the concentration of chlorides, phosphates and nitrogen compounds (urea, creatinine, and others).

In case of violation of the formation of vasopressin in the posterior lobe of the pituitary and release it into the blood of a person has a disease - diabetes insipidus, characterized by the release of the body of a large amount of urine (4-5 liters or more per day). There are cases of severe diabetes insipidus, when the body of the patient was allocated to 20 liters of urine per day. Patients drink a lot, so their urine is diluted with water (almost not colored), and the proportion of low (1,002-1,005). Chemical analysis of urine did not reveal the presence in it of pathological components. It follows that the urine of patients with diabetes insipidus differs from urine of healthy individuals only water content.

The occurrence of diabetes insipidus usually associated with pathological processes in the hypothalamus, thus hormonal posterior pituitary function of the central nervous system is governed. This is supported by the fact of that nerve experiences (voltage nervous system) are often accompanied by increased urine output (frequent urination).

The role of water in human life support and nutrition

Water belongs to the nutrients without which life is impossible. In an aqueous environment, all biochemical reactions occur, it possesses unique physical and chemical properties. Water has a very high surface tension when mercury thereby can move from the top to the root of the plant branches. Due to this property, the blood moves through the smallest vessels of the human body. Furthermore, the water easily dissolves a substance other performs metabolism of a living organism.

Water molecules are polar state and electrically readily dissociate into ions - positively charged hydrogen (H⁺) and negatively charged hydroxyl (OH⁻) - which determines the spatial structure of proteins, lipids, nucleic acids and various other organic materials, water is the medium tone, where the chemical reactions occur.

Water plays a leading role in thermoregulation, supports thermal homeostasis, so the body adapts to changes in ambient temperature. With increasing temperature increases the evaporation of water from the body surface, it is cooled. Lowering the temperature of the surrounding air and body items drastically reduces water evaporation, heat is stored in the body.

A living cell at 60-99,7% of water (an adult weighing 65 kg has an average of 40 liters of water). On water depend structure and functional properties of cell membranes.

The water requirement for an adult per day is about - 40 ml per kg on body weight, infants - to 120-150 ml more.

The total daily water demand (on average 2.3-2.7 l) to determine the nature of the work, environmental conditions and food quality of the data. With food the body gets 600-800 ml.

In accordance with the sanitary and epidemiological rules and standards SanPiN 2.1.4.1116-02 there are following types of drinking water (depending on origin source of water):

- artesian, spring, ice (infiltration) - underground water source;
- river, lake, glacier - surface water source.

Depending on the methods of water treatment there are following types of drinking water:

- cleaned or polished – from water supply network;
- conditioned (enriched with essential macro and microelements).

Depending on the quality packaged water share PA two categories:

1) first class quality - this category refers drinking water quality, regardless of source of healthy, fully relevant criteria of favorable organoleptic properties, security of epidemic and radiation regard, the safety of the chemical composition; the water of this category maintains their high drinking properties;

2) highest quality - this category refers water, safe for health and optimized for quality; it is from underground, spring or artesian water sources, protected from biological and chemical contamination). SanPiN 2.1.4.1116-02 installed hygienic standards of composition and properties of bottled water for two quality categories.

Table 2

Organoleptic indicators of drinking water bottled to the receptacles

Indicators	Units of measure	Quality standards of bottled drinking water, not more		Harmfulness indicators	Harmfulness level
		First class quality	Highest quality		
Organoleptic indicators					
Fragrance (20°C)	Points	0	0	Organoleptic	-
When heated (60°C)		1	0	-	-
Flavour		0	0	Organoleptic	-
Colour	degrees	5	5	Organoleptic	-

Water silt content	FTU	1.0	0.5	Organoleptic	-
pH index	units	6,5-8,5	6,5-8,5	Organoleptic	-

Table 3

Salt composition indicators (influenced on organoleptic properties of drinking water)

Chlorides	g/l	250	150	Organoleptic	4
Sulfates	g/l	250	150	Organoleptic	4
Phosphates	g/l	3,5	3.5	Organoleptic	3

Water harmless by its chemical composition is determined by its compliances regulating the content:

- major salt elements;
- toxic metals of I, II and III harmfulness level;
- toxic non-metallic elements and halogens;
- organic substances of anthropogenic and natural origin nongeneric and specific indicators.

Table 4

Harmlessness criteria of chemical composition and radiation safety of drinking water (mg/l, not more)

Indicators	Units of measure	Quality standards of boted drinking water, not more		Harmfulness indicators	Harmfulness level
		First class quality	Highest quality		
Salt and gas composition					
Silicates (Si)	mg/l	0	10	Sanitarian toxicological	2
Nitrates (NO ₃)	mg/l	20	5	Organoleptic	3
Cyanides (CN)	mg/l	0,03 5	0,03 5	Sanitarian toxicological	2
Hydrogen sulphide (H ₂ S)	mg/l	0,00 3	0,00 3	Organoleptic	4
Toxic metals					
Aluminium	mg/l	0,2	0,1	Sanitarian toxicological	2
Barium	mg/l	0,7	0,1	Sanitarian toxicological	2

Continuation of table 4

Beryllium	mg/l	0,0002	0,0002	Sanitarian toxicological	1
Ferrum	mg/l	0,3	0,3	Organoleptic	3
Cadmium	mg/l	0,001	0,001	Sanitarian toxicological	2
Cobalt	mg/l	0,1	0,1	Sanitarian toxicological	2
Lithium	mg/l	0,03	0,03	Sanitarian toxicological	2
Manganese	mg/l	0,05	0,05	Organoleptic	3
Cuprum	mg/l	1	1	Organoleptic	3
Molybdenum	mg/l	0,07	0,07	Sanitarian toxicological	2
Sodium	mg/l	200	20	Sanitarian toxicological	2
Nickel	mg/l	0,02	0,02	Sanitarian toxicological	1
Hydrargyrum	mg/l	0,0005	0,0002	Sanitarian toxicological	1
Selenium	mg/l	0,01	0,01	Sanitarian toxicological	3
Argentum	mg/l	0,025	0,025	Sanitarian toxicological	1

Plumbum	mg/l	0,01	0,01	Sanitarian toxicological	3
Strontium	mg/l	7	7	Sanitarian toxicological	2
Stibium	mg/l	0,005	0,005	Sanitarian toxicological	2
Chromium	mg/l	0,05	0,03	Sanitarian toxicological	3
Zinetum	mg/l	5	3	Organoleptic	3
Toxic non-metallic elements					
Borium	mg/l	0,05	0,05	Sanitarian toxicological	2
Arsenium	mg/l	0,01	0,006	Sanitarian toxicological	2
Ozone	mg/l	0,1	0,1	Organoleptic	3
Halogens					
Bromide-ion	mg/l	0,2	0,1	Sanitarian toxicological	2

Chlorine residual binded	mg/l	0,1	0,1	Organoleptic	3
Chlorine residual free	mg/l	0,05	0,05	Organoleptic	3

Table 5**Biocontamination criteria**

Permanganate oxidability	mg Oz/l	3	2		
Ammonia and ammonia-ion	mg Oz/l	0,1	0,5		
Nitrites (NO ₂)	mg Oz/l	0,5	0,00 5	Organoleptic	2
Organic carbon	mg/l	10	5	Organoleptic	
Superficially active substances (SAS)	mg/l	0,05	0,05	Organoleptic	
Petrochemicals	mg/l	0,05	0,01	Organoleptic	
Phenols volatile (total)	mkg/l	0,5	0,5	Organoleptic	4
Chloroformium	mkg/l	60	1	Sanitarian toxicological	2
Bromform	mkg/l	20	1	Sanitarian toxicological	2
Dibrom chloromethane	mkg/l	10	1	Sanitarian toxicological	2
Bromodichloromethane	mkg/l	10	1	Sanitarian toxicological	2

Quadri - chlorous carbon	mkg/l	2	1	Sanitarian toxicological	2
Formaldehyde	mkg/l	5	5	Sanitarian toxicological	2
Benzopyrene	mkg/l	3	2	Sanitarian toxicological	2
Di phthalate	mkg/l	0,1	0,5	Sanitarian toxicological	2
Benzene hexachloride	mkg/l	0,5	0,00 5	Sanitarian toxicological	2
Benzene hexachloride (HCH)	mkg/l	10	5	Sanitarian toxicological	1
2.4-D	mkg/l	0,05	0,05	Sanitarian toxicological	2
Heptachlor	mkg/l	0,05	0,01	Sanitarian	2

				toxicological	
DDT	mkg/l	0,5	0,5	Sanitarian toxicological	2
Atrazine	mkg/l	60	1	Sanitarian toxicological	2
Simazin	mkg/l	20	1	Organoleptic	4

Table 6

Integrated toxicological characteristics

In total NO ₂ , NO ₃	units	<0,5	<0,1	Organoleptic	
In total trihalomethanes	units	<0,5	<0,1	Organoleptic	

Table 7

Radiological safety criteria

Total radioactivity α-	Bq/l	0,1	0,1	Radiological	
Total radioactivity β-	Bq/l	1	1	Radiological	

Table 8

Microbiological and parasitological indicators of drinking water

Indicators	Units of measure	Quality standards of bottled drinking water	
		First class quality	Highest quality
Total microbial count (t 37°C)	CFU/sm ³	20, not more	20, not more
Total microbial count (t 22°C)	CFU/sm ³	100, not more	100, not more
Total coliform bacteria	CFU/sm ³	absence in 300 sm ³	absence in 300 sm ³
Thermotolerant coliform bacteria	CFU/sm ³	absence in 300 sm ³	absence in 300 sm ³
Glucose positive coliform bacteria	CFU/sm ³	absence in 300 sm ³	absence in 300 sm ³
Sulfite-reducing	CFU/sm ³	absence in 20	absence in 20

clostridia flavours		sm ³	sm ³
Pseudomonas aeruginosa	CFU/sm ³	absence in 1000 sm ³	absence in 1000 sm ³
Coliphages	CFU/sm ³	absence in 1000 sm ³	absence in 1000 sm ³

Continuation of table 8

Cryptosporidia oocyst	quantity/50 l	absence	absence
Lambliia cysts	quantity/50 l	absence	absence
Helminth eggs	quantity/50 l	absence	absence

Bottled water for baby nutrition must conform to the normative values by the basic indicators of the highest quality water. It is not allowed to use argentine and carbon dioxide as preservative agents. The content of fluoride-ion should be within 0,6-0,7 mg/l, iodide-ion – 0,04 to 0,06 mg/l.

