National University of Pharmacy
Department of chemistry of natural compounds and nutriciology

NUTRICIOLOGY and BROMATOLOGY
Module 2

LECTURE on NUTRICIOLOGY

Nutrition for Patients with Diseases of the Musculoskeletal and Urinary system

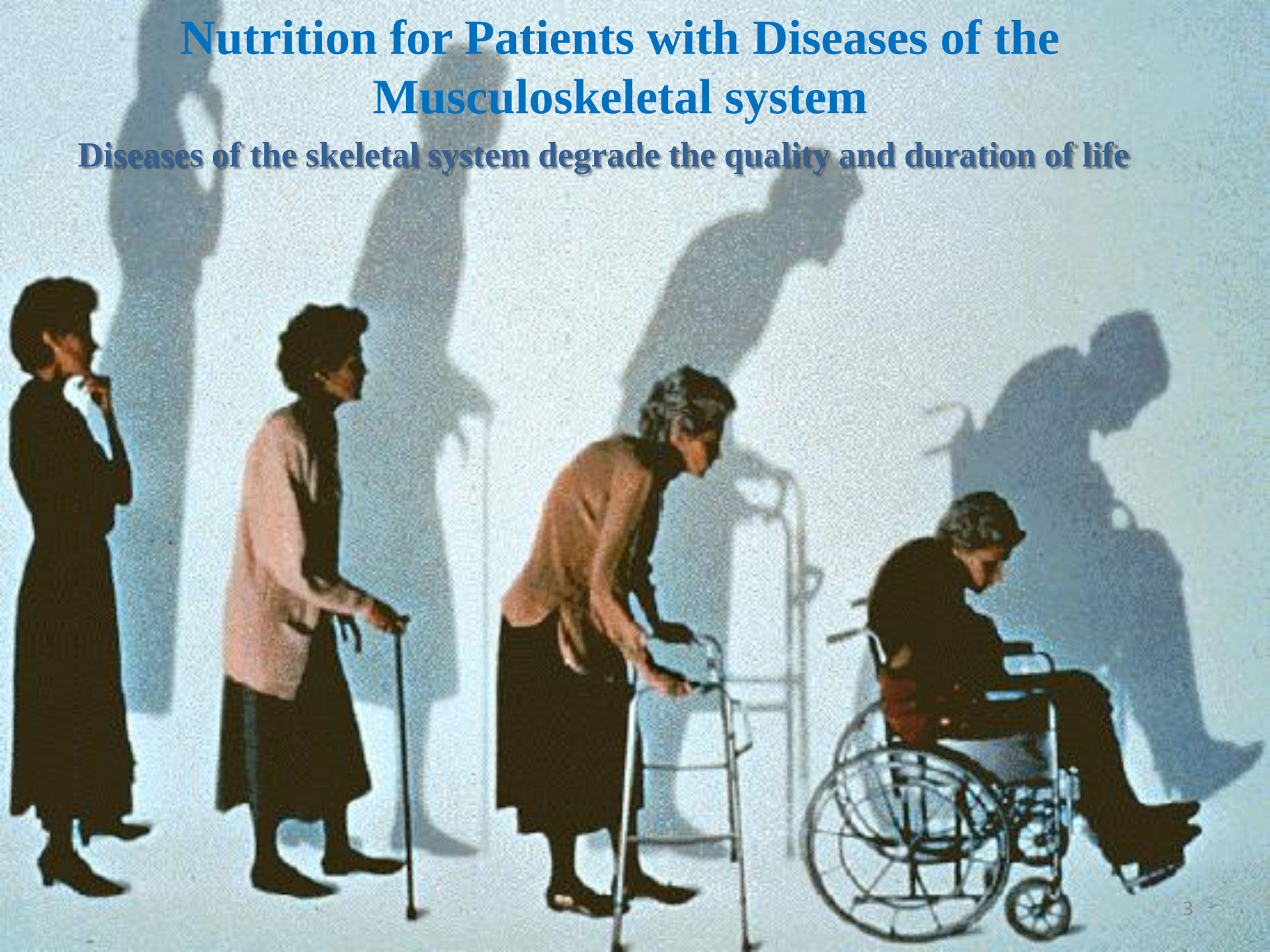
Kharkov 2020

PLAN

- **Diseases of Musculoskeletal system in Ukraine and world**
- **Type of Diseases of Musculoskeletal system**
- **Reason of Diseases of Musculoskeletal system**
- **Clinical diet for different types of Diseases of Musculoskeletal system**
- **DS for different types of Diseases of Musculoskeletal system**

Nutrition for Patients with Diseases of the Musculoskeletal system

Diseases of the skeletal system degrade the quality and duration of life



The most common diseases and injuries related to joints, bones and muscles of the person:

Ankylosis - fusion of the joints due to illness or injury, resulting in bones lose their mobility relative to each other.
Arthritis - **inflammation of the joints** (reasons - different), which leads to their *swelling*, **immobility**, *pain, strain*.
Achondroplasia (dwarfism) - a hereditary disease in which the long bones grow to normal size.
Bursitis - **inflammation of the bags joint** (often due to prolonged load on the elbow or knee joints). It leads to swelling and pain. **Dislocation** - displacement of the bones in the joint (often - in the elbow or shoulder).
Myalgia (muscle pain) - pain and numbness in the muscles due to excessive load.
Muscular dystrophy - an inherited condition leading to underdevelopment or atrophy of muscles.
Osteoarthritis Gout Osteoporosis Fractures Sprain
Rheumatoid arthritis
Cramp - painful muscle spasms due to excessive contraction of these muscles.
Tendinitis - inflammation of the tendons due to their injury or excessive stress.

Gout

- heterogeneous by origin disease characterized by the deposition in various tissues of the body **urate crystals** in the form of ***monourate sodium or uric acid.***

- Lies at the origin of the accumulation of uric acid, and reduction of its allocation by the kidneys, which leads to higher concentration in the blood (***hyperuricemia***).

Gout

- Deposits of **sodium urate** crystals in articular, periarticular, and subcutaneous tissues
- May be **primary or secondary**
  - Primary – hereditary error of purine metabolism
  - Secondary – drugs that inhibit uric acid excretion or increase rate of cell death or another acquired disorder

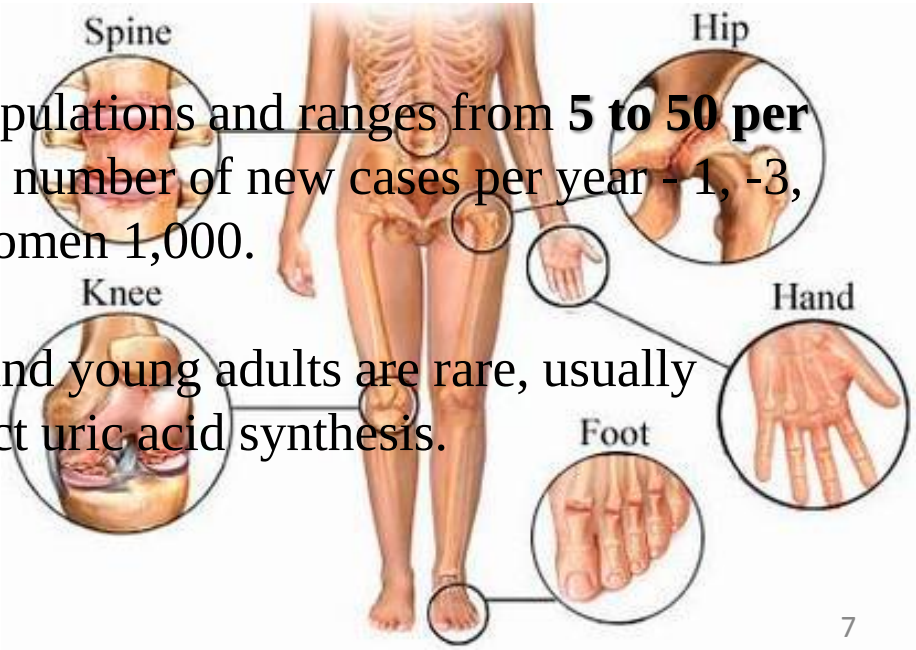
Hyperuricemia

Hyperuricemia detected in **4-12% of the population** suffers from gout 0.1% of the population of Ukraine.
In the US and Europe suffer from gout 2% of the population, among men aged 55 - 65 years old suffer from gout 4 - 6%.

The ratio of **men to women is 7: 1.** The peak incidence occurs in the 40-50 years men 60 years and older women.
Before menopause, women rarely become ill, probably due to the effects of estrogen on the excretion of uric acid.

Gouty arthritis incidence in different populations and ranges from **5 to 50 per 1000** men and 1000 women 1-9 and the number of new cases per year - 1, -3, respectively, 1,000 in men and 0.2 in women 1,000.

An acute attack of gout in adolescents and young adults are rare, usually mediated by primary or secondary defect uric acid synthesis.



