MINISTRY OF HEALTH OF UKRAINE
UKRAINIAN MEDICAL STOMATOLOGICAL ACADEMY

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at the meeting of department of
therapeutic dentistry

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Guidelines for independent work of
students for preparation for a practical lesson
and during the practical studies

<table>
<thead>
<tr>
<th>Academic discipline</th>
<th>Therapeutic dentistry</th>
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<tr>
<td>Module number 4</td>
<td>Diseases of the oral mucosa</td>
</tr>
<tr>
<td>Topic of the lesson 18</td>
<td>Changes in the oral mucosa in hypo- and avitaminosis group B and PP. Tactics of the dentist</td>
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<tr>
<td>Course</td>
<td>V</td>
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<td>Faculty</td>
<td>Foreign students training faculty (dentistry)</td>
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Poltava 2020
1. Relevance of the topic:

In the practice of dentists are often patients with manifestations of hypovitaminosis in the oral cavity. Vitamin imbalance in the body can be the result of insufficient intake of vitamins from food, or with impaired absorption in the gastrointestinal tract, significant destruction in the intestine, increased body needs for vitamins, diseases of other organs and systems, long-term use of antibacterial drugs.

Most hypovitaminosis in the early stages appears on the mucous membrane of the oral cavity. Therefore, the study of hypovitaminosis is of great importance in the training of a dentist.

2. Specific goals.

- Have a general idea of the role of vitamins in metabolism in the human body;
- Explain the relationship between etiopathogenetic factors of changes in the oral mucosa in hypo-and beriberi B, PP;
- Know the changes in SOPR in hypo-and beriberi B, PP;
- To make the plan of inspection of the patient with diseases of a mucous membrane of an oral cavity and to explain their features at hypo-and avitaminosis B, PP and to analyze the data received after carrying out clinical and laboratory researches;
- Know the principles of treatment and prevention of hypovitaminosis and avitaminosis B, PP;
- Teach students to make a treatment plan for patients with hypo-and beriberi B, PP;
- Carry out therapeutic dental manipulations in the oral cavity with hypo-and beriberi B, PP;
- Substantiate the choice of drugs for the treatment of this pathology depending on the clinical and morphological features of the process.

3. Basic knowledge, skills, abilities necessary for studying the topic (interdisciplinary integration).

<table>
<thead>
<tr>
<th>Name of previous disciplines</th>
<th>Acquired skills</th>
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<tbody>
<tr>
<td>1. Biochemistry</td>
<td>Know the role of vitamins in metabolism</td>
</tr>
<tr>
<td>2. Pathological anatomy</td>
<td>Know the structure of SOPR and navigate the pathomorphological changes in inflammation and dystrophy</td>
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<tr>
<td>3. Normal physiology</td>
<td>Know the groups of vitamins, their functions and mechanisms of their formation.</td>
</tr>
<tr>
<td>4. Internal diseases</td>
<td>The main clinical manifestations of changes in hypo- and avitaminosis B, PP</td>
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<tr>
<td>3. Therapeutic propaedeutics dentistry</td>
<td>Methods of examination of a dental patient</td>
</tr>
<tr>
<td>5. Pharmacology</td>
<td>Pharmacodynamics of drugs, prescribe prescriptions, explain to the patient the value of the prescribed treatment</td>
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<tr>
<td>6. Intra-subject integration</td>
<td>To know the clinic of SOPR lesions in hypo- and avitaminosis B, PP</td>
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<td></td>
<td>Be able to conduct diff. diagnosis junction, with the affection we periodontal, oral mucosa in various primary and secondary (symptomatic) disease.</td>
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</tbody>
</table>
4. Tasks for independent work in preparation for the lesson.

