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**ADDITIONAL METHODS OF EXAMINATION IN
DENTISTRY**

The textbook for individual-training of practical classes

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The manual in a concise and accessible form outlines the key points of the diagnostic process in dentistry based on the spectrum of the described methods, the indications for their application, and the successful interpretation of the results.

For students of the Faculty of Dentistry and doctors interns of higher medical schools.

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PREFACE

The problem of lack of understanding by students of the stages of the diagnostic process, and especially the spectrum and the role of additional methods of examination in establishing the final diagnosis, which would correspond to traditional ideas and scientific developments of the present, prompted the authors to publish a textbook.

It is known that the tissues of the maxillofacial area due to functional differences have certain regional features due to differences in the histostructure of the tissues of the teeth, periodontal and oral mucosa that undergo age-related changes. This question in dentistry is especially relevant, since the stomatological status of the individual may reflect the disruption of metabolic processes in the body, the pathology of individual organs and systems. At the same time, the peculiarities of the structure and functioning of the organs of the cavity of the mouth create conditions for the exogenous factors, bacteria and viruses to affect it.

Changes in the organs of the oral cavity may have a clearly specific character, when it is already possible to diagnose the appearance and determine the tactics of treatment.

However, in most cases, the diagnosis of dental diseases and secondary manifestations in the oral cavity of the associated somatic pathology is complicated, as the clinical picture is nonspecific and is often burdened with additional unfavorable local (inadequate hygiene, trauma, secondary infection) and general (hypovitaminosis, concomitant somatic pathology) factors.

A detailed clinical review is required and additional research methods are used to establish the correct diagnosis.

Proceeding from the data of numerous literary sources, it can be argued that most dental diseases are multifactorial and require the use of modern advanced research methods.

In recent years, numerous military conflicts, terrorist attacks, aviation and man-made disasters, fires and other natural disasters have