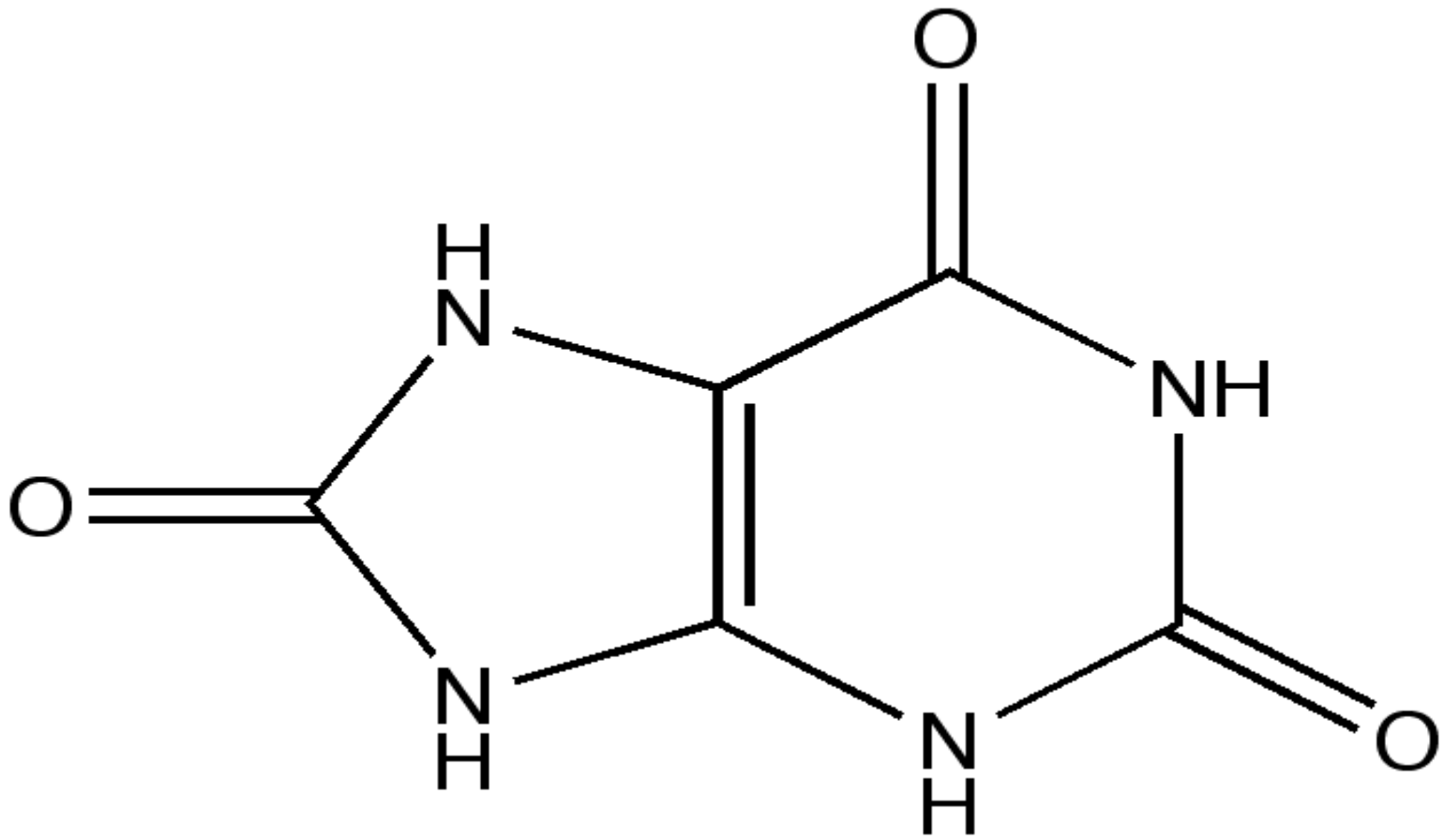
Incidence and Risk Factors

- Primary gout accounts for 90% of cases
- Affects primarily middle aged men
- Risk factors: obesity, HTN, thiazide diuretics, excess alcohol use

Clinical Manifestations

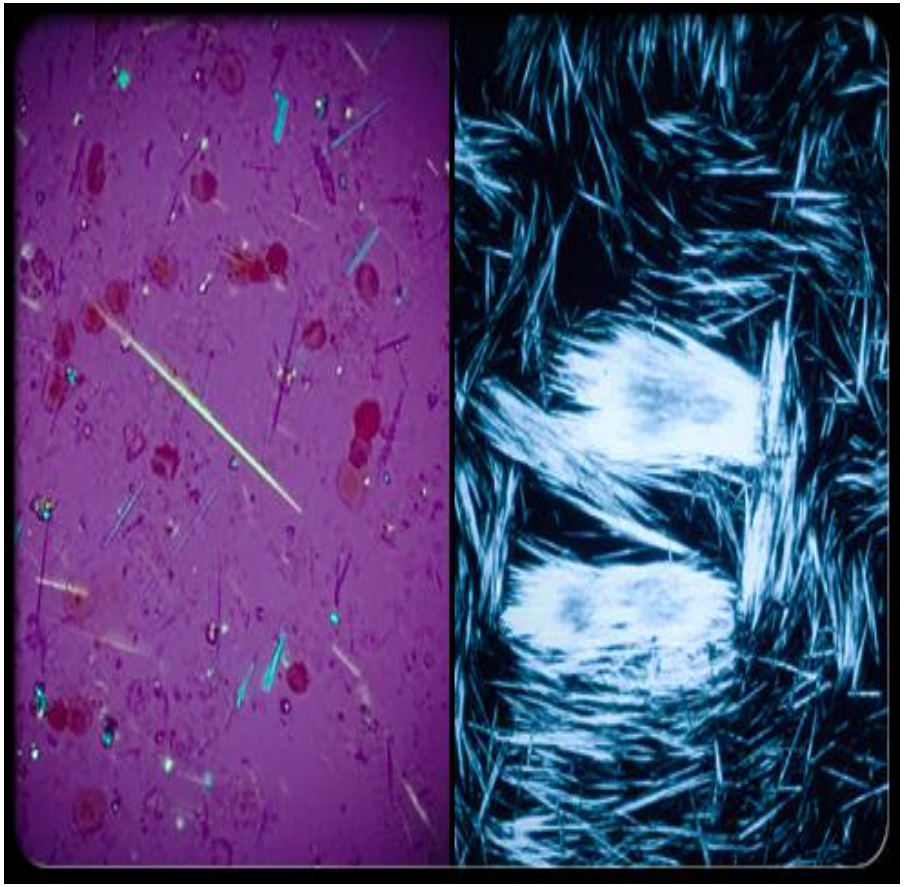
Рис. Периоды в течении подагры

Uric acid



Urate crystals

- Urate crystals look **like sticks or thin needles** with broken or rounded ends a length of about 10 microns. Microcrystals of urate in synovial fluid found both lie, and in neutrophils.



Uric acid is manifested by **pain and inflammation in the joints**, where the crystals are accumulated in not excretion of uric acid, in turn damaging **the smooth cartilage surface.**

Uric acid

Uric acid is not a harmful substance. This is a normal component of our metabolic system. Moreover, it performs several **important functions** in the body. For example, it is a powerful antioxidant, protecting us from cancer and premature aging.

Uric acid is present in the tissues of our body and in the blood. Normally found in men and 6.5 mg / dL in women and 5.5 mg / dL. In terms of weight - in an adult it was about 1.2 day During produced, on average, of 400-600 mg of uric acid and hence, the same should be inferred.

Uric acid is **poorly soluble in water**, so the partially converted into its sodium salt - sodium urate, and then displayed.

This process depends on the **acidic properties of the urine**. When violations of urine pH to the acid side (below 5, 75) forming sodium urate is reduced and can form crystals of uric acid (kidney stones).

When alkalinization urine urate solubility increases and the grains of sand and stones from uric acid **are not formed.**

Products containing purines (uric acid)	Purine content, mg. uric acid	Food product density
The highest content of purines; 400 mg. uric acid to 100 g or more		
Theobromine	2300	1611
Yeast beer	1810	1866
Neck bovine sweetbreads (thymus gland)	1260	3029
smoked Sprat	804	795
Yeast baking	680	2071
Spleen sheep	773	1702
Spleen pork	516	1208
Bovine liver	554	1010
Pig heart	530	1382
Pork liver	515	937
White mushrooms, dried	488	932
Sardines in oil	480	519
Veal liver	460	837
Spleen bovine	444	1052
Pork lungs	434	911

Gout Etiology

The factors of the disease

Risk factors for gout include hypertension, obesity, hyperlipidemia, chronic alcohol intoxication.