The physiological usefulness of macro and microelement composition of packed water is determined by the compliance with the standards. Such standards are on the basis of the maximum water hardness (7 mgkv/l), of recording the minimum required content of magnesium and maximum content of calcium, and vice versa.

Oxygen content in bottled water should be not more than:

5 mg/l – for the first class quality water

9 mg/l (saturation, 20-22°C)– for the highest quality water.

Table 9

Physiological usefulness standards of drinking water

Indicators	Units of measure	Physiological usefulness standards of drinking water, within	Quality standards of bottled drinking water	
			First class quality	Highest quality
Total mineralizing (solid residue), within	mg/l	100-1000	1000	200-500
Hardness	mgkv/l	1,5-7	7	1,5-7
Alkalescency	mgkv/l	0,5-6,5	6.5	0,5-6,5
Calcium	mg/l	25-130	130	28-80
Magnesium	mg/l	5-65	65	5-50
Potassium	mg/l	-	20	2-20
BicarbonateS	mg/l	30-400	400	30-400

(HCO ₃)				
Fluoride-ion	mg/l	0,5-1,5	1,5	0,6-1,2
Iodide-ion	mkg/l	10-125	125	40-60

Standards of water quality and safety continuously reviewed and made more tightened. US Food and Drug Administration (FDA) in collaboration with EPA plans to set standards for new contaminants of drinking water and lower for existing ones. So, for bottled water is additionally introduced new control indicators for antimony, beryllium, cyanide, nickel, thallium, diquat, endothelia and 2,3,7,8-TCDD (dioxin). To reduce the risk for human health caused by radon, EPA proposes to reduce the standards for radon in drinking water to 4,000 picocurie per litre.

Monitoring of bottled drinking water is carried out by IBWA founded in the United States in 1958. IBWA members are more than 1,200 USA companies and companies from other countries. They produce 85% of bottled drinking water sold in the United States. In order to protect the interests of consumers IBWA has developed a set of quality requirements for bottled water - IBWA Model Code, including the control of all production stages: from choice of drinking water source for bottling to its delivery to the consumer.

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PRECONDITIONS OF FORMING AND DEVELOPMENT OF PUBLIC HEALTH CARE IN HALYCHYNA IN THE EARLY TWENTIETH CENTURY

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Creating a public health system in Halychyna was caused by several factors. Despite the policy of the Government of Austria-Hungary at building a network of medical facilities, generally advanced at that time measures, the rural population of Halychyna had no proper medical care. One of the reasons – the ratio of residents to the amount of doctors, for example, in the late nineteenth century one doctor accounted for 7065 people and served an area of 60–140 square kilometers [28, p.114].

Therefore there was a private medical practice, medical care was very expensive. In late nineteenth century an appointment costed 5 zlotych, call at home – 10 zlotych (at night – 20 zlotych), leaving the village to the patient - an average of 20-50 zlotych (depending on distance) and night rates for these services were twice as big; removal of appendicitis, for example, cost 200-300 zlotych, more complicated operation reached 1000 zlotych; other medical services are too expensive: x-rays – 30 zlotych, abortion – 100 zlotych [20, p. 34-35]. Consequently, the aid was not available to peasants.

Severe social and economic situation, heavy physical labor, poor nutrition, lack of food and warm clothes, sophisticated living conditions and lack of sanitation, alcoholism and other negative effects worsened health of Ukrainians. Peasants do not understand the need for personal hygiene, as always suffered from infectious diseases (influenza, pneumonia, tuberculosis, scarlet fever, smallpox, cholera, typhoid, dysentery, venereal illnesses, etc.). Statistics of deaths is impressive: in five years (from 1883 to 1887) about 300 000 people died from epidemics, caused about 40–47% of all deaths were diseases caused by various pathogens [30, p. 7]. Mortality was extremely high in Halychyna – it was the highest in Western Europe, infant mortality was 22.9% (for example, in England, of Denmark, Sweden – only 13%). Thus, in 1904 in the province died 201000 people, including 115,000 children aged 1 to 15 years, including 66214 year old children [18, pp. 23; 6 p.265-26]. According to a survey of 884 children held by company “Batkivska Spilka” in Ternopil, 32% lived in dark rooms, 51% – in damp areas, 31% - did not receive a warm breakfast, 43% – during the day were without parental care [32, p. 48]. In Lviv most adults and children suffered from tuberculosis, for example, the death rate from tuberculosis in the 1880-1881 was 57.8 persons per 10,000 persons [1, p. 184].

Despite the imperfect health care system in the Austro-Hungarian Empire, that it gave impetus to the development of Ukrainian medicine and medical intelligentsia formation. Thus, December 2, 1867 Lviv medical doctors created Galician Doctor Society [22, pp. 11], which was originally only 47 people, then the number of members increased, soon having branches in the province. Pharmacists and dental

technicians created their own societies for the protection of the rights [21, pp. 13; 23, pp. 3; 27 ark.1].

Society “Poliklinika Lvivska” emerged on the initiative of Lviv doctors in 1900. Its mission is to help patients for free, provide them drugs at a discount. “Poliklinika Lvivska” had clinic and laboratory. Doctors arranged conferences, published medical journals [24 ark.1], that is combined practice and scientific work.

Ivan Horbachevskiy (1854–1942) (the most titled Ukrainian scientist in the Austro-Hungarian Empire) made a great contribution to the development of Ukrainian medicine, national health care system. He studied at the University of Vienna (1873–1877), was recognized among European scholars. Ivan Horbachevskiy was an active member of societies “Hromada” and “Sich” from 1899 – member of the Shevchenko Scientific Society [17, p. 3–4]. Scientist actively cooperated with Ukrainian scholars and practitioners in Lviv.

The creation of the world's first specialized Ministry of Health in 1917 was a big event in the life of Ivan Horbachevskiy and of development of not only national but also European medicine. It was a separate entity of the government of Austria-Hungary. It is for this Ukrainian scheme having been established counterpart in England, France, Poland and other countries. Ivan Horbachevskiy was not only the author of this idea, but it embodied in life. He was its first minister (since July 20, 1918 – the end of October 1918) [7, p. 5-8]. He had the experience of such work – was a member of the Regional board of health in Prague, member of the Highest health council in Vienna (1906) [8, p.15]. Ivan Horbachevskiy has made great efforts to establish the Ukrainian Free University in 1921, which led in 1923 [33, p. 156-157].

Jaroslav Okunevskiy and Sofia Okunevska (cousin) are also famous Ukrainian doctors of Halychyna. It was a common practice when graduates of medical faculties became military doctors. This path was chosen by Jaroslav Okunevskiy who made brilliant career in military medicine. In 1884 received his medical degree, then began perform the duties of ship's doctor of the Austria-Hungary navy, he had visited Europe, Asia, Africa, North America and Oceania.

He is the author of the first charter of the naval forces medical service (1900). At the beginning of World War I was promoted to Rear Admiral, led the medical service of the Habsburg Admiralty Navy, worked here with Ukrainian colleagues and subordinates. Rear Admiral J. Okunevskiy organized Ukrainian health service and headed it. He organized the supply of medicines for the Legion of Ukrainian Sich Riflemen, helping their health services, donated funds, etc. [5].

Sofia Okunevska (1865–1926) was the first woman doctor in Halychyna. In 1885 she passed the matriculation exams in Lviv Academic Gymnasium (then women could not take the graduate exam). At the event there were Ivan Franko, Ivan Nechuy–Levytsky, Olexander Konyskyj with daughter, Ivan Belei, etc.

Then Sofia Okunevska moved to Switzerland, in 1887 she became a student of the University of Zurich, because in Halychyna women do not have access to higher medical education. In 1895 successfully graduated from the University of Zurich. Sofia Okunevska became the first female doctor in the Austro-Hungarian Empire and the first woman in Western Ukraine, who gained university education [14, p. 48]. In

1895 almost all newspapers in Halychyna wrote about this sensational news. Sophia's Husband was famous Polish literary critic, chemist and doctor – Vaclav Moraczewski. He came from an ancient aristocratic family. He had defended his doctoral dissertation in chemistry and medicine. Vaclav Moraczewski chose a new promising direction of research – physiological chemistry. At one time he worked at Lviv University, headed Lviv veterinary institute.

It was hard to get a government job for Sofia Okunevska, she worked in the “Narodna Lichnytsya”, headed by her cousin – known scholar and social activist Yevhen Ozarkevych. Sofia Okunevska created a school of Obstetricians and Gynecologists in Lviv, for the first time in Western Ukraine organized courses for nurses and midwives. For very sensitive heart and friendly attitude to patients, they called her “Saint Sofia” [4]. Sofia Okunevska simultaneously worked on scientific problems, worked in medical commission, helped Y. Ozarkevych to conclude Ukrainian dictionary of medical terminology, and participated in the publication of the medical journal “Zdorovlye”. In 1908 she also published the book “The influence of temperature on erythrocyte osmotic pressure” (had several editions) [14, p. 48].

She was an active Ukrainian women's movement activist, member of the Ukrainian Society of women with higher education created in Lviv. Sofia Okunevska was extremely talented (author of art works) and erudite woman, she was admired by Ivan Franko, Vasyl Stefanyk, Olga Kobylanska [13]. During the First World War Sofia Okunevska worked as a doctor in Hmindi and other cities in the Ukrainian internment camps (up to 1919). Her life is an example of national pride, patriotism, charity. Sofia Okunevska died February 24, 1926 in hospital from purulent appendicitis. She was buried at the Lychakiv cemetery in Lviv [13].