4.1. List of basic terms, parameters, characteristics that must be mastered by the student in preparation for the lesson.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Vitamin B&lt;sub&gt;1&lt;/sub&gt; (thiamine, antineurite)</td>
<td>Performs a coenzyme function, transforming into cocarboxylase, which plays an important role in the conversion of pyruvic acid to acetyl-co A.</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;2&lt;/sub&gt; (riboflavin)</td>
<td>Participates in carbohydrate and nitrogen metabolism. It is a part of the enzymes regulating redox processes in fabrics, stimulates regeneration and production of antibodies, normalizes permeability of microvessels, provides trophism of a mucous membrane of an oral cavity.</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;6&lt;/sub&gt; (pyridoxine, adermin)</td>
<td>In the body it is converted into pyridoxal -5-phosphate and is part of enzymes that play an important role in the metabolism of many essential amino acids. Regulates phosphorus-calcium metabolism, improves trophism, tissue regeneration.</td>
</tr>
<tr>
<td>Vitamin PP (nicotinic acid, niacin)</td>
<td>Participates in cellular respiration reactions, promotes the absorption of carbohydrates by tissues, has a vasodilating effect, enhances the body's immunological reactivity by stimulating phagocytosis, reduces capillary permeability, inhibits exudation. An important property of nicotinic acid is the improvement of impaired blood circulation in periodontal tissues.</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;12&lt;/sub&gt; (cyanocobalamin, antianemic)</td>
<td>Participates in the biosynthesis of protein, nucleic acids that affect the composition of the protoplasm and cell nucleus, activates the blood coagulation system, increases the number of reticulocytes, increases the content of hemoglobin in erythrocytes.</td>
</tr>
</tbody>
</table>

4.2 Theoretical questions for the lesson.
1. Describe the importance of vitamins in the life of the human body.
2. Highlight daily vitamin needs.
3. Name the general changes in the body and on the oral mucosa in hypovitaminosis and avitaminosis of B vitamins, PP.
4. List the methods of examination of patients with hypo- and beriberi B, PP.
5. List the treatment and prevention measures.

4.3. Practical work (tasks) performed in class.
1. Master the technique of taking material for laboratory examination.
2. Carry out curation of the patient with manifestations of hypovitaminosis in the oral cavity.
3. When interviewing a thematic patient, pay attention to bad habits, the presence of dental interventions, somatic pathology and allergy history.
4. Analyze the results of laboratory tests.
5. Define a plan and treat a patient with hypovitaminosis.
7. Draw up medical records of patients admitted for medical examination

5. Content of the topic:

Vitamin B₁ (thiamine, antineuritic) performs a coenzyme function, transforming into cocarboxylase, which plays an important role in the conversion of pyruvic acid to acetyl-co A.

Thiamine is involved in carbohydrate metabolism, regulation of the functional state of the central nervous system. It normalizes the tone of the sympathetic nervous system, affects the balance in the system of acetylcholine - cholinesterase, provides the conduction of nerve impulses, and also plays an important role in the elimination of tissue hypoxia.

Age requirement - 1-2 mg.
Natural sources of vitamin B₁: yeast, walnuts, peanuts, egg yolks, wholemeal bread, grapes, beans, peas, spinach, wheat germ, oats.
Insufficient vitamin B₁ develops increased mental and physical fatigue, loss of appetite, muscle weakness, cramps, leg pain, paresthesia, tachycardia. The primary signs may be depression, insomnia, memory loss.

In the oral cavity, taste sensations are weakened, fungal papillae of the tongue are hypertrophied, the sensitivity of the mucous membrane increases, paresthesia and glossalgia develop.

Vitamin B₁ results in beriberi, which is a severe form of alimentary polyneuritis. Signs of the disease - myalgia, muscle atrophy, myasthenia gravis, weight loss, areflexia, impaired sensitivity, weakening of the cardiovascular system, secretory function of the gastrointestinal tract, increased blood and urine pyruvic acid.

Vitamin B₁ is taken orally at 0.002 - 0.01 g 3 times a day 15 minutes after eating. Intramuscularly 1 ml of 6% solution, the course of treatment - 10 injections. Vitamin B₁ is introduced by electrophoresis from the anode.