And also:

- **increased intake of purine bases (for example, in the use of large amounts of meat, milk, eggs, fish, coffee, cocoa, chocolate);**
- **increase in the catabolism of purine nucleotides (e.g., at anticancer therapy; massive apoptosis in humans with autoimmune diseases);**
- **inhibition of excretion of uric acid in urine (e.g., renal failure);**
- **increased synthesis of uric acid while reducing its elimination from the organism (e.g., alcohol abuse, shock states, glycogenosis deficiency of glucose-6-phosphatase).**

Purpose of diet №6

- Normalization of metabolism (**purines**)
- Reduction in the formation of uric acid and its salts,
- Shift reaction urine **alkaline side**,
- as well as the normalization of **bowel function**.

General characteristics of the of diet №6

- Diet sharp restriction products containing **purines, oxalic acid, sodium chloride,**
- and increased number of **alkalizing products** (milk, vegetables, fruits) and free fluid, with little limitation proteins and fats.
- Culinary processing usual. An exception is the cooking of meat, poultry and fish, which is a mandatory pre-boiling. This is done because when cooked to 50% in the product of purine transferred to the broth. After boiling the meat, poultry, fish can be used to prepare various dishes (steamed, baked, fried) chopped products. You can combine meat and fish in approximately equal amounts.
- The diet of meat and fish dishes include no more than 2-3 times a week.
- **A piece of meat should not exceed 150 g Fish allowed to use up to 170 g**

General characteristics of the of diet №6

Diet for a given fractional diet, 4-6 times a day, in between and fasting is required to take **additional fluid.**

The temperature of the food ordinary.

When gout is recommended once a week to spend **fasting days** - cottage cheese, kefir, milk and fruit. During the fasting days the patient should receive **at least 2.5 liters of fluid per day**, unless contraindicated by the cardiovascular system.

But the treatment of hunger and the appointment of "hungry" days, on the contrary, strictly contraindicated. Fasting in the first days leads to a sharp increase in uric acid in the blood, followed by the emergence of a gout attack.

If gout is combined with obesity, diet prescribed №8 with unloading days.

Diet № 6

- Traditional dietary recommendations are **to limit the consumption of purine and alcohol.**
- Foods high in purines include **meat and fish products, tea, cocoa and coffee, containing purines.**
- Recently, it was also shown that **the weight loss achieved** moderate restriction of carbohydrates and energy intake of food in conjunction with a proportional increase in protein and unsaturated fatty acids in patients with gout resulted in a **significant reduction of uric acid levels and dyslipidemia**.

Gout. Diet № 6. Recommended dishes and food

- Bread flour any of the 1st and 2nd grade, wheat and rye bran.
- Appetizer - salad with fresh and pickled vegetables.
- Soups - vegetarian borscht, cabbage soup, vegetable soup, potato with cereal.
- Meat, poultry and fish - low-fat. Limited to 3 times a week, boiled or baked form.
- Dairy products - milk, milk products, cheese and dishes from them.
- Any grains in moderation.
- Eggs - 1 egg per day in any cooking.
- Any vegetables **except legumes**.
- Fruits and berries in large amounts - raw and cooked any, dried fruits.
- Creams and milk and fruit jelly.
- Sauces - the vegetable broth, tomato, milk.
- Jellies, candy, jam, honey.
- In order to increase the alkali valences in the diet include citrus fruits (lemon, grapefruit), alkaline mineral water.
- Before going to sleep a person suffering from gout, be sure to drink 1 cup of liquid. It may be weak tea, coffee, milk or tea with lemon, yogurt, wheat bran broth, juice.

Gout Diet № 6 Excluded products and dishes

- Meat, fish and mushroom broth.
- Smoked, canned food.
- Frozen meat, fish.
- Beef, mutton and cooking fats.
- Sorrel soup, beans.
- Liver, kidney, tongue, sausage,
- Smoked, salted fish.
- Salty cheeses.
- Legumes, salted and
- Pickled vegetables.
- Chocolate, raspberry, cranberry,
- Cocoa, strong tea and coffee.
- Dried grains, except
- Refined rice,
- Purified wheat
- Milled wheat.
- Dried fruits, except prunes.
- Biscuits, confectionery,
- prepared with salt and sugar.

- Excluded sauces on meat, fish and mushroom broth.
- It should limit foods that excite the nervous system (coffee, cocoa, strong tea, savory snacks, spices, etc.).

- **Drinking alcohol can provoke gouty attacks, since alcohol impairs the excretion of uric acid by the kidneys**


Нельзя!

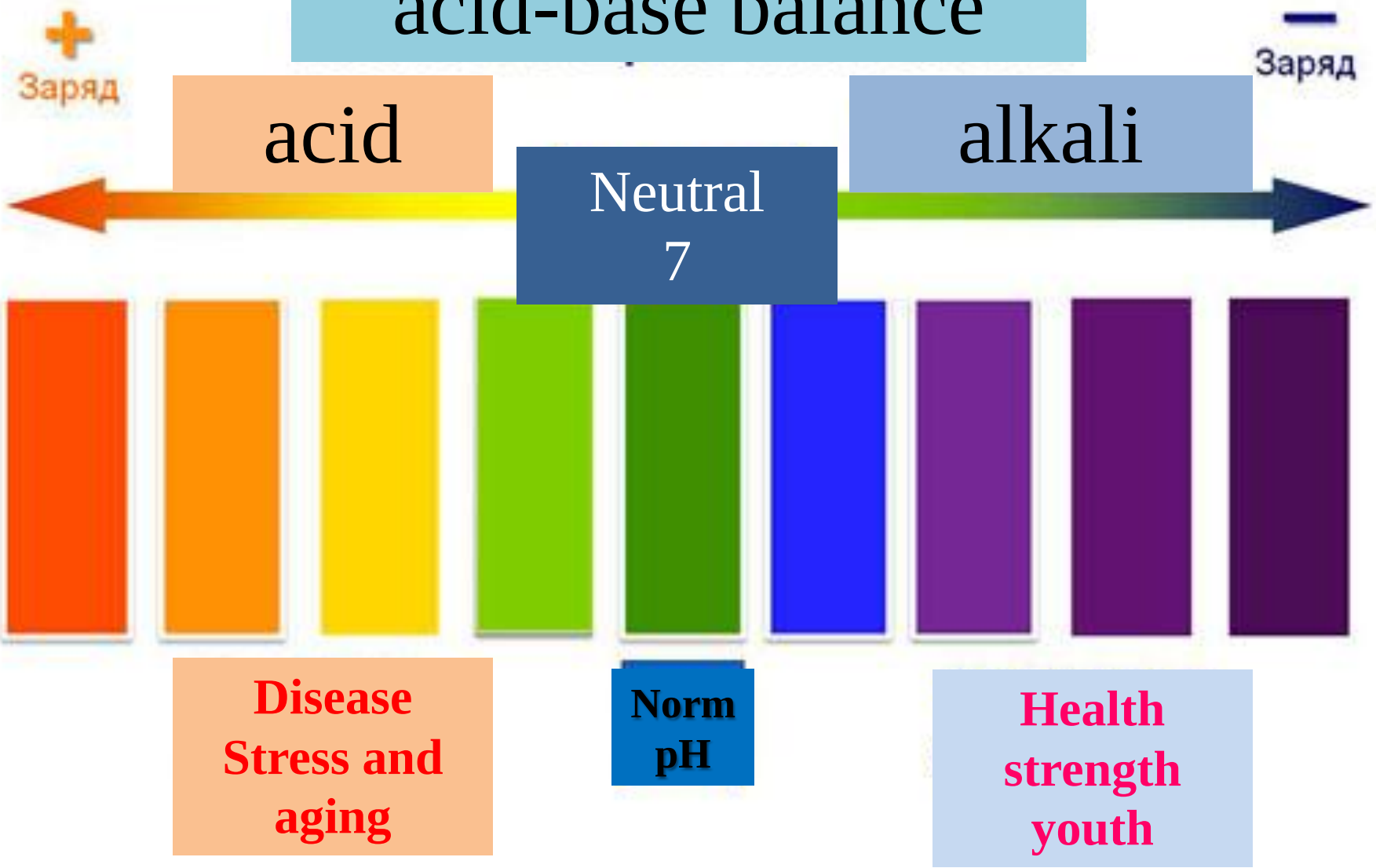
General characteristics of the of diet № 6

- **Drinks** - green tea, lemon tea, milk, coffee (substitute) with milk rather weak, broth hips, wheat bran, fruit juices, berries, vegetables, fruit drinks, kvass, compotes.
- Especially valuable fruit drinks from cranberries and cranberry;
- It promotes the excretion of excess purines **cucumber juice** (1 cup per day), **alkaline mineral water** (a little mineralized) and containing organic compound ("Naftusia", "Essentuki №17", "Narzan", "Borjomi");