Sofiya Parfanovych-Volchuk (1898-1968) was another female doctor who left an important mark on the development of health care of Ukrainians in Halychyna. She worked on the development of medical science, trained personnel of medical professionals. Sofiya Parfanovych-Volchuk was a scientist, writer, educator, social activist (active member of the Ukrainian medical association, one of the founders of the Ukrainian hygienic society, the Union of Ukrainian women, head of the union “Vidrodzhennya”).

Sofia Parfanovych was born June 7, 1898 in Lviv in the family of a railroad employee. Her father – Mykola – gave university education to all five children, three of whom (Sofiya, Teodor, Kostyantyn) became doctors, two (Yuliya ta Olga) became teachers. In 1916 Sofia graduated from Lviv girls' school, and in 1917 entered the Medical Faculty of the Lviv University, becoming the first Ukrainian woman who acquired the medical profession. Sophia was nationally conscious young woman, a member of the Student Society “Medychna gromada” in Lviv. In Prague she belonged to the Ukrainian “Akademichna gromada” and the Women's Student Society. Sofia Parfanovych as Sofia Okunevska worked in clinic “Narodna lichnycya” for free. Since 1926 she belonged to the Ukrainian Medical Association [11], took part in medical congresses, where she performed with reports and belonged to the Union of Ukrainian Women. She was one of the founders of the Ukrainian hygienic society (1929). She made a great effort to organization and development of anti-alcohol company “Vidrodzhennya”, which she headed. Sofia was a chief editor

of the “Vidrodzhennya” journal. She collaborated actively with “Prosvita”, “Ridna shkola”, “Silskyj gospodar” societies. She was the author of such works as “Man and Woman” (1930–1935); “Vegetables, herb and soft drinks” (1932), 572 page publication on “Hygiene Women” (1939) and a collection of essays “The Price of Life” (1937) [16; 19; 25].

Thus, this work of local doctors became the basis and prerequisite for the creation Ukrainian public health system. It was an alternative health care system, which was organized by Ukrainian doctors and public figures, Greek Catholic clergy and philanthropists.

The creation of the “Narodna lichnycya” was of great importance, its statute was developed in late 1902. The purpose of the “Narodna lichnycya” was free medical care (including medicines) for poor citizens. Its “creator” was doctor Yevhen Ozarkevych. He was born May 8, 1861, came from a well-known family of priest.

Yevhen Ozarkevych studied at Chernivtsi gymnasium and at Academic gymnasium in Lviv. In 1879 entered the Medical Faculty of the University of Vienna, was a leader of the Ukrainian students association called “Sich”. In 1888 became a professor and worked in hospitals of Vienna for three years. In 1893 Yevhen Ozarkevych moved to Stryj, where he worked as a private doctor, from 1894 – as a district doctor in Rozhnyativ.

Yevhen Ozarkevych is called as organizer of Ukrainian doctors. For only 55 years of his life (8 May 1861 – September 21, 1916, Vienna), he did very much for Ukrainian science, domestic medicine and Ukrainian national development, social and medical care of the most vulnerable segments of the population. Yevhen Ozarkevych is an author of the first Ukrainian scientific medical publications, member of the Shevchenko Scientific Society, the founder and editor of the first Ukrainian scientific medical publication called “Likarskyj zbirnyk”, the author of many scientific and sociopolitical publications, the founder and editor of the first Ukrainian sanitary magazine called “Zdorovlye”, the initiator of creating and the director (until his death) of the first Ukrainian ambulatory called “Narodna lichnycya”, the representative of Ukrainian doctors in several international scientific congresses, an active leader of “Prosvita” and member of Supreme health council in Vienna [12]. He published first scientific medical research laboratory works with liver disease and diagnosis of malaria in Ukrainian, was the first to publish Ukrainian language abstracts and reviews of articles from new European magazines, published a number of works from different fields of hygiene, author of article called “Poshestni nedugy”, which laid the foundations of a Ukrainian medicine doctrine of infectious diseases [4; 5].

Organizational meeting of “Narodna lichnycya” took place in January 1903, it included 800 people. On October 1, “Narodna lichnycya” started its activity with four divisions: ophthalmic, surgical, therapeutic, gynecological, where Sofia Okunevska–Morachevska worked. Children’s section was opened the following year. As of 1906 it was already seven departments. All patients were provided with free medical care in, “Narodna lichnycya“. It was very vivid social and national-patriotic design.

In a speech delivered by Metropolitan Andrey Sheptytsky September 22, 1903 on the occasion of the consecration of the “cultural and humanitarian institution”, was

stated that its a key task to help “poor and suffering humanity” “without national differences” [31, p. 20–21], which is meant here can get a full free medical care not only Ukrainians, but also Poles, Jews, members of other minorities. This distinguished “Narodna lichnycya” from those of Polish or Jewish institutions.

At the “Narodna lichnycya” there was provided treatment or examination of about 16 thousand patients till the beginning of World War I [2, p. 8–9]. Only in 1912 it had eight hospital departments, provided medical care to 3250 patients from the city and suburbs, in total there were 10,000 visits [2, p. 8–9; 5].

“Narodna lichnycya” has turned into a Russian hospital on the Russian occupation during World War II [2, p. 8–9].

In the early 1920s, “Narodna lichnycya” began to restore its activity. It was quite difficult to realize due to Polish occupation. After the war its first directors became bishop Y.Botsyan (1918-1919) and prelate L.Kunytsky (1919–1921). They and their successors – known doctors and public figures (S.Drymalyk, M.Vahnyanyn, I.Kurovets) improved physical infrastructure of facility, attracted to work on a voluntary basis or for a nominal charge best Ukrainian doctors and medical students [2 p.10–11; 26, p.78].

During the 1920s, at the institution was working from 14 to 18 Ukrainian doctors who treated outpatient or inpatient with 6.5 to 8.3 thousand people each year. Many of them were doing complex surgeries for free and were provided with medical treatment. Medical students performed by 17-25 thousand reviews and advices annually. Such charitable activities of Lviv “Narodna lichnycya” had a wide resonance and recognition among the population of Western Ukraine. Therefore patients from all over Halychyna, Volyn, Holmshhyna came here for help. This medical care had supranational nature.

In the first half of the 1930s 55% of patients were school students from education society UPT “Ridna Shkol” and Ukrainian unemployed, the disabled, widows, artists, teachers [15].

In 1927, there were 16 doctors in “Narodna lichnycya” (M.Panchyshyn, M.Muzyka, T.Tuna–Nadragova, Tyt Burachynskyj, M.Vaxnyanyn, Ya.Gynylevych, M.Dzerovych, L.Maksymonko, O.Podolynskyj, V.Kashubynskyj, S.Parfanovych and others). They treated near 16 thousands patients annually. In 1937 about every 12th Lviv resident sought medical help to the Ukrainian clinic. Among physicians need to add the following names: J. Rudnytska–Kryshtalska, N.Luk'yanovych, H.Luk'yanovych, Ye.Durdello, Ya.Malys, O.Filyas, R.Osinchuk, I.Hrynevetsky, O.Peleh, I.Simovych, I.Dovbush, B.Makarushka, M. Boyko, O.Chaykivska–Pshepyurska, Yu.Kordyuk.

One of the important directions of the “Narodna lichnycya” development was building of a separate hospital. This idea emerged in 1921 and the following year made the first fundraising – \$ 200 [2; 31, p. 22]. In April 1928 was created a special committee of structure and construction commission, which included Ye.Burachynsky, O.Podolynsky, M.Halibey, M.Stefanivsky. With the support of the Ukrainian Greek Catholic Church and national institutions there was launched a massive campaign of gathering donations, which covered all Western Ukraine. For a decade with the help of 75 patrons and of the province population was collected more

than 600 thousand zlotych. Metropolitan Andrey Sheptytsky, who was the guardian of the “Narodna lichnyca”, gave a piece of land under the structure of the hospital.

Polish authorities sometimes committed bureaucratic obstacles, would not prevent the creation of another Ukrainian public health institution. Ukrainian parliamentary presentation, Metropolitan A. Sheptytsky and influential Ukrainian political, financial, economic and social organizations helped to overcome all difficulties. Hospital “Narodna lichnyca” was designed by the best examples of its kind of European institutions. It was opened only in October 1938, although the first stone was laid in September 1930 [2; 31, p. 23–63]. Dr. Tyt Burachynskyy was a chief doctor. The hospital has 10 departments, including dental, analytical laboratory, physiotherapy room [2; 5].

Hospital became one of the best medical facilities in Lviv due to its equipment, trained professionals and care for patients.

Due to administrative obstacles, and most importantly due to the lack of necessary equipment and medical staff it was impossible to open such hospitals in the region.

Thus, despite the imperfect health care system in the Austro-Hungarian Empire, that it gave impetus to the development of Ukrainian medicine and medical intelligentsia formation. Even in 1867 Lviv doctors created Society of Halychyna physicians. In 1900 there was a company “Poliklinika Lvivska“, whose goal was an assistance for free and drug supply at a discount. “Poliklinika Lvivska” had ambulatory and laboratory. Doctors arranged conferences, published medical journals. In the early twentieth century Ukrainian doctors in Halychyna (Ivan Gorbachevskyj, Yevgen Ozarkevych, Yaroslav Okunevskyj, Sofiya Okunevska-Morachevska, Sofiya Parfanovych, etc.) made a great contribution to the development of Ukrainian academic medicine, national health care system.

Founded in 1903 in Lviv “Narodna lichnyca” society was the biggest event in the history of Ukrainian public health system. Not only Ukrainians, but also Poles, Jews, members of other minorities received here a full medical assistance for free. It had a supranational character. This distinguished “Narodna lichnyca” from those of Polish or Jewish institutions where physicians carried about patients’ ethnicity. The activity of “Narodna lichnyca”, Ukrainian medical association (1910), Ukrainian hygienic Society (1929) and other health agencies eliminated the gaps in public health system and assisted the most vulnerable segments, including peasants, pupils, and students.

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J11506-004**Tokareva N.G., Zeleznova E.V.****FEATURES OF PSYCHOLOGICAL PROTECTION OF PATIENTS
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Abstract. In this paper we describe the use of mechanisms of psychological protection at patients with epilepsy is carried out. It is noted that definition of the main mechanisms of psychological protection at epilepsy plays an important role when carrying out medical and rehabilitation actions to this contingent of patients.