Vitamin B1 is not recommended for use with vitamin B₆, as the latter disrupts its conversion into diphosphate, as well as with vitamin B₁₂, which enhances the allergic properties of vitamin B₁.

Vitamin B₂ (riboflavin) is involved in carbohydrate and nitrogen metabolism. It is a part of enzymes that regulate redox processes in tissues, stimulates regeneration and production of antibodies, normalizes the permeability of microvessels, provides trophic of the oral mucosa.

Daily dose - 2.5 mg.
Natural sources: yeast, leafy green vegetables, cereals (buckwheat and oats), peas, dairy products, cheese, hazelnuts, bread, liver, fish.

Vitamin B₂ deficiency is manifested by weakness, loss of appetite, nervous system disorders (paresthesias, headaches, apathy), digestive disorders, the development of seborrheic dermatitis, hypochromic anemia.

Early symptoms of ariboflavinosis are cheilosis (small cracks and dry lips), angular cheilitis (lesions of the corners of the mouth) and glossitis. The tongue is initially purple-red, dry, rough (orange peel), then becomes smooth, shiny, sharply painful when eating and speaking. Later develop seborrheic dermatitis of the
nasolabial triangle, ears and neck, as well as interstitial keratitis, blepharitis and conjunctivitis.

Vitamin B₂, administered orally 0.01 g 3 times daily after meals. The course of treatment is 10-45 days. Riboflavin combines well with antimicrobials and phagocytosis stimulants. Alkaline-reactive substances weaken its action.

Vitamin B₆ (pyridoxine, adermin) in the body is converted into pyridoxal-5-phosphate and is part of enzymes that play an important role in the metabolism of many essential amino acids. Regulates phosphorus-calcium metabolism, improves trophism, tissue regeneration.

Daily dose - 2-3 mg.

Natural sources: green leafy vegetables, yeast, buckwheat and wheat groats, legumes, carrots, walnuts, potatoes, soybeans, liver, meat, fish.

Insufficient pyridoxine leads to the development of hypochromic anemia and impaired iron metabolism. Affected nervous system (increased irritability or inhibition, convulsions, peripheral neuritis), gastrointestinal tract (loss of appetite, nausea), skin (seborrheic dermatitis). In the oral cavity - angular cheilitis, desquamative glossitis, paresthesias.

Vitamin B₆, taken orally at 0.05 g 2 times a day. The course of treatment is 1-2 months. Subcutaneously 1-2 ml of 5% solution. Vitamins B₂ and B₁₂ are effective when used together in the treatment of periodontal disease.

Vitamin PP (nicotinic acid, niacin) is involved in cellular respiration reactions, promotes the absorption of carbohydrates by tissues, has a vasodilating effect, enhances the body's immunological reactivity by stimulating phagocytosis, reduces capillary permeability, inhibits exudation. An important property of nicotinic acid is the improvement of circulatory disorders in periodontal tissues.

Age requirement - 15-25 mg.

Natural sources: beef liver, meat products, fish, yeast, carrots, cheese, dates, eggs, milk, tomatoes, nuts, parsley.

Vitamin PP deficiency is manifested by neuropsychiatric disorders, headache, fatigue, dermatitis.

Changes in the oral cavity are characterized by taste disturbance, increased salivation, burning, redness of the mucous membrane. A characteristic symptom is glossitis. The back of the tongue is initially covered with a dark plaque, the edges and tip are bright red ("cardinal tongue"). Gradually, the redness spreads to the entire tongue, the surface layers of the epithelium peel off and the dorsal surface becomes smooth and shiny ("mirror"). Sometimes cracks appear on it - "chess tongue" (Fig.11.16).

As a result of vitamin PP avitaminosis, a symptom complex called pellagra develops and is characterized by a triad (three Ds): specific pigmented dermatitis - symmetrical areas of the skin affected by direct sunlight are affected; diarrhea (diarrhea) - inflammation of the mucous membrane of the gastrointestinal tract, accompanied by ulcers and hemorrhages; dementia: due to a decrease in the rate of redox reactions there is a lack of energy, resulting in impaired CNS functions.