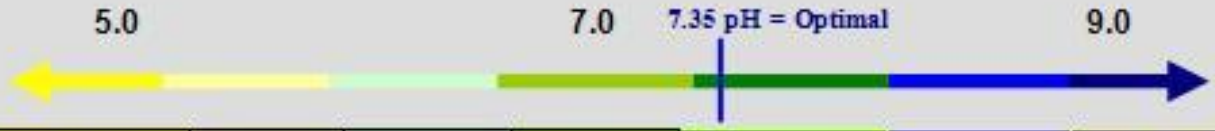
Herbal medicine (phytotherapie) for gout

- When gout is recommended to include in your diet the following fruit and berries: **cranberries, cherries, strawberries, red and black currants, apples**. Fruits and berries need to eat twice a day, morning and evening, **for 40-60 minutes before eating or 2-3 hours after eating.**
- Very useful cowberry (***Vaccinium vitis ideae***) tea. To do this, 1 tbsp. l. cowberry leaves make a glass of water. Drink 1 tbsp. l. 3-4 times per day.
- In folk medicine to treat gout used the following **herbal tea**: **take flowers elderberry, linden blossom, herb St. John's wort, chamomile flowers** - 1 tbsp. l., all mix thoroughly. The mixture is placed in a porcelain bowl, brew with boiling water, tightly close the lid and put in 15 minutes in a water bath. Then cool at room temperature, strain, and the remnants of raw materials squeeze. Thereafter, the boiled water to bring it to the desired volume in a ratio of 1:10 or 1:20. **Take 3-4 cups of 4 times a day for 15 minutes before eating. Store in a cool, dark place or in the refrigerator for 3 days.**
- **All drugs from herbal medicine should be used in about 1 month.**

acid-base balance



Acid & Alkaline Forming Food Groups & Foods



Highly Acid	Acid	Low Acid	Food Groups	Low Alkaline	Alkaline	Highly Alkaline
Chocolate	Cooked beans, Lentils, Peas, Potatoes	Cooked vegetables (all)	Beans, Legumes, Vegetables	Fresh, carrots, cabbage, mushrooms, onions, tomatoes	Fresh, raw, beats, celery, carob, green beans	Fresh, raw, organic, alga's (blue green), garlic, ginger, leafy greens, sprouts, vegetable juices
Alcoholic, processed & soda (all)	Caffeinated (all)	Tea's (black) (all)	Beverages	Tea's (ginger)	Tea's (green & herbal) (all)	Alkaline (ionized) & fresh squeezed lemon juice water
Highly processed wheat, white flower, pastries, pastas	Processed buckwheat, corn, oats, rye, white rice	Brown rice, sprouted grain breads	Cereals, Grains	Amaranth, millet, quinoa, rice (wild)	None	None
Cheese, homogenized milk, ice cream	Raw milk	Butter, Buttermilk, cottage cheese, eggs, yogurt	Dairy	Raw, goats cheese & milk, Soy cheese & milk, Whey	Human breast milk	None
Highly processed sweetened fruits (all), Blueberries, Cranberries	Cherries (sour), Rhubarb	Processed fruit juices (all)	Fruits	Avocados, bananas, cherries (sweet), oranges, peaches, pineapples	Fresh, raw, Apples, berries, dates, figs, grapes, kiwi, melons, raisins, pears	Grapefruits, lemons, limes, mangos, Papayas, watermelons
Red meat (all)	Chicken, Lamb, Turkey	Cold-water fish (Salmon, Cod etc.)	Meats	None	None	None
Peanuts, Walnuts	Pecan, Cashew	Pumpkin, Sunflower	Nuts, Seeds	Chestnuts	Almonds	None
None	None	Corn	Oils	Canola	Flax seed	Olive
Chemicals (Aspartame, Equal, NutraSweet, Sweet 'N Low), highly processed	Highly refined sugar (brown, white, all)	Processed (Agave, Honey, Molasses etc.)	Sweeteners	Raw, natural (Honey, Agave, Molasses etc.)	Raw, natural, organic (maple & rice syrups)	Raw, natural, organic Stevia

Osteoporosis

(Osteoporosis (greek.osteon- bone, poros- pores) - **bone density loss)**

"Osteoporosis - a systemic skeletal disease characterized by **low bone mass** and impaired **architectonic** in bone which lead to increased **bone fragility** and increased risk of **fracture**" (WHO).

Osteoporosis is considered a "disease of civilization" due to an increase in the length and quality of life.

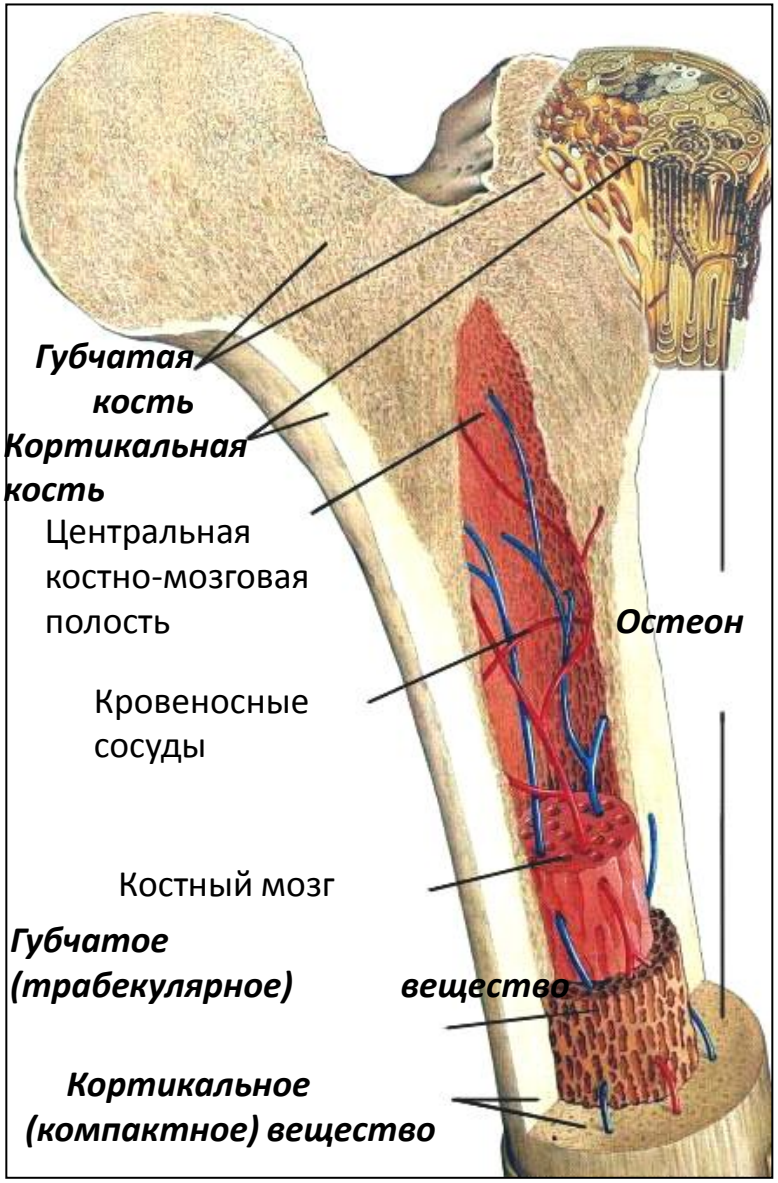
In Ukraine, in 2015. people over 60 years will amount to about 20% of the population!

norm osteoporosis

Osteoporosis affects about 200 million people in the world; at 2.5 million - a disease accompanied by bone fractures!

According to WHO statistics, every 20 seconds. on this planet there is a fracture due to osteoporosis.

The structure and composition of bones



Cortical bone (QC) and trabecular bone (TC) formed by the same cells and matrix but differ in their degree of calcification (calcified CC 80-90% TC - 15-20%). Bone strength depends on the thickness (bulk density) of the matrix and cortical structures (micro-architectural) trabecular bone.

Components of bone tissue

Cells
((3% volume of bones) :
-

Osteoblasts - Osteoclasts, - Osteotsities.

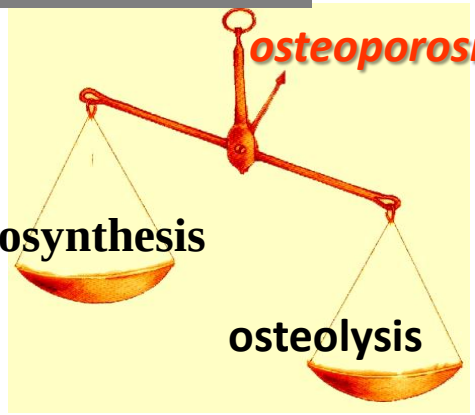
The organic matrix:
- Collagen type I (glycoproteins and proteoglycans - collagenous fibrils); - Non-collagenous proteins: osteocalcin, osteopontin, fibronectin.