Key words: epilepsy, mechanisms of psychological protection.

Epilepsy is the most significant disease in medical, psychological, sociological aspects. Over 50 mln people in the world have an epilepsy diagnosis. Compared with other neuropsychical diseases it is epilepsy that significantly influences the quality of the patients' social life due to restrictions of social functions, including labour activity, qualification, teaching and communication, social and psychological problem are stipulated by different restrictions of epilepsy patients, imperfection of legal help, absence of necessary social support, namely, social and psychological help. It often stipulates discrimination of epilepsy patients in labour sphere and reduces the level of their social adaptation. Clinical psychological examination of 40 epilepsy patients (20 males and 10 females) at the age of 25 to 50 has been held. The duration of epilepsy is from 5 to 20 years. The epilepsy diagnosis was made by the diagnostic scheme of verification of epileptic seizures (ILAE, 2001). The clinical psychodiagnostic examination included anamnesis conversation, observation, psychodiagnostic questionnaire LSI (definition of the basic types of mechanisms for psychological protection, statistical processing of the examination results was conducted with the help of the programme «STATISTICA».

As a result of the conducted examination the following findings on the distribution of mechanisms of psychological protection of epilepsy patients were obtained: negation-23%, exclusion-20%, regression-70%, compensation-12%, projection-10%, displacement-9%, intellectualization-3%, reactive formation-3%. Patients with the leading mechanism of psychological protection – negation-report that they like to be in the centre of attention and often do rash actions. Patients with the leading mechanism of psychological protection are characterized by anxiety, a feeling of discomfort. At the mechanism of regression patients are «immersed» the conversation, and are whining during the conversation, and are characterized by change of mood.

Patients with mechanism of reactive formation are polite in the conversation, show increased selfassessment and are concerned with their 'decent' outward appearance.

Knowledge of the leading protective mechanism which influences the form of psychological correction and technology of providing compliance between the doctor and the patient is necessary for creating medical rehabilitation programmes. Psychotherapeutic measures for epilepsy can be divided into general and special. The

main tasks of general measures are to establish close, informationally saturated confidential contact with a patient and explanatory support of all the types of therapeutic procedures and prescription of medicines. Special measures are aimed at those disorders (neurological, hypochondric, etc) which can aggravate the course of the basic disease. While indications to the use of anti-convulsive means is dictated first of all by the structure of seizures, their frequency, etc, psychotherapy at epilepsy is mainly addressed to the patients' personality and arises from it. Modality, objectivizing understanding of the epilepsy patient's personality reflects specifics of suffering proceeding by cycles with convulsive loss of consciousness and post-critical or episodic disorders-corresponding to big and small seizures, their equivalents and subclinical seizures. Sharp lack of knowledge of a patient about what is happening to him leads to the decrease of organization of the system of his relations with the surrounding people, to egocentric narrowing of his experience and to worsening of his perception. Therefore already the first conversations with patients are given psychotherapeutic accent of informationally constructive method, which retains its force in future. Already during the collection of anamnesis from the patient's words the aim is to restore its 'internal picture' and to fill in gaps in patient's consciousness, along with the phenomenological study of the disease. Registration of the leading mechanism for psychological protection is important for providing high compliance between the doctor and the patient, while the aim for psychological correction is clinical psychodiagnostic parameters connected with the given mechanisms.

J11506-005**Mershenova G. Zh., Vostrova O. P., Grafkina Ya.V., Gnedkova A.N.,
Goroshko V.O., Lazareva G.V., Seytekova A.N.****DEPENDENCE OF DEGREE OF ARTERIAL HYPERTENSION ON
THE BODY WEIGHT INDEX AT WOMEN DURING THE POST-
MENOPAUSAL PERIOD.***Karaganda state medical university,
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Abstract. In the review are analyzed dependence of degree of arterial hypertension on a body weight index at women during the post-menopausal period. Influence of healthy nutrition and optimum exercise stresses at continuous anti-hypertensive therapy on degree of an obesity and lability of arterial hypertension.

Keywords: arterial hypertension, obesity, post-menopausal period.

In economically developed countries more than 50% of women suffer from a metabolic syndrome to which repeated rising of risk and frequency of development of the arterial hypertension (AH), a diabetes mellitus of the 2nd type, atherosclerosis and coronary heart disease is distinctly bound that leads to mortality augmentation from cardiovascular pathology [2, 5, 8]. According to epidemiological researches, women after menopause have menopause and within the next 4-5 years the frequency of AH doubles and makes more than 50% [4]. Various researches confirm the weakened influence of estrogen and progesterone on a vascular wall. Deficiency can lead them to a vasoconstriction and rising of the arterial pressure (BP). But thus the AH pathogenetic mechanisms in a postmenopause aren't limited to the termination of positive influence of hormones of ovaries on a vascular tonus. Now it is known that estrogens accelerate processes of splitting of fats and suppress synthesis of the lipide fractions promoting development of an atherosclerosis. Gradual depression of level of estrogens in a perimenopause leads to disturbances of a lipide exchange, and also development of an insulin resistant, as causes predilection to a weight increase in a climacteric [1]. In case of controlled depression of body weight the risk of developing of the specified diseases decreases, the mortality decreases.

Research objective - to study dependence of degree of AH on the body weight index (BWI) at women during the post-menopausal period. To estimate influence of healthy nutrition and optimum exercise stresses at continuous anti-hypertensive therapy on degree of an obesity and lability of arterial hypertension.

Materials and methods. Research included 200 women with AH and an obesity who are in a postmenopause. Criteria of including of patients in research were: Degree AH 2nd and 3rd; obesity of the 1st (body weight index = 30,0–34,9 kg/sq.m) and 2nd (body weight index 35,0-39,9kgm²) degree; the postmenopause period till 10 years; existence of the signed informed consent of patients to participation in research. Research didn't join the patients who had at least one of criteria of an exception: ischemic heart diseases demonstrative forms; the postponed myocardial infarction and/or a stroke in the previous 6 months; difficult disturbances of a rhythm and conduction; diabetes mellitus of the I type; diseases of a thyroid gland; serious

somatic or mental illness. Arterial hypertension (idiopathic hypertension) was diagnosed according to criteria of All-Russian scientific organization of cardiologists (2008) [3]. The secondary genesis of AH was excluded on the basis of the analysis anamnestic yielded, results of clinical and laboratory and tool inspection of patients. Degree of an obesity was determined by body weight index, according to the WHO classification of 1997. 3 groups of patients were allocated: 1 group - an obesity of 1 degree and the 2nd degree of AH (67 female-33,5 of %), the 2nd group - an obesity of 2 degrees and the 2nd degree of AH (65 female-32,5 of %), the 3rd group – an obesity 2 and 3rd degree of AH (68 female-34 of %).

At the beginning of research by all patient recommendations on anti-hypertensive therapy, healthy nutrition and optimum exercise stresses were made, drug treatment of an obesity wasn't used. Inspection was performed 1 time in 3 months. Duration of research made 12 months. All allocated groups at the beginning of research were comparable on age, sex, growth, and also disease duration, existence of the accompanying pathologies and a social economic situation.

The statistical analysis of the received results carried out with use of didymous t-of criterion of Student. Tabulation was carried out in the Excel program, the statistical analysis - by means of programs of a «Statistica» package.

Research was clinical, prospective, comparative, open in parallel groups.

Results of research. At the first investigation phase anthropometric and all-clinical examination of patients, measurement of a BP was conducted, also all patients were examined by the gynecologist and the cardiologist. All patient made recommendations on anti-hypertensive therapy, healthy nutrition and optimum exercise stresses. At the subsequent surveys anthropometric examination and measurement of a BP was also taken.

Primary inspection showed that the frequency of occurrence of AH of 2 degrees is identical at an obesity as 1 and 2 degrees (50,7-49,3% respectively). Thus an obesity of 2 degrees in 51% of cases is followed by AH of 3 degrees. At 15 patients with AH of 3 degrees (22%) at starting medicamental therapy target indicators of a BP weren't reached.

At repeated inspection in 12 months it was taped: at 3 patients indicators of body weight index reached level ;30,0, at 94 patients indicators of body weight index corresponded to an obesity of 1 degree, at 103 – 2 degrees. Thus indicators of a BP were distributed as follows: 1 degree - 33 women, the 2nd degree - 127 women, the 3rd degree – 40 women. By results of research in groups there were following changes: 1 group - an obesity of 1 degree, AH of 2 degrees – 61 women; The 2nd group – an obesity of 2 degrees, AH of 2 degrees – 66 women; The 3rd group – an obesity of 2 degrees, AH of 3 degrees – 40 women; at 33 women of digit of a BP there corresponded AH of 1 degree, thus at 3 of them an obesity wasn't diagnosed. It is necessary to notice that the BP target levels were reached at all women.

Therefore, repeated research showed depression of indicators of a BP at simultaneous decrease of degree of an obesity. Also correlation of degree of an obesity with AG degree attracts attention. Thus weight reduction only by means of normalization of a delivery and optimization of exercise stresses at women in the postclimacteric period proceeds quite slowly in view of a hormonal imbalance though

in 13,5% of cases it was succeeded to achieve statistically significant weight reduction, and in 1,5% of cases an obesity wasn't diagnosed. The number of women with AH of 3 degrees decreased by 14% (initially 34%), at 16,5% (initially 0%) women 1 degree of AH is defined.

Conclusions. The obtained data testify that AH degree at women in the postclimacteric period directly correlates with obesity degree, lability of AH also depends on the patient's weight, thus weight reduction is reached by exclusively balanced diet and optimum exercise stresses.

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**Mershenova G. Zh., Seytekova A.N., Mirzayeva B. N., Gnedkova A.N.,
Vostrova O. P., Grafkina Ya.V., Goroshko V.O.**
**QUALITY OF LIFE OF THE PATIENTS WHO TRANSFERRED Q-
POSITIVE MYOCARDIAL INFARCTION.**

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Abstract. In the review it is surveyed qualities of life of the patients who transferred the Q-positive myocardial infarction complicated by paroxysmal or constant forms of a ciliary arrhythmia.