Vitamin PP is used orally at 0.05 g 3 times a day after meals, the course of treatment - 15-30 days.

From the ingestion of vitamin PP possible "phenomenon of ignition" - redness of the face and upper torso with a burning sensation. Prolonged use of high doses of
the vitamin impairs liver function. It is necessary to simultaneously prescribe lipotropic drugs - methionine, folic acid, lipoic acid or cyanocobalamin.

*Vitamin B₁₂* (cyanocobalamin, antianemic) is involved in the biosynthesis of protein, nucleic acids that affect the composition of the protoplasm and cell nucleus, activates the blood coagulation system, increases the number of reticulocytes, increases hemoglobin in erythrocytes.

Vitamin B₁₂ enhances the oxidative breakdown of glucose in tissues, increases the phagocytic activity of leukocytes, improves trophic, creates an analgesic effect, reduces hyperesthesia of the hard tissues of the tooth.

Synthesized in sufficient quantities by the intestinal microflora, but only in the case of food intake of the trace element cobalt, which is part of the structure of this vitamin. A prerequisite for the assimilation (absorption) of vitamin B₁₂ in the intestine is the synthesis by the gastric mucosa of a complex glycoprotein protein, which is called "internal Castle factor".

**Daily dose** - 2-5 mcg.

**Natural sources:** yeast, seaweed, offal, beef, fish, milk, eggs, soy.

Vitamin B₁₂ deficiency is manifested by a triad of symptoms: anemia (impaired hematopoietic function), achilles (decreased acidity of gastric juice), ataxia (impaired coordination). In addition, there are paresthesias of the upper and lower extremities, pale skin, weakness, fatigue, tinnitus, drowsiness during the day and insomnia at night, depression, visual disturbances.

An early sign of cyanocobalamin deficiency is damage to the tongue: hyperemia of its lateral surfaces and tip and atrophy of the papillae ("lacquer tongue"). There is also dysfunction of the salivary glands - hyposalivation. A common symptom is paresthesia.

Cyanocobalamin is administered intramuscularly or subcutaneously in 1 ml of 0.02% solution 2-3 times a week. Concomitant administration of cyanocobalamin and thiamine increases the risk of allergic reactions.

*Folic acid* (vitamin B₉) stimulates cell division, DNA and RNA synthesis, leuko- and thrombocytopoiesis, regenerative processes in all organs and tissues, increases cellular immunity.

**Daily dose** - 0.2 mg.

**Natural sources:** spinach leaves, lettuce, beans, parsley, cabbage, onions, carrots, meat, kidneys.

Folic acid deficiency causes megaloblastic anemia, diarrhea and stear-type constipation, fever.

In the oral cavity there is pallor of the mucous membrane, dry, bright red tongue, often atrophic processes.

Used orally at 0, 001 - 0, 002 g 1-3 times a day after meals. The course of treatment is 20-30 days

### 6. Additions.

**Tests for self-control.**

1. In which biological processes vitamin PP is directly involved:
   - **A.** Regula is a redox reaction
   - **B.** Regulates cellular respiration responses
C. Increases capillary permeability  
D. Reduces capillary permeability  
E. Promotes the absorption of carbohydrates by tissues

2. In which biological processes vitamin B₂ is directly involved:  
A. Enhances the trophic function of CO  
B. Strengthens the protective function  
C. Stimulates redox processes  
D. Stimulates carbohydrate metabolism  
E. Promotes melanin synthesis

3. Select the main clinical manifestations characteristic of PP hypovitaminosis:  
A. Diarrhea  
B. Dystrophy  
C. Dementia  
D. Dermatitis  
E. Demineralization