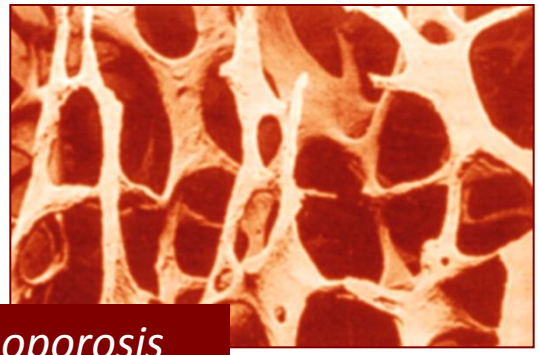
Minerals

(60-70% of bone): - Crystals hydroxy - apatite; - Amorphous calcium phosphate.

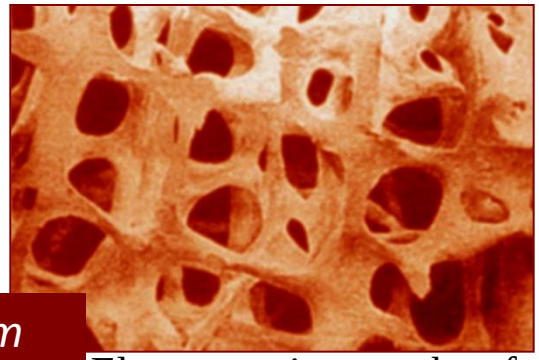
Reasons of osteoporosis

Osteoporosis is a result of the imbalance between the process of osteosynthesis and osteolysis, leading to severe osteopenia and impaired bone (primarily trabecular) architectonics.





Osteoporosis



Norm

Electron. micrographs of bone tissue

Reasons of disturbance bone remodeling, causing osteoporosis:

- **Deficiency of minerals in the diet, the violation of their intestinal absorption or capture of bone tissue.**
- **The deficit, impaired metabolism, or the reception of vitamin D.**
- **Redundancy effects of parathyroid hormone, thyroxine, or glucocorticoids.**
- **Prolonged immobility or lack of physical activity, slows the formation of bone tissue. - Age-related inhibition of the function of osteoblasts .**

PREVENTION OF OSTEOPOROSIS

Prevention - is the main task of the problem of osteoporosis!

For all population

"Primary" prevention:

1. **Monitoring the adequate intake of calcium from childhood;**
2. **Active lifestyle, regular moderate exercise;**
3. **Sufficient exposure to the sun;**
4. **The maximum decrease in the influence of risk factors (alcohol, smoking, excessive consumption of coffee, a variety of hobby-suite an unbalanced diet, starvation);**
5. **Adequate provision of calcium in the body of women during pregnancy and childbirth.**

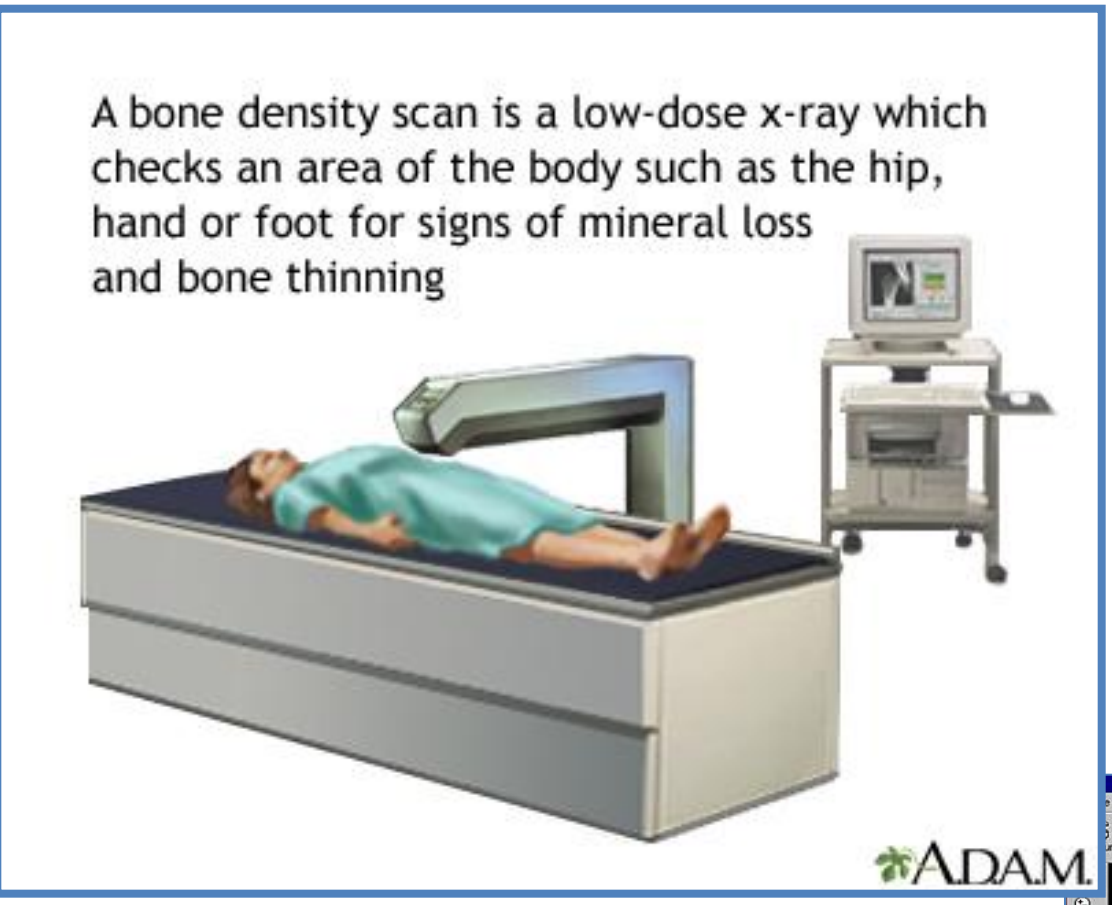
For the "osteoporotic alertness" doctor

"Secondary" prevention.
The indication is the presence of significant risk factors:

1. **The early or artificial menopause;**
2. **hypogonadism;**
3. **Corticosteroid therapy;**
4. **Hyperthyroidism;**
5. **Hyperparathyroidism;**
6. **Diabetes mellitus type I;**
7. **A number of gastrointestinal and renal pathologies;**
8. **8. Prolonged anticonvulsant therapy, etc.**

WHO recommendation:

Ensure availability osteodensitometry for people with an increased risk of osteoporosis in order to conduct timely and adequate therapy.



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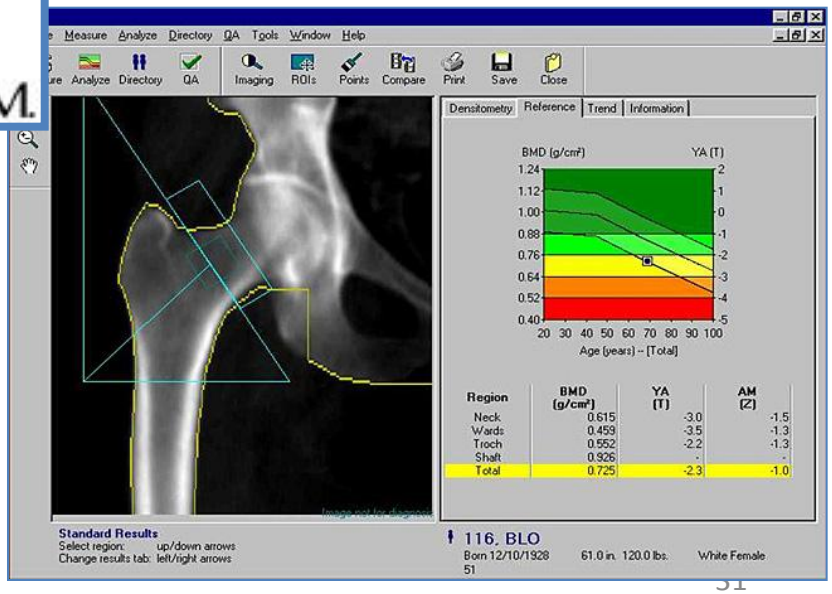


Osteoporosis. General recommendations for the treatment of the disease

It is necessary to eliminate the use of products that **accelerate the excretion of calcium** from the body, **coffee, strong tea, chocolate, cocoa**.

As little as possible to include in the diet of **foods rich in the fatty acids**: margarine, butter, mayonnaise.

Minimize the use of **meat as it contained phosphorus does not absorb calcium** in the body.

Increase consumption of foods containing calcium: almonds, cottage cheese, cabbage and so on. D.

Increase the intake of vitamin D, which is found in eggs, sesame, sour cream, cheese.

Exclude alcohol, diuretic drugs and carbonated drinks

How much calcium do you need?

That depends on your age and sex.