Key words: quality of life, myocardial infarction, ciliary arrhythmia.

The most widespread disease of cardiovascular system the coronary heart disease (CHD) is considered. [1,10]. The disease quite often happens at the working-age and sharply reduces quality of human life.[2,4].

The assessment of quality of life of patients with cardiovascular pathology has the features because at such patients the pavor of sudden death is increased, their sufferings are bound to pain, a dyspnea, delicacy and the mortality remains high. [4,5,9]. At patients with disturbances of a cardiac rhythm the assessment of quality of life is important additional criterion at a choice of medical tactics [3,7,8].

Research objective - to estimate quality of life of the patients who transferred the myocardial infarction complicated a ciliary arrhythmia.

Research methods. Research joined men and women aged from 45 till 65 years, the suffering ischemic heart diseases and which transferred a Q-positive myocardial infarction having a paroksizmalny or constant form of a ciliary arrhythmia. Criteria of including in research were: the patients who are suffering from an ischemic heart disease, transferred a Q-positive myocardial infarction.

Research methods. In work all-clinical methods of inspection of patients are used: data of out-patient cards, acts of medico-social examination of patients, data of the anamnesis, the analysis of an ECG is carried out. When carrying out research of indicators of quality of life questionnaires were used: "SF-36 Health Status Survery".

The emphasis on an assessment of the general state of health at the time of including of patients in research and treatment prospects according to special sections of a questionnaire of SF-36 is placed.[5,7,12]. Indicators of social functioning of the patients who transferred Q-positive IM without disturbance of a rhythm, and the patients having a paroxysmal and constant form of a ciliary arrhythmia are investigated.

The statistical analysis was carried out by means of applied packages of the statistical «Statistica» programs. It is analysed only 209 out-patient cards and acts of medico-social examination. Selection for research was made by 102 patients aged from 45 to 65let (middle age of 54,4±9,5 years) with the postponed Q - positive a myocardial infarction, of them 64 men (62,7%) and 38 women (37,3%). All patients (transferred Q - positive IM and depending on absence/existence by paroxysmal and constant forms of a ciliary arrhythmia) are divided into three groups. The 1st group included the 58th patient with absence in the anamnesis of a paroxysmal or constant

form of a ciliary arrhythmia. The second group is presented by 30 patients at whom took place a paroxysmal form of a ciliary arrhythmia and the 3rd group included 14 patients having a constant form of a ciliary arrhythmia. (tab.1)

Table 1

	1 group (p=58)	2 group (p=30)	3 group (p=14)
Age, years	53,4±3,5	52±4,2	53±2,8
Men	36	18	10
Women	22	12	4
I degree AH(p=7)	2(3,4%)	3(10%)	-
Level SBP	150,4±4,1	153±4,9	152,3±5,3
DBP (mm Hg.)	90±3,9	95,2±4,0	92,5±3,0
II degree (n=30)	19(32,7%)	7 (12,0%)	4(28,5%)
Level SBP (mm Hg.)	167,8±5,9	170±4,5	165,3±4,4
DBP (mm Hg.)	98,3±5,0	105,0±3,8	100,2±2,1
III degree (n=65)	37 (63,7%)	20 (66,6%)	10 (71,4%)
Level SBP	190,5±11,3	195,5±9,0	192,3±7,8
DBP (mm Hg.)	110,0±4,2	115,3±5,5	110,8±7,6
CHF I FC (NYHA) (p=16)	18 (31,0%)	6 (20%)	-
CHF II FC (NYHA) (p=60)	26 (44,8%)	16 (53,3%)	10 (71,4%)
CHF III FC (NYHA) (p=26)	-	8 (26,6%)	4 (28,5%)
I Functional class of stenocardia (p=12)	8 (13,7%)	2 (6,6%)	-
II Functional class of stenocardia (p=56)	32 (55,1%)	17 (56,6%)	6 (42,8%)
III Functional class of stenocardia (p=34)	18 (31,0%)	11 (36,6 %)	8 (57,1%)

The depression and alarming disorders worsen a clinical current of a myocardial infarction, are associated with long attacks of stenocardia, disturbances of a cardiac rhythm and are rising factors by 2-6 times of death rate after IM irrespective of gravity of a lesion of heart.[6,8,11,13].

Frequency repeated the myocardial infarction, the frequency of attacks of stenocardia authentically ($p < 0,05$) meets in the second and thirds groups in comparison with the first more.

Mental aspects of quality of life of patients with a Q-positive myocardial infarction in the anamnesis and disturbances of a cardiac rhythm, give intensifying of level of clinical alarm for 7,9%, depressions for 8,5% more in comparison with the patients who don't have disturbances of a rhythm.

Results of researches. On the general state of health which means an assessment by the patient of the health at the moment and treatment prospects, it is noticed that quality of life of patients of the 2nd group for 27,1% ($p < 0,05$) and the 3rd group - for 33,9% ($p < 0,01$) is lower in comparison with the patients who don't have a ciliary arrhythmia.

Conclusions. Data research shows that quality of life of patients with the Q-positive myocardial infarction complicated by a paroxysmal or constant form of a ciliary arrhythmia, on all making components of health is reliable below in comparison with patients without tachyarrhythmia.

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**Mershenova G. Zh., Gnedkova A.N., Goroshko V.O., Vostrova O. P.,
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**PROPHYLAXIS OF A STROKE AT PATIENTS WITH ARTERIAL
HYPERTENSION**

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Abstract. In the review methods of prophylaxis of a stroke at patients with arterial hypertension are surveyed. Influence of continuous anti-hypertensive therapy on extent of depression of risk of development of a stroke.

Key words: arterial hypertension, obesity, post-menopausal period.

Arterial hypertension – one of the most widespread chronic diseases of the person at whom the risk of development of cardiovascular complications and premature death considerably increases. According to RK Agency statistically in 2012- 2013, 9 cases of an arterial hypertonia were registered for the first time in life of 1173,3 cases on 100 thousand of the population, in 2011 [1]. Over time, in particular because of aging of the population prevalence of AH will increase.

Between the level of arterial pressure and risk of cardiovascular diseases there is a continuous, appreciable communication which isn't depending on other risk factors. When rising a BP the probability of a myocardial infarction, heart failure, a stroke and a lesion of kidneys increases. It is established that at persons aged from 40 to 70 years the gain of a systolic BP (SBP) on each 20 mm hg or a diastolic BP (DBP) on 10 mm hg doubles risk of cardiovascular diseases in all the range of the BP levels, beginning from 115/75 to 185/115 mm hg [2]. One of terrible complications of arterial hypertension is the stroke. Late diagnostics, out of time provided medical care leads to the population invalidism that is a serious consequence not only for patients, but their environment [3]. There of prophylaxis primary and the prevention of a repeated stroke remain one of the most acute and studied questions of modern medicine [4].

Anti-hypertensive therapy is a basis not only primary, but also secondary prophylaxis of a stroke at the patients suffering from AH [5]. Excessive depression of a BP at the persons who had a stroke can aggravate a failure of a cerebral circulation that demands an individual approach at a choice of the scheme of treatment taking into account not only AH degree, but also character of the had stroke, degree of the reduced of carotids, the available cardiac pathology [6]. The basic principles of anti-hypertensive therapy are: a combination of anti-hypertensive preparations and non-drug methods of correction of a BP, individual selection of preparations taking into account contributing factors, gradual depression of a BP to target level, orientation of the patient on long administration of drugs, correction of contributing factors of risk [7].

For medicamental correction of AH diuretics, antagonists of a calcium, IATE inhibitors (inhibitors an angiotensin - the turning enzyme), antagonists of receptors of angiotensin II, α -adrenoblockers, preparations of the central action are used [8].

Hypotensive preparations from IATE group are considered as choice preparations for secondary prophylaxis of a stroke (level of substantiality of I) today. These two groups of preparations reduce the frequency of repeated strokes not only at hypertensive patients, but also at normotonic in connection with a pleiotropy of preparations [8].

Anti-hypertensive action of IATE is based on their immediate impact on cardiovascular system through improvement of rheologic parameters of a blood: viscosity, aggregation activity of thrombocytes and erythrocytes.

Angioprotective action is caused by direct anti-atherogenous influence, anti-proliferative and anti-migratory action on muscular cells of a vascular wall, improvement of endothelial function, antiplatelet effect, intensifying of an endogenic fibrinolysis [9]. The nephroprotective effect is characterized by depression of an intraglomerular hypertension, augmentation of rate of a glomerular filtration, augmentation of a natriuresis and decrease of a potassium urez, decrease of a proteinuria, augmentation of a diuresis [10].

Versatility of action of IATE allows to consider them as "the gold standard" in therapy of cardiovascular diseases. Now more than 20 IATE are known. Within preventive treatment of a stroke the preference is given to IATE of the prolonged action which treat fozinoprit, lizinoprit, enalapril, ramiprit, perindoprit, etc. The anti-hypertensive effect of a fozinopril comes in 1–3 h after intake, action peak (the maximum concentration of a preparation in a blood) – in 6 h, the semi-removal period – 12–13 h, action duration – 34 h. Fozinopril causes a dilatation of arterioles and veins that the SBP and DBP for 15% is followed by depression [11]. Fozinopril effectively reduces a BP not only at rest, but also at a load, both physical, and mental. Thus, IATE – larger group of the medicinal preparations possessing multicomponent anti-hypertensive efficiency and good tolerance. There are convincing proofs that IATE are capable to improve the remote forecast at sick AH, especially at a combination to diabetes mellitus(DM) and an atherogenous dislipidemiya [12]. Fozinopril is a preparation with the proved hypotensive efficiency and protective properties concerning lesions of target organs. The preparation differs in good tolerance. Use of original IATE (Fozinopril) is the perspective direction of prophylaxis of a stroke at patients with AH [13].

One of methods of prophylaxis of a repeated stroke is Involvement of the patients who had an ischemic stroke in School of prophylaxis of a stroke that provides systematic control of arterial pressure, increases commitment of patients to carrying out anti-hypertensive therapy. The patients who were trained at School of prophylaxis of a stroke authentically to a bowl are ready to elimination of the modified risk factors of development of a stroke (refusal of smoking, optimization of a diet, sufficient level of an exercise stress. [14].