4. Choose the main clinical manifestations characteristic of hypovitaminosis B₁:  
A. Angular cheilitis  
B. Hypersalivation  
C. Xerostomia  
D. Desquamative glossitis  
E. Hyperplasia of the fungal papillae of the tongue

5. Select the main clinical manifestations characteristic of hypovitaminosis B₆:  
A. Hemorrhagic syndrome  
B. Paresthesias  
C. Angular cheilitis  
D. Hyperplasia of the fungal papillae of the tongue  
E. Hypersalivation

6. What is the characteristic feature of Miller-Gunter glossitis?  
A. Hypovitaminosis B₁  
B. Hypovitaminosis B₆  
C. Hypovitaminosis B₁₂  
D. Hypovitaminosis B₂  
E. Hypovitaminosis PP

7. Select the main clinical manifestations characteristic of hypovitaminosis B₁₂:  
A. Desquamative glossitis  
B. Paresthesias  
C. Angular cheilitis  
D. Hyperplasia of the fungal papillae of the tongue  
E. Hypersalivation

8. Choose natural sources of the vitamin in the B₁:  

A. Cream butter  
B. Yeast  
C. Beet  
D. Coarse bread  
E. All of the above

9. Choose natural sources of the vitamin in the B₁₂:  
A. By-products  
B. Fish  
C. Milk  
D. Soy  
E. All of the above

10. Choose natural sources of vitamin in PP:  
A. Eggs  
B. Fish  
C. Milk  
D. Nuts  
E. All of the above

Tasks for self-control.

1. The patient, 58 years old, complains of pain, smoking in the tongue when eating solid, sour, hot food, taste disturbances. On examination, the skin is pale, on the back and tip of the tongue bright red spots of desquamation, devoid of filamentous papillae, painful to the touch and palpation. Blood test of erythrocytes 2.5x10¹² / l, anisocytosis, poikilocytosis; HB-100 g / l, color index 1.4, leukocytes - 4.2x10⁹ / l, polymorphonuclear-1%, segmental-36%, eosinophilic-4%, basophilic-2%, lymphocytes-53%, monocytes-4%, platelets 180x10⁹ / l, ESR 20 mm / h. With what preliminary diagnosis should the patient be referred to a hematologist?  
A. B₁₂ and folate deficiency anemia  
B. Hypoplastic anemia  
C. Werlhof's disease  
D. Acute leukemia  
E. Iron deficiency anemia

2. Patient D., 67 years old, went to the dentist with complaints of pain in the tongue, fatigue, loss of appetite, muscle weakness, cramps. Objectively: normal size tongue, tongue papillae mushroom, hypertrophied. At additional inspection increase in content of pyruvic acid in blood and urine is noted. Establish a preliminary diagnosis.  
A. Hypovitaminoz vitamin B₁  
B. Hypovitaminoz vitamin B₂  
C. Hypovitaminoz vitamin B₆  
D. Hypovitaminoz vitamin B₁₂  
E. Hypovitaminoz vitamin PP

3. Pregnant L., 23 years old, complains of pain in the corners of the mouth and tongue. Objectively, symmetrical face, the skin within nasolabial triangle of red, peel off. There are cracks in the corners of the mouth. The tongue is smooth, shiny, sharply painful when eating and speaking. Establish a preliminary diagnosis.
A. Hypovitaminosis vitamin B₂.
B. Hypovitaminosis vitamin B₁.
C. Hypovitaminosis vitamin B₆.
D. Hypovitaminosis vitamin B₁₂.
E. Hypovitaminosis vitamin PP.

4. Patient Ts., 69, complains of taste disturbance, burning with CO₂, gastrointestinal disorders (diarrhea), itchy skin. Rev. ’È objectively, symmetrical face, skin – symmetrical pigmented spots. The back of the tongue is covered with a dark plaque, the edges and tip are bright red. Establish a preliminary diagnosis.
A. Hypovitaminosis vitamin PP
B. Hypovitaminosis vitamin B₁.
C. Hypovitaminosis vitamin B₆.
D. Hypovitaminosis vitamin B₁₂.
E. Hypovitaminosis vitamin A.