Age	Recommended Dietary Allowance: Male	Recommended Dietary Allowance: Female
0-6 months	200 mg	200 mg
7-12 months	260 mg	260 mg
1-3 years	700 mg	700 mg
4-8 years	1,000 mg	1,000 mg
9-18 years	1,300 mg	1,300 mg
19-50 years	1,000 mg	1,000 mg
51-70 years	1,000 mg	1,200 mg
71+ years	1,200 mg	1,200 mg

Osteoporosis. General recommendations for the treatment of the disease

- Particular attention is given to products with a high content of **ZINC**, as during the disease the body's need for zinc increases almost twice. It is necessary to include in the diet of celery, seafood, liver, legumes.

- Increase the intake of **VITAMIN B6 AND FOLIC ACIDS** contained in seafood, beef liver, cereals, legumes.

- In order for bone density to recover quickly, you need to eat foods with **MAGNESIUM**: grains, bananas, nuts, dairy products, beans, leafy vegetables.

- To saturate the body beneficial trace elements and vitamins is recommended to **DRINK A FEW GLASSES OF FRESH JUICES.** Suitable for juices carrots, beets, tomatoes, apples, cucumbers and spinach.

Osteoporosis. General recommendations for the treatment of the disease

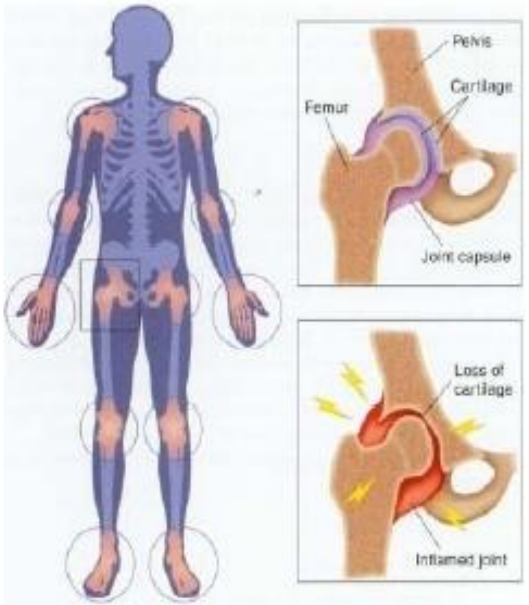
A source of **DIETARY CALCIUM** are the following products:

- asparagus,
- cauliflower and cabbage,
- spinach,
- broccoli,
- figs,
- nuts and seeds,
- legumes,
- egg yolks.
- Basically, dietary calcium enters into the body when consumed **milk and dairy products.**
- Also contains a lot of calcium in the bones of **sardines and salmon** (canned).

Arthritis. General recommendations for the treatment of the disease

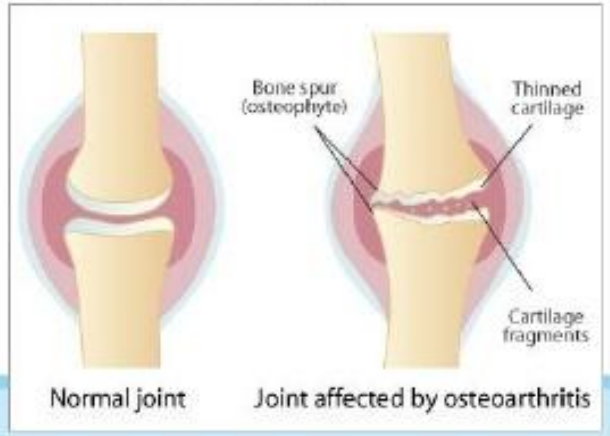
What is Arthritis?

- Inflammation and pain in the joints
- The degeneration and inflammation of joints can cause joint stiffness, pain, swelling, deformity, and eventually disability
- Also refers to joint damage, such as destruction of cartilage



Types of Arthritis

- **Rheumatoid Arthritis**
- **Juvenile Arthritis**
- **Gout**
- **Fibromyalgia**
- **Osteoarthritis (OA)**
  - Most common form, affecting 21 million adults, according to the CDC
  - Characterized by degeneration of cartilage and the underlying bone within a joint as well as bony overgrowth
  - The joints most commonly affected are the knees & hips; Spine, ankles, and old fractures sites also affected



Risk Factors

- The exact cause is unknown
- Age
  - More likely to develop as you age
- Weight
  - Excess weight increases the likelihood
- Sex
  - Women are more likely to develop
- Medical History
  - Joint injury or acute trauma
- Genetics
  - Specific gene found in some people
- Lifestyle

Arthritic Nutrition 101

- **How does Food Affect Arthritis?**
  - Arthritis is a disease of *inflammation*
  - Logical and effective treatment should consist of anything that fights inflammation
  - Specific foods you eat can either make inflammation in the body worse or can reduce the amount of inflammation produced by the body

Arthritic Nutrition 101

- **What Foods Should be Avoided?**
  - **Saturated Fats**
    - Fats found in and from animal products and some oils
    - Avoid fatty beef or pork, poultry skin, ice cream, butter, whole or 2% milk, regular cheese, bacon
    - Opt for low-fat or no-fat dairy products, lean cuts of beef or pork, and skinless chicken or turkey
  - **Trans Fats**
    - Man-made to give baked goods longer shelf-life
    - Mix of vegetable oil and added hydrogen molecules that turn solid
  - **Simple and Refined Carbohydrates**
    - Set up a state of inflammation in the body which causes an increase in cytokines and other pro-inflammatory compounds
    - Sugary foods, white flour baked goods, white rice, bread

Arthritic Nutrition 101

- **What Foods Should be Included?**
  - **Omega-3 Fatty Acids**
    - Work to decrease inflammation in the body by suppressing the production of cytokines and enzymes that erode the cartilage
    - Many studies support fish oil to reduce symptoms of rheumatoid arthritis
    - Salmon, herring, mackerel, sardines, anchovies, trout, oysters, omega-3 fortified eggs, flaxseed, walnuts, seaweed, and soybeans
  - **Extra Virgin Olive Oil**
    - Protects body against inflammation because it contains polyphenols (an antioxidant)
    - Substitute olive oil when cooking rather than using vegetable oil or butter

Arthritic Nutrition 101

- **What Foods Should be Included?**
  - **Antioxidants**
    - Protect the body from the effects of free radicals, which are cell-damaging molecules produced by inflammation
    - Research has demonstrated certain antioxidants may help prevent arthritis, slow its progression, and relieve pain
    - The best include Vitamin C, Selenium, Carotenes, and Bioflavonoids
      - Guava, peppers, oranges, grapefruit, broccoli, brazil nuts, tuna, crab, shrimp, whole grains, sweet potatoes, carrots, kale, squash, and many more!

Arthritic Nutrition 101

- **What Foods Should be Included?**
  - **Vitamin D**
    - Critical for joint health
    - May reduce risk of arthritis
    - For those already with arthritis, a deficiency may cause a worsening disability overtime
    - Basic daily requirement: 400 IU until age 70, 600 IU over 70
    - Wild salmon, mackerel, sardines, milk (skim, 1%, low-fat), soy milk, egg yolks, and mushrooms
  - **Spices**
    - **Ginger**
      - Shown to lessen pain of osteoarthritis if taken in highly purified form.
      - Contains chemicals that work similar to anti-inflammatory meds
    - **Turmeric (curcumin)**
      - A mustard-yellow spice with its main ingredient being yellow curry
      - Said to suppress inflammatory body chemicals and work similar to an anti-inflammatory med

Arthritic Nutrition 101

- **Should Supplements be Considered?**
  - **Multivitamins**
    - Provides 100% DV of Vitamin D, Vitamin C, Selenium, and Vitamin A
    - Beware of mega-dose varieties: *Excess **Vitamin C** can make certain cases of arthritis **worse***
  - **Fish Oil**
    - Studies have shown doses from 1.2 grams to 3.2 grams for excellent relief in conjunction with an omega-3 rich diet
  - **Glucosamine + Chondroitin**
    - Nutrients naturally found in and around cartilage cells
    - Thought to strengthen and stimulate growth of cartilage
    - Recommend 15 mg glucosamine and 1200 mg chondroitin daily
  - **SAMe**
    - Possibly as effective as NSAIDs
    - Recommend 1200 mg daily
    - Beware of side effects: insomnia, rash, GI problems
  - **GLA**
    - Found in evening primrose oil, borage oil, and black current oil
    - Thought to reduce pain, joint tenderness, and morning stiffness by suppressing certain inflammatory substances
    - Recommend 1-2 grams daily