Conclusion. It is expedient to carry out work on the prevention of a stroke in common to therapists and neurologists as prophylaxis cerebral and cardiovascular diseases are closely bound. AH — the most important risk factor of a stroke, and TIA(transitional ischemic attack) - an essential predictor of development not only an infarct of a brain, but also a myocardial infarction. At a choice of the preparations of anti-hypertensive action prescribed for the purpose of secondary prophylaxis of a

stroke, the prolonged forms of medicines providing the level of arterial pressure stable within a day and which are characterized by convenience application have preference. Application of the prolonged forms is associated with larger commitment of patients with the carried-out therapy [15].

Systematic course application of metabolic therapy for the patients with arterial hypertension who had an ischemic stroke promotes reliable decrease of expression of neurologic deficiency, simplification of carrying out rehabilitational actions and ensuring sufficient level of independence in everyday life. At the same time broad application of the preparations normalizing a metabolism in a brain isn't followed by depression of risk of a repeated cerebral stroke and demands obligatory reception of anti-hypertensive preparations and antiagregant [16].

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**APPLICATION OF OINTMENTS ON A BASIS OF SODIUM
CARBOXYMETHYLCELLULOSE IN EXPERIMENTAL TREATING
WOUNDS**

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Abstract. The article presents results of application and proved the effectiveness of our developed immobilized on the basis of sodium carboxymethylcellulose (NaCMC) Miramistinum and Metronidazolium in phase I and II of the wound process in the experiment.

Key words: wound, healing of wounds, Myramistinum, Metronidazolium.

The prevalence of wounds of various etiologies (according to some authors 32-36%), high mortality rate to 22%, increased material costs of treatment, all this necessitates the search and development of new agents for the treatment of inflammatory processes of soft tissues [1, 5]. Uncontrolled use of antibacterial medicines leads to the predominance in the wound micro flora insensitive or unresponsive to antibiotics, causing increasing interest in antiseptics, they formed much less resistant strains of microbial pathogens have high antimicrobial activity, they are cheaper and affordable compared to antibiotics [3 6]. Previously, we have conducted research on the development of immobilized preparations for the topical treatment of wounds [2], undoubtedly modern medicines should have a different effect and combine properties such as broad antimicrobial activity, high dehydrating capacity, stimulation of tissue regeneration [4, 7].

In view of the above has posed the following purpose: to study in animal experiments, in a comparative perspective, wound-healing effect, immobilized on the basis of NaCMC preparations containing antiseptic miramistin and its combination with antimicrobial metronidazole in the first and second phase of wound healing.

On the basis of comprehensive studies have been developed following ointments:

Composition 1: Sol. Miramistin 0.01% - 100 gr., NaCMC - 4.0 gr.

Composition 2: Sol. Miramistin 0.01% - 100 gr., metronidazole - 1.0 gr., NaCMC - 4.0 gr.

In experiments in vitro antimicrobial spectrum of the studied medicines designed immobilized against test strains St. aureus ATCC 6538-P, Bac., Bac. cereus ATCC 10702, E. coli ATCC 25922, Proteus vulgaris и Pseudomonas aeruginosa ATCC 9027, Candida albicans ATCC 885-653. Was performed on each 6 parallel studies the experimental sample with the immobilized medicine all of these strains of microorganisms.

In animal experiments studied wound healing activity of immobilized medicine developed in comparison with the use of officinal ointment "Levomekol".

The in vivo experiments carried out on 144 white male rats breed "Wistar" animals under anesthesia in sterile conditions simulated purulent wound. To do this, shaved hair of the back of the treated skin with antiseptic excised subcutaneous tissue size 15x15 mm. In the resulting wound was administered gauze ball containing 1 billion. Microbes daily culture of *Staphylococcus aureus* 592 and wound sutured. On the third day (after 48 hours) after modeling all animals abscess was formed with all the characteristic signs of inflammation.

Initial wound area was determined by applying a transparent film to contour and then perform debridement 3% hydrogen peroxide solution. In accordance with the purpose of the experiment the animals were divided into 4 series: a series of control animals were daily debridement only 3% hydrogen peroxide solution. In a series of comparisons performed daily debridement 3% hydrogen peroxide solution and the imposition of napkins with officinal ointment "Levomekol". In a series of NaCMC+miramistin daily debridement was performed with 3% solution of hydrogen peroxide and the imposition of gauze with a medicine composition 1. In a series of NaCMC+miramistin+metronidazol daily debridement was performed with 3% solution of hydrogen peroxide and the imposition of gauze with a medicine composition 2.

Ligation of experimental animals in all the series is done once a day, every day for 14 days. The data were processed statistically.

Analysis of the results obtained by microbiological investigation showed that the preparations immobilized on NaCMC NaCMC+Miramistin and NaCMC+Miramistin+Metronidazole possess a broad spectrum of antimicrobial activity against both gram-positive and gram-negative microorganisms. The medicine NaCMC+Miramistin have the greatest area of growth retardation in relation to the test strains of *E. coli* ATCC 25922 (18,2±0,48 mm), *Bac. cereus* ATCC 10702 (22,5±0,76 mm), *Pseudomonas aeruginosa* ATCC 9027 (25,0±0,45 mm), *Candida albicans* ATCC 885-653 (26,7±0,71 mm). The medicine NaCMC+Miramistin+Metronidazole excelled in the zones of growth inhibition combination NaCMC+Miramistin against some test strains, namely, *St. aureus* ATCC 6538-P (25,5±0,56 mm), *Bac. cereus* ATCC 10702 (27,0±0,89 mm), *E. coli* ATCC 25922 (29,2±0,60 mm), *Proteus vulgaris* (24,7±0,42 mm).

Planimetric data studies have shown that immobilized on the basis of NaCMC medicine with Miramistin and metronidazole reduces the wound area to 15 days at 99.2%, which is 10.4% more than the percentage reduction in wound area to the 15-th day using Levomekol. Moreover, the maximum difference falls on the same day 8, when a percentage reduction in wound area of series NaCMC+Miramistin+Metronidazole 1.4 times higher than in series Levomekol and 1.73 times higher than in the control series.

In a series of NaCMC+Miramistin compared with a series of comparisons Levomekol percentage reduction in wound area was significantly higher with 1-st on the 15-th day. Immobilized on the basis of NaCMC medicine reduces the wound area to 15 days at 99.5%, which is 10.63% higher than the reduces the wound area to the 15-th day using Levomekol.

When compared to each other experimental series revealed that the area of wounds was significantly less, and percentage reduction in wound area - significantly more in the series NaCMC+Miramistin on the 5-th and the 10-th day of observation. However, on the 15-th day no significant differences were found.

The high rate of wound healing during the first 8 days and also shows a high wound healing activity we have developed medicines.

Analysis of the data indicates that the use in the treatment of festering wounds developed on the basis of the immobilized preparations NaCMC promotes rapid decrease (1.5 times) the microbial contamination of the wounds, as compared with ointments Levomekol and promotes faster healing of the wound.

As a result, histological examination revealed that in the control series of preparations for the 15-th day, the process of epithelialization of the wound defect, but there is still a moderate infiltration of underlying tissue. Full epithelialization injury occurs. In a series of Levomekol defect wound is completely made bundles of immature collagen fibers. The surface of the wound defect is covered by the epidermis, having fully-layered organization. When using NaCMC+Miramistin there is complete epithelialization of the wound defect. The regenerated epithelium was normal. In the dermis, directly in the field of pre-existing wound defect. In the dermis well defined boundary regeneration of hair follicles with their gradual growth check to the central region of a pre-existing wound defect, gradually there is a complete recovery of the structural organization of the superficial and deep layers of the dermis. In a series of NaCMC+Miramistin+Metronidazole on the 15-th day, there is complete epithelialization of the wound defect. Under the epithelium to regenerate parts of the newly formed mature connective tissue is well vascularized, fibrous component substantially predominates over the cell. Total area of the newly formed connective tissue in the wound defect existed previously, substantially less than when using NaCMC+Miramistin.

Conclusions:

1). Found that immobilized preparations based compositions NaCMC NaCMC+Miramistin and NaCMC+Miramistin+Metronidazole possess broad spectrum antimicrobial activity against test strains *St. aureus* ATCC 6538-P (zone stunting $15,3 \pm 0,42$ and $22,5 \pm 0,76$ mm, respectively), *Bac. cereus* ATCC 10702 ($22,5 \pm 0,76$ - $27,0 \pm 0,89$ mm), *E. coli* ATCC 25922 ($18,2 \pm 0,48$ - $29,2 \pm 0,60$ mm), *Proteus vulgaris* ($12,3 \pm 0,76$ - $24,7 \pm 0,42$ mm), *Candida albicans* ATCC 885-653 ($26,7 \pm 0,71$ - $27,7 \pm 0,67$ mm) and *Pseudomonas aeruginosa* ATCC 9027 ($25,0 \pm 0,45$ - $25,5 \pm 1,06$ mm).

2) The use in the treatment of experimental purulent wounds in the first and second phase of wound healing process immobilized on NaCMC antiseptic Miramistin and its combination with metronidazole significantly ($p < 0.05$) shortens cleaning wounds, accelerates the appearance of granulation and epithelialization, reduces the area of wounds 1.4-1.5 times, and microbial contamination of the wounds at 1.4-1.5 times in comparison with the use of a series of ointments "Levomekol".

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BASIS FOR ACUPUNCTURE APPLICATION IN COMPLEX
TREATMENT OF PYOINFLAMMATORY PROCESSES ACCORDING TO
THE PRINCIPLES OF DEMONSTRATIVE MEDICINE

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Abstract. Aim of work – experimental and clinicolaboratory basis for acupuncture application in the treatment and rehabilitation complex for patients with pyoinflammatory process of odontogenic etiology. Object of examination is 127 patients: 113 patients with pterygoido-mandibular area abscesses and abscesses of mylohyoideus area of odontogenic etiology; 20 guinea pigs with the model of limited pyoinflammatory process. Acupuncture should be advised for application in complex treatment of pyoinflammatory processes in maxilla-facial area.