5. Patient D., 60 years old, complains of weakness, heartburn, taste disturbances. Examination revealed pale skin and SOPR, their yellowish tinge. The back of the tongue is smooth, shiny, as if polished. On the back and tip of the tongue there are limited bright red stripes and spots. The results of blood tests show a significant decrease in the number of erythrocytes, along with a moderate decrease in hemoglobin and a high color index. Characteristic aniso- and poikilocytosis, the presence of megalocytes and megaloblasts. What factor in the body is caused by this disease?
A. Cyanocobalamin
B. Riboflavin
C. Iron
D. Nicotinic acid
E. Ascorbic acid

6. Patient M., 20 years old, complains of dry lips, cracks in the corners of the mouth, soreness when eating. The patient suffers from gastritis with low acidity. On examination, the lips are red, swollen, cracks and erosions appear on their surface. Get stuck in the corners of your mouth. The tongue is smooth, shiny, covered with furrows. Blood color index 0.9. What condition is characterized by these changes?
A. Hypovitaminosis vitamin B₂
B. Hypovitaminosis vitamin B₁.
C. Hypovitaminosis vitamin C.
D. Hypovitaminosis vitamin B₁₂.
E. Hypovitaminosis vitamin A.

7. Patient D. went to the dentist with complaints of pain in the tongue, fatigue, loss of appetite, muscle weakness, convulsions. Objectively: the tongue of normal size, fungal papillae of the tongue are hypertrophied. At additional inspection increase in content of pyruvic acid in blood and urine is noted. Make a preliminary diagnosis:
A. Hypovitaminosis vitamin B₁.
B. Hypovitaminosis vitamin B₆.
C. Hypovitaminosis vitamin C.
D. Hypovitaminosis vitamin B₁₂
E. Hypovitaminosis vitamin C

8. Patient Z., 45 years old, complains of taste disturbance, heartburn, gastrointestinal disorders (loss of appetite, nausea), itchy skin, irritability. Objectively, symmetrical face, mucous membrane anemic, at the corners of his mouth - cracked tongue smooth, shiny and tender. Establish a preliminary diagnosis.
A. Hypovitaminosis vitamin B₆
B. Hypovitaminosis vitamin B₁₂
C. Hypovitaminosis vitamin B₆
D. Hypovitaminosis vitamin B₁₂
E. Hypovitaminosis vitamin A

9. In the treatment of patient G., 51, due to hypovitaminosis, there was a "phenomenon of ignition" - redness of the face and upper torso with a burning sensation. With long-term use of which vitamin is this phenomenon possible? What drugs should be prescribed to the patient to prevent such complications?
A. When using vitamin E use. To prevent complications, it is necessary to simultaneously prescribe lipotropic drugs - methionine, folic acid, lipoic acid or cyanocobalamin
B. When using vitamin A.
C. When using vitamin B₆.
D. When using vitamin B₁₂.
E. When using vitamin B₂

10. Patient C., 64, complains of taste disturbances, weakness, fatigue, drowsiness. Six months ago he underwent gastrectomy. Objectively, symmetrical face, skin pale, anemic mucosa, tongue smooth, hyperemic of the side surfaces and tip.
What additional method of diagnosis should be prescribed to the patient for a final diagnosis?
A. With a general blood test.
B. General analysis of urine.
C. Biochemical analysis of blood.
D. Blood sugar test.
E. Glycosylated hemoglobin.

7. Recommended literature.

Basic sources

Additional sources
5. Jenkins G.N. The Biochemistry of the Mouth. – 4-th ed. – Oxford etc:

Electronic resources:
2. Electronic resource: [https://www.booksmed.com/stomatologiya]
3. Electronic resource: [https://studfile.net/search/?q]
5. Electronic resource: [https://books.google.com.ua/books?]

Guidelines prepared
associate professor of department

Sidash Y.V.