Arthritic Nutrition: 1Day Meal Plan

- **Breakfast**
  - Vanilla Pumpkin Breakfast Pudding
    - 1 cup nonfat, vanilla yogurt mixed with ½ cup canned pumpkin puree and topped with 2 TBS chopped walnuts
- **Lunch**
  - The Ache-Less Salad
    - 3 cups leafy greens topped with 4 ounces of either salmon, crab, shrimp, tilapia, turkey breast, or grilled chicken. Mix with ½ cup chopped tomato, ¼ cup chopped red onion, ¼ cup sliced mushrooms, 1 sliced red bell pepper, 2 chopped beats, ½ cup chopped carrots, ¼ cup corn. Toss with 1-2 teaspoons olive oil and unlimited balsamic vinegar
- **Afternoon Snack**
  - Ginger Spiced Pumpkin Muffin
  - Includes whole-wheat flour, cinnamon, ginger, skim milk, pumpkin, canola oil, and more
  - For full recipe, visit www.today.msnbc.com
- **Dinner**
  - Chicken Curry and Cauliflower with Brown Rice
  - Includes curry powder, garlic, ginger, boneless chicken breast, onion, chickpeas, fat-free yogurt, and more
  - For full recipe, visit www.today.msnbc.com
- **PM Snack**
  - One cup of fresh berries

BEST FOOD for ARTHRITIS

Fatty Fish varieties such as salmon, mackerel, sardines and trout are high in omega-3 fatty acids, which have been shown to have potent anti-inflammatory effects.
An analysis of 17 studies found that taking omega-3 fatty acid supplements decreased joint pain intensity, morning stiffness, the number of painful joints and use of pain relievers in patients with rheumatoid arthritis

Garlic has been shown to have an anti-inflammatory effect that may help decrease symptoms of arthritis.

Ginger Besides adding a burst of flavor to teas, soups and sweets, ginger may also help ease the symptoms of arthritis

One study that looked at the diets of 1,005 women found that the intake of cruciferous vegetables like **broccoli** was associated with decreased levels of inflammatory markers

BEST FOOD for ARTHRITIS

Walnuts Walnuts are nutrient-dense and loaded with compounds that may help reduce the inflammation associated with joint disease. It was\ showed that eating walnuts was associated with reduced markers of inflammation . Walnuts are especially high in omega-3 fatty acids, which have been shown to decrease the symptoms of arthritis

Berries Tons of antioxidants, vitamins and minerals are crammed into each serving of berries, which may partially account for their unique ability to decrease inflammation.

General recommendations for the treatment of osteoarthritis

Osteoarthritis - frequent, especially in the elderly, the disease of the joints. The main symptoms of osteoarthritis - **pain in the joints and the deformity of the joints**. This affects the knee and hip joints, as well as the small joints of the hands. Characterized by the formation of small nodules in the interphalangeal joints of the hands.

Among the common causes of osteoarthritis - a genetic predisposition (heredity), and excess body weight. Overweight is more mechanical stress on the affected joint.

When the treatment **is very important diet.** There should be 5-6 times a day, but gradually. The diet is recommended to include low-fat foods - meat, fish, cheese. Vegetables, vegetable dishes must be present in your menu in a significant amount - 500-600 g per day.

Limit foods that contain easily digestible carbohydrates.

What are the most common diseases of the genitourinary system?

- Diseases of the kidneys and urinary tract:

  - acute nephritis,
  - pyelonephritis,
  - acute cystitis
  - renal failure
  - urolithiasis disease

What are the characteristic symptoms of diseases of the urinary system?

- Most often, kidney and urinary tract diseases are manifested:
- pain in the lower back and lower abdomen, as well as when urinating
- swelling
- violation of urination.
- possible increase in blood pressure,
- changes in urine.

What is acute nephritis, and what are its main causes?

- ***Acute nephritis is an acute infectious-allergic disease of the kidneys with a primary glomerular lesion.***
- ***Usually, it is preceded by the development of diseases associated with streptococcal infection (tonsillitis, tonsillitis, pharyngitis, acute respiratory viral infections, otitis media, etc.), less commonly pneumonia, food intoxication, dental caries, rheumatism, and viral infections.***

How does acute nephritis manifest?

- The main symptoms are hypertension (increased blood pressure),
- changes in urine:
- protein, red blood cells, an increase in relative density, often urine acquires the color of “meat slops”,

What complications can acute nephritis cause?

- Acute nephritis can be complicated by acute renal and heart failure (cardiac asthma),
- eclampsia (increased intracranial pressure and swelling of the brain tissue),
- cerebral hemorrhage - stroke.

What are the first aid measures for acute nephritis?

- The patient needs to create calm,
- with shortness of breath - a semi-sitting position.
- To free breasts from overshadowing clothes.
- Provide fresh air.
- At the feet - a warm heating pad, on the calves - mustard plasters.

What are the first aid measures for acute nephritis?

- With severe headaches - a can or mustard collar.
- For pain in the heart or behind the sternum - validol, nitroglycerin; for pain in the lumbar region - painkillers.
- It is necessary to monitor the pulse, blood pressure and respiration.
- Call a doctor to resolve hospitalization.

DIET N 7

- Kidney disease leads to metabolic disorders.
- The body can be helped by a special sparing diet, which doctors call Diet N 7.
- The nutrition system will restore the water-salt balance and will cope with constant swelling of the legs, which are often a constant "companion" of kidney disease.

What type of diet you should follow to acute nephritis?

In acute nephritis, DIET No. 7 is prescribed.

Limit:

- consumption **of salt** (in severe cases, up to 0.2-0.3 g per day),
- **liquids** (up to 500-600 ml per day),
- **animal proteins** (meat, fish, eggs),
- Unloading days (apple, apple and potato) are prescribed 1-2 times a week.

Diet N 7

- *Indications*
- *Indications for the appointment of diet number seven - acute nephritis during the recovery period, chronic nephritis without exacerbation, renal failure, metabolic disorders, tendency to edema.*
- *The subtleties of a "kidney" diet*
- *Meat and fish dishes are best cooked in a boiled form, and then bake or fry.*
- *The calorie content of the diet should be at least 3500 kcal per day.*
- *It is advisable to take food 4-6 times a day.*
- *All food is cooked with virtually no salt. In renal failure, no more than 2-3 g of salt per day is recommended, but patients with high blood pressure need to cook food without salt at all.*
- *The volume of fluid per day should not exceed .*

What is PYELONEPHRITIS and what are the causes of its occurrence?

- *Pyelonephritis is an inflammatory process in which the kidney, renal pelvis and calyx are involved.*
- *Acute pyelonephritis occurs due to the spread of infection (E. coli, coccal flora) from the renal pelvis to the renal tissue.*

What are the characteristic signs of acute pyelonephritis?

- Sudden onset, fever up to 39 ° C and higher, often with chills and sweating,
- clouding of urine, pain in the lumbar region, right or left,
- symptoms of general intoxication (weakness, malaise, lack of appetite, etc.).

What are the principles for treating pyelonephritis?

- Treatment of patients should be timely and inpatient.
- Assigned to bed rest.
- **Diet No. 7, mainly milk-vegetable,**
- **Excludes:**
- **spicy,**
- **sour,**
- **salty foods,**
- **spices and smoked meats.**
- Since edema is usually absent, the use of a large amount of fluid (**2.5-3 liters per day**) is indicated.

Renal insufficiency

- **Renal insufficiency** is poor function of the kidneys that may be due to a reduction in blood-flow to the kidneys caused by **renal** artery disease. Normally, the kidneys regulate body fluid and blood pressure, as well as regulate blood chemistry and remove organic waste.

Kidney failure

- Kidney failure is classified as either **acute kidney failure**, which develops rapidly and may resolve; and **chronic kidney failure**, which develops slowly.
- ***Symptoms*** may include ***leg swelling***, *feeling tired, vomiting, loss of appetite, and confusion*.
- ***Complications*** of acute and chronic failure include uremia, high blood potassium, and volume overload. Complications of chronic failure also include herat disease, high blood pressure, and anemia.

The basic principles of clinical nutrition in chronic renal failure.

- 1) **protein restriction** **(up to 40-60 g) mainly vegetable, with the simultaneous introduction of animal proteins containing the necessary amount of essential amino acids;**
- **2) the exclusion or sharp reduction in table salt;**
- **3) the exclusion of substances and drinks that irritate the kidneys (alcohol, coffee, tea, cocoa, chocolate, snacks);**
- **4) the inclusion in the diet of foods containing a small amount of protein and having a high calorie content (mashed potatoes and mousses with swelling starch, dishes from wheat starch),**

Renal insufficiency DIET

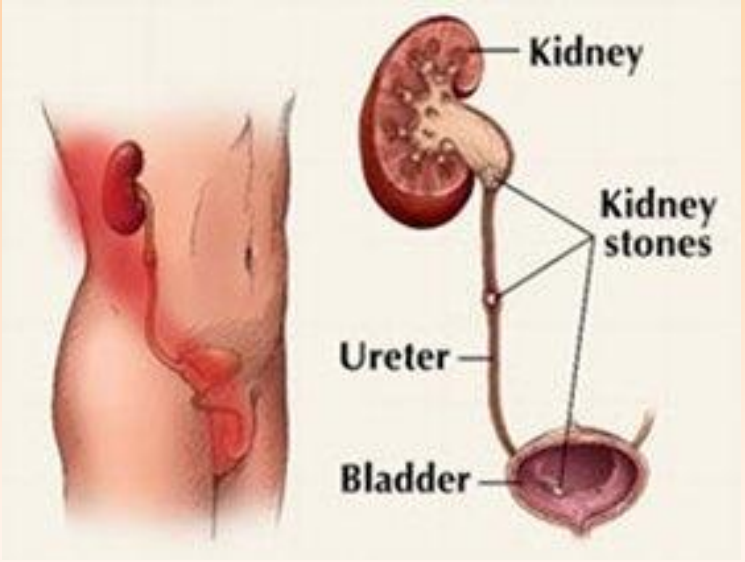
- 5) Ensuring sufficient caloric intake (3000-3500 kcal) due to fats and carbohydrates;
- 6) the maximum fortification of the diet with the help of various juices (watermelon, melon, cherry, apple, plum, etc.), equalization of the water-salt balance.