Key words: pyoinflammatory process, acupuncture, oral fluid.

Introduction. Pyoinflammatory diseases of odontogenic etiology in the maxillo-facial area are not decreasing our dates [4, 13]. Treatment of this pathology makes one of more complex part of maxillo-facial surgery. Quantity of patients with pyoinflammatory diseases of the odontogenic etiology makes 27.2–61% of the total hospital patients [8] and 10–20% of the hospital patients in the Maxillofacial Departments [1, 14]. Abscesses of the perimandibular soft tissue makes great part of this kind of diseases [12]. 14.6–34.4% of patients had pterygoido-mandibular area abscesses and 40.7% of patients had mylohyoideus area abscesses [6, 9]. This situation is aggravated by increasing number of acute complications of odontogenic infection, patients with allergic reaction on the medical preparations and having contra-indications for physiotherapy procedures. It makes treatment difficult as well as rehabilitation procedure for this kind of patients. So, new treatment methods are to be found. According to the information in medical literature, microorganism (common level of resistance, sufficient adaptive potential of the human body) state has main role in the pyoinflammatory processes in the maxillofacial area beginning and development. It defines common and local response as well as quantitative and qualitative composition and characteristics of the biological environment of the human body (serum of blood, oral fluid).

Is necessary to say that characteristics of the homeostasis changes and oral fluid, ways of its regulation are not well studied in pyoinflammatory diseases of maxillo-facial area [3, 5, 7].

We ascertained the variability of data of biochemical indices of the oral fluid for patients with mylohyoideus area and pterygoido-mandibular area abscesses of odontogenic etiology as well as information about its changes during the treatment [2]. Normalization capacities and permanency support of the internal medium of the human body of patients with perimandibular soft tissue abscesses when acupuncture included in the complex treatment are not studied.

So, it's evident that experimental, clinic and laboratory basis for acupuncture application consisting of efficient complex treatment and rehabilitation procedures

for this kind of patients, made according to the principles of the demonstrative medicine, make them actual and with perspectives corresponding to the requirements of the modern medicine.

Aim of work – experimental and clinicolaboratory basis for acupuncture application in the treatment and rehabilitation complex for patients with pyoinflammatory process of odontogenic etiology.

Materials and methods. This work is based on the experimental, clinical and laboratory methods of examinations results.

In order to make experimental model for study of acupuncture influence on the skin reparation during pyoinflammatory diseases, we used sexually mature littermates males of guinea pigs. Experiment performed on 20 experimental animals. We made 40 operations for two runs. Every run consisted of 6 – 7 months old animals, 350 – 400 grams of weight. The first run consisted of 10 animals. They had antibacterial therapy course postoperatively. It was a group of control. The second run consisted of 10 animals received antibacterial and acupuncture treatment at the same time. Examination of experimental animals and postoperative wounds were performed every day. Materials sampling for pathomorphological examination were done: 24 and 48 hours postoperatively, 3rd, 7th, and 21st days after operation.

We make complex examination of 127 patients, 15–55 years old, in order to appreciate acupuncture treatment effectiveness included in complex treatment of patients with mylohyoideus and pterygoido-mandibular area abscesses of odontogenic etiology. 113 patients of them had abscesses of perimandibular soft tissue (mylohyoideus and pterygoido-mandibular area) of odontogenic etiology. All patients were divided into 3 groups. Group I included 85 patients underwent standard complex treatment and rehabilitation procedures and was a group of control. Group II included 28 patients underwent treatment and rehabilitation procedures combined with acupuncture instead of physiotherapy procedures. Group of standard was made by 14 healthy patients of the same age.

Methodological base of examination is conception of complex treatment and rehabilitation for patients with pterygoido-mandibular and mylohyoideus area abscesses of odontogenic etiology. We used the following methods in our works according to the European standards EN 30993–3, EN 30993–6: clinical, laboratory (immunological, biochemical, biophysical) X-ray, experimental, morphological, statistical.

Clinical examinations of patients performed according to the recommendations by special medical literature and included: patient's inquiry (passport data, patient anamnesis, medical history, allergic history, presence or absence of the concomitant pathology), patient's examination (external examination, oral cavity examination), special methods (X-ray examination, caries intensity level determination, change of mouth opening level, body temperature measurement) [1, 10, 11].

Patients of the I and II groups had middle and high caries intensity level (CIL)

Laboratory examinations consisted of: general blood test (GBT), determination of the integral leukocytic indexes of intoxication (LII), leukocytic indexes of intoxication by Ostrovskiy (LIIO), nuclear index (NI), index of blood leucocyte correlation (IBLC), leukocytic granulocytic index (LGI), neutrophil and monocyte

correlation index (NMCI), analysis of IgA and IgG indexes levels, determination of acid phosphatase activity level (AF) in the serum of blood and oral fluid, determination of Ca^{2+} ions levels, microcrystallization of the oral fluid [2, 12, 13].

Discussion of results. Data of the experimental examinations confirmed that animals of the second series, treated with acupuncture, had less expressed inflammation reaction and stopped by 3–4 day. The same results were achieved by 7–8 day in the group of control. Morphological results of examination showed that acupuncture has positive influence on the clinical and morphological indices which characterize pyoinflammatory processes development of the soft tissues by formation in the macroorganism of optimal conditions for immunological and metabolism processes and stimulation of the fluid medium microcirculation in the tissues. It stimulates after operation wound cleansing from necrotic suppurative substances in earlier terms, activate epithelium forming processes and formation of the connective tissue without hard fibrous structure.

By the 21 day, wound canal was closed and skin regenerated for the animals of the II group. There was no hair follicle at the place of the wound. The scar was not determined. At the place of the wound the coverlet was regenerated (Fig. 1, b). At the same period of time, the canal of wound was absent and skin regenerated on the wound edges in the group of control. Considerable quantity of necrotic dendrite was on the surface of the wound, inflammatory reaction inside (Fig. 1, a).

In clinic, after having checked patient's temperature for the I and II group, we saw its normalization by the third day for the patients treated with acupuncture and made 36.8 ± 1.34 what was one day earlier than for patients had standard treatment. Acupuncture treatment allowed stopping inflammatory contraction of the mesial

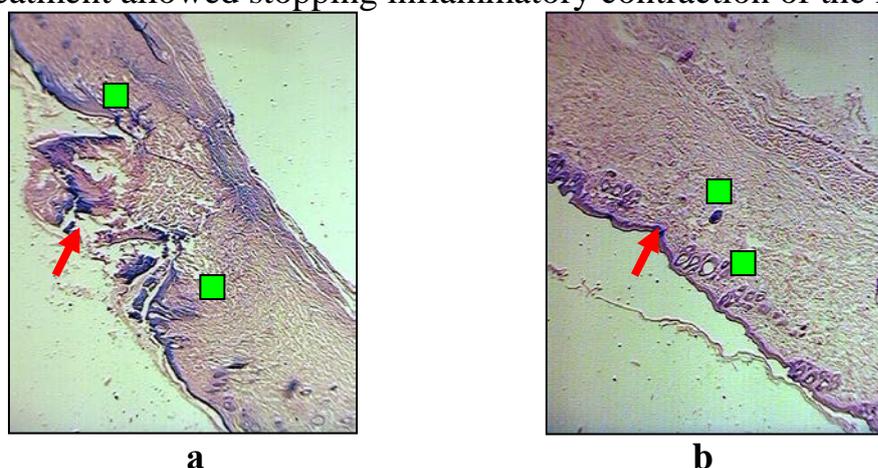


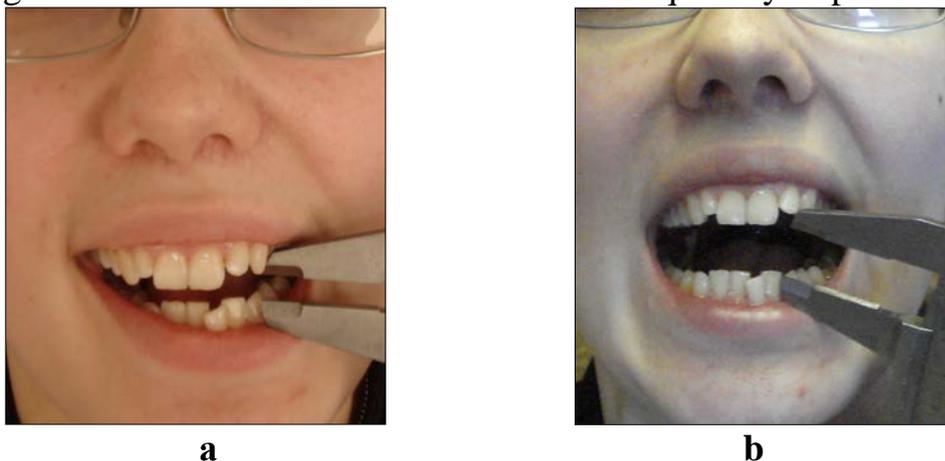
Fig. 1. Morphological picture 21 days after operation. Stain with hematoxylin-eosin. Magnification x 125.

wings of heart by the 5 day of examination. It was not possible to achieve the same results during the examination lasting 6 days even for the patient's group where standard treatment applied.

Authentic difference between corresponding indices was evident in the groups I and II ($p < 0.02$) beginning from the 3rd day. Achieved result was stable and demonstrated authentic difference between patient's groups by 4–6 days (Fig. 2). Elimination of inflammatory contraction in earlier terms had positive influence on the pyoinflammatory process of studying localization development, contributed to the

pain intensity reduction and patient's nutrition normalization, as a result psychoemotional state of patients improved. Functional reconstruction formed favorable conditions for quick cleansing of the postoperative wound, microcirculation normalization in the interested area.