Renal insufficiency DIET

- With severe renal failure, purification of the patient's blood using an "artificial kidney" (**hemodialysis**), food is prepared without salt,
- in the absence of edema and hypertension, a patient can be given **2-3 g of salt per day,**
- free fluid to use no more than **0.8-1 liters per day**,
- salt-free bread - up to 150-200 g per day, **meat or fish - up to 100 g** per day, up to 140 g of milk, 140 g of sour cream, 25 g of cottage cheese can be consumed per day.
- Take food 6 times a day. During the recovery period with acute nephritis and chronic nephritis without exacerbation per day, the patient can use 3-6 g of salt with complete salt-free cooking. The distribution of food should be at least 5-6 meals per day.

renal colic


Локализация боли при мочекаменной болезни


Kidney
Kidney stones
Ureter
Bladder

UROLITHIASIS

Kidney stone disease, also known as **urolithiasis**, is when a solid piece of material (kidney stone) occurs in the urinary tract.

Kidney stones typically form in the kidney and leave the body in the urine stream.
A small stone may pass without causing symptoms.

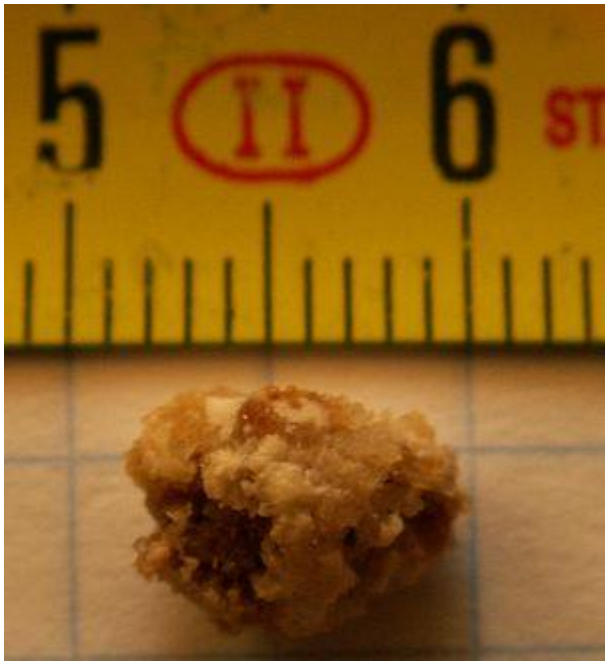
If a stone grows to more than 5 millimeters (0.2 in) it can cause blockage of the ureter resulting in **severe pain** in the lower back or abdomen.

Stone may also result in blood in the urine, vomiting, or painful urination. About half of people will have another stone within ten years.

UROLITHIASIS

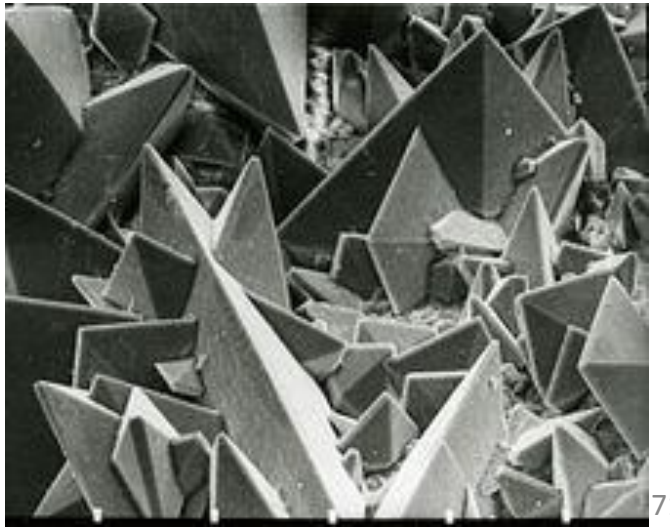
- Calcium Oxalate Stones
- Calcium Phosphate Stones
- Uric Acid Stones
- Cystine Stones

X-ray diagnosis



A kidney stone, 8 millimeters (0.3 in) in diameter

A kidney stone (yellow) composed of calcium oxalate



kidney stone showing tetragonal crystals

UROLITHIASIS DIET

Calcium Oxalate Stones

Reduce oxalate

If you've had calcium oxalate stones, you may want to avoid these foods to help reduce the amount of oxalate in your urine:

- nuts and nut products
- peanuts—which are legumes, not nuts, and are high in oxalate
- rhubarb
- spinach
- wheat bran

Talk with a health care professional about other food sources of oxalate and how much oxalate should be in what you eat.

UROLITHIASIS DIET

Reduce sodium

Your chance of developing kidney stones increases when you eat more sodium. Sodium is a part of salt. Sodium is in many canned, packaged, and fast foods. It is also in many condiments, seasonings, and meats.

Talk with a health care professional about how much sodium should be in what you eat.

See tips to reduce your sodium intake.

Limit animal protein

Eating animal protein may increase your chances of developing kidney stones.

A health care professional may tell you to limit eating animal protein, including

- beef, chicken, and pork, especially organ meats
- eggs
- fish and shellfish
- milk, cheese, and other dairy products

OXALATE STONES

- Do not tolerate foods rich in oxalic acid.
- ***Exclude***: sorrel, spinach, figs, cocoa, green tea, chocolate, strong fish and meat broths, alcohol, spicy seasonings and snacks, fried meat.
- ***Limit***: potatoes, salt, carrots, onions, tomatoes, cherries.
- ***Add to the menu***: wheat bran and sprouted wheat, apples, pears, grapes, red currants, seafood (except fish).
- But don't be alarmed. The list of allowed products is not so small: cabbage (Brussels sprouts, white cabbage, cauliflower), cucumbers, zucchini, pumpkin, watermelons and melons, peas, all kinds of cereals, white bread, vegetable oil (preferably olive and linseed!), From fruits - apricots, bananas. As well as dairy products and meat, which is better to eat in the morning and in boiled form.
- ***Herbal medicine*** - it is very useful to drink decoctions of herbs: a leaf of black currant, lingonberry, St. John's wort, horsetail, corn stigmas.
- Mineral water - Essentuki-4, Novaya, Smirnovskaya, Slavic, Maykop

UNIVERSAL WASHING PRODUCT

- **Watermelon has a good diuretic effect. In the summer, when it is sold on every corner, you must regularly include a watermelon in your diet, and once a week arrange a fasting day - eat 1.5–2 kg of watermelon pulp.**

Uric Acid Stones

Often seen in patients with low urine pH and low urine volume. This stone type is associated with individuals that have chronic diarrhea, volume depletion, high animal protein intake, and sometimes myeloproliferative disorders.

10%
of all kidney stones

Urolithiasis disease

- **URATE STONES It is possible to dissolve using an alkalizing diet.**

- **Limit to a minimum: meat, poultry, offal (kidneys, liver), cheese, eggs and fish. Cook soups mainly vegetarian or cooked on the second broth (first drain after 5-10 minutes of boiling).**

- **Maximize: consumption of vegetables, fruits, juices.**
- **Add to the menu: dairy products and non-fish seafood (shrimp, squid, mussels, oysters) to compensate for the lack of protein.**
- **Herbal medicine - decoctions of diuretic herbs: half a floor, bearberry, cornflower flowers, tansy.**
- **Mineral water - Borjomi, Moscow, New.**

- **PHOSPHATIC STONES**
- **Need "acidification." After consulting with your doctor and eliminating the possibility of diseases of the parathyroid gland and colitis, you can establish a constant diet.**
- **Strictly limit: milk, dairy products, and plant foods.**
- **Leave on the menu: meat and fish products, any cereals, pasta and legumes, which can be eaten more.**
- **Herbal medicine - madder dyeing, herbal preparations "Marelin" and "Fitolizin".**
- **Mineral water - Narzan, Marcial.**

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