Studying the quantity of leucocytes, segmented neutrophil, stab neutrophil we checked authentic reduction of these indices till the norm quantity when described treatment methods applied. Indices named above, had no authentic difference between of them in the I and II groups during the 2nd examination. It is necessary to say that leucocytes indices became normal by the 5 day of examination for 66.1% of patients during the standard treatment methods while the quantity of patients



Pic. 2. Dynamic of inflammatory contraction of masticatory muscles of patient Sh., group II, after acupuncture session.

increased on 5.3% and made 71.4% for case where acupuncture was included into the treatment.

During examinations we found some changes of the content of the peripheral blood: eosinophils, lymphocytes, monocytes. But these indices did not exceed the limits of norm and didn't had authentic difference when comparing results.

Integral indices of LII, LIIO, NI, IBLC, LGI had authentic changes when mentioned above treatment methods were applied. It demonstrated general conditions of patients, acute inflammatory reaction stopping and conformed indices informativity when studying pathologies under examination. At the same time, there was not found authentic differences between indices of the groups I and II of the second examination.

When studying IgA level in the serum of blood for both groups of patients, we saw IgA level was increasing by the 5 day in the group treated with acupuncture. Patients underwent standard treatment had no IgA level change. Indices had authentic difference between of them ($p < 0.05$), group II had advantages.

During the second examination of IgG indices, we fixed IgG indices level as 14.2 ± 0.86 for the patients of the group I, but it doesn't have authentic difference with initial indices. Patients treated with acupuncture, had 16.26 ± 0.3 of IgG indice in the serum of blood. It was closer to the indices of standard and was authentically higher than indices of the group I ($p < 0.05$).

Achieved results show moderate activation level for gummatous immune of the microorganism when acupuncture applied and has positive influence on the pyoinflammatory diseases development in total.

When studying activity level of the acid phosphatase in the serum of blood during the treatment of the patients with odontogenic abscess we fixed authentic reduction of indices when acupuncture treatment applied and no dynamic changes were fixed for standard treatment and rehabilitation cases. These indices level were authentically different in the groups I and II ($p < 0.05$) during the 2 examination. This result confirms that acupuncture in complex of treatment and rehabilitation procedures contributes to the acute inflammatory process stopping in quickest terms.

When acupuncture applied, IgA level in the oral fluid was increasing and achieved the standard indices during the 2 examination (0.37 ± 0.1). IgA level didn't changed and remains the same during the treatment for the patients of the group I (0.14 ± 0.02) and was authentically less than indices of the group II ($p < 0.05$) and indices of standard ($p < 0.001$) (Fig. 3). Taking into consideration that IgA is important for providing of the local immunity of the oral fluid, IgA level augmentation testifies positive influence of acupuncture on the pyoinflammatory process development for patients with odontogenic abscesses when acupuncture applied.

Results for group II patients demonstrate IgG level augmentation in the oral fluid till 1.7 ± 0.53 during the treatment unlike the group I (0.71 ± 0.11). This fact positively characterizes the state of the local immunity of the oral fluid and confirms the positive influence of acupuncture treatment on the pyoinflammatory process development.

When acupuncture was included into the treatment, acid phosphatase activity level was reduced authentically in the oral fluid and achieved the standard level by 5 day of examinations. We checked small reduction of level in the group I during the treatment at the same time. Meanwhile, results of 2nd examination were authentically different ($p < 0.05$) when comparing indices of both groups.

When analyzing Ca^{2+} ions level in the oral fluid for patients underwent standard treatment we fixed no changes. These indices achieved standard level by 5 day when

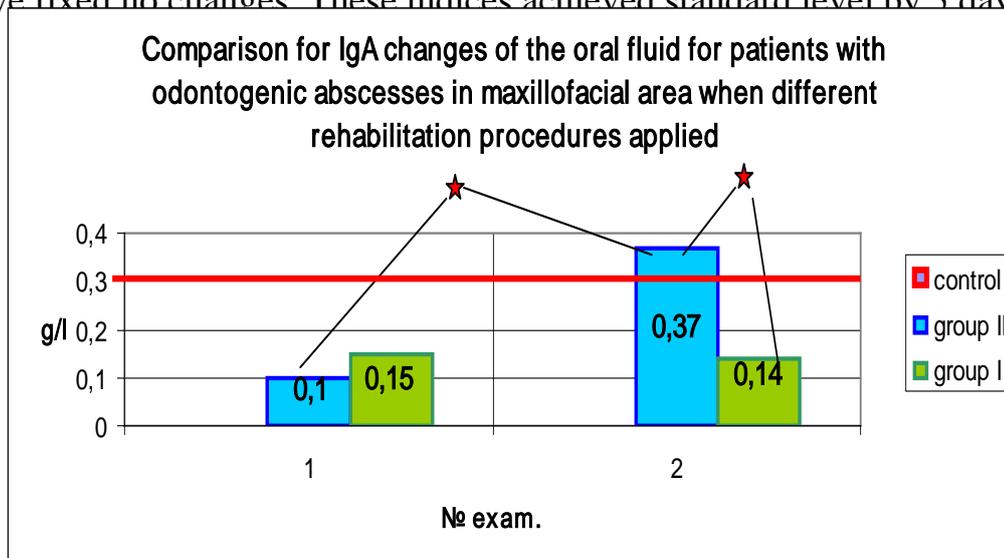


Fig. 3. Comparative evaluation of the IgA level change in the oral fluid for patients of groups I and II, * – $p < 0.05$ – $p < 0.01$.

acupuncture included in the treatment. We saw authentic difference between I and II groups of the 2nd examination when compared and the group II advantages.

Microcrystallization indices of oral fluid were changed appreciably during treatment to the side of normalization and don't have authentic difference with standard indices by the end of treatment in hospital when acupuncture applied. These indices had not been changed and had kept authentic difference with indices of standard ($p < 0.05$) and initial indices by the 5 day during the standard treatment. Microcrystallization indices of oral fluid have positive changes for patients of both groups. These indices become normal during treatment when acupuncture applied while it has tendency to the authentic difference with standard indices for the patients of the group I during the 2nd examination (Fig. 4; 5). At the same time indices we

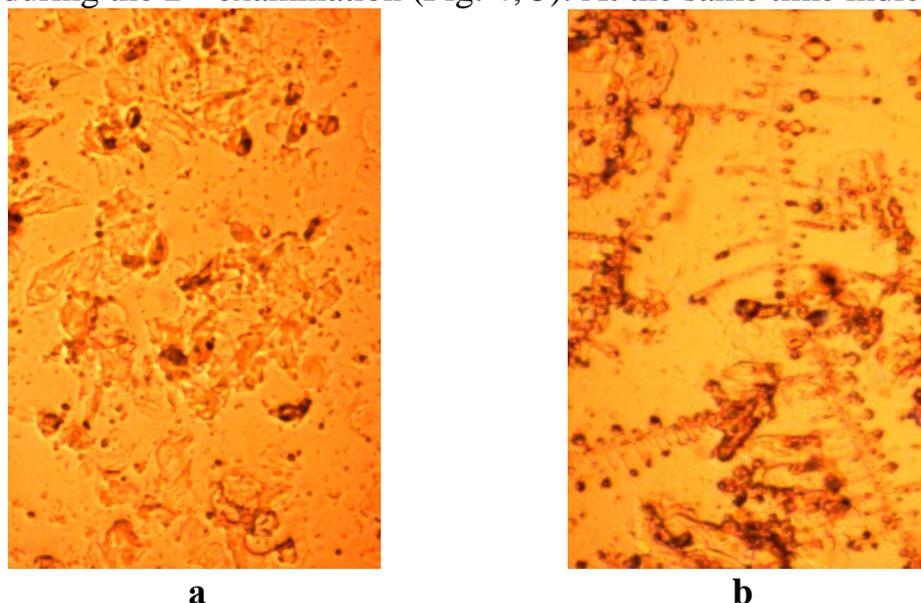


Fig. 4. Pic. 4. Microcrystallization dynamic of oral fluid for patient L. of the group I after standard treatment.

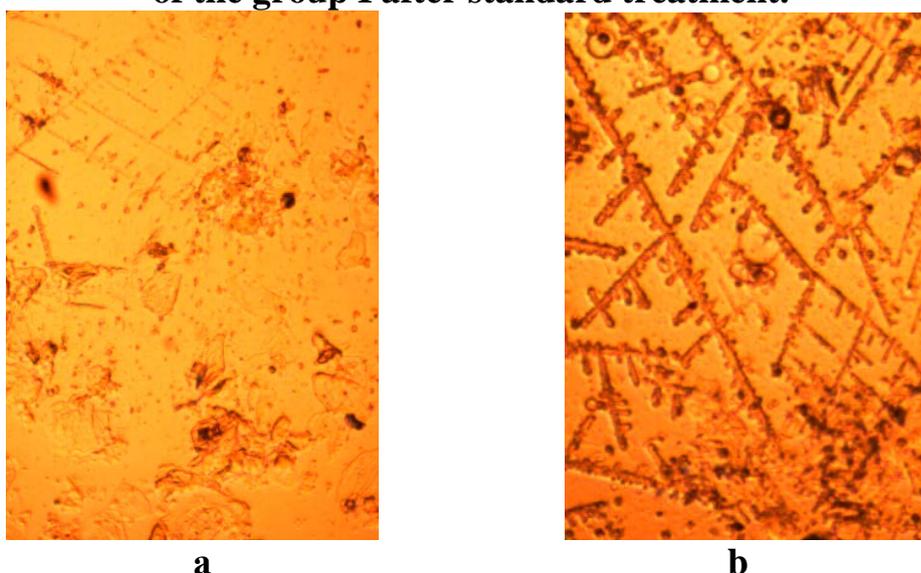


Fig. 5. Microcrystallization dynamic of oral fluid for patient Sh., of the group II after complex treatment when acupuncture applied.

study in both groups are authentically different by the 5 day of examination ($p < 0.001$).

So, acupuncture treatment has positive influence on the pyoinflammatory diseases development located in the area we chosen for examination. This treatment method contributes to the quicker recovery of acute inflammatory processes comparing with standard treatment methods and reduces recovery terms in hospital for 1.7 days for this kind of patients. It has significant economic sense.

Conclusions. Acupuncture should be advised for application in complex treatment of pyoinflammatory processes in maxillo–facial area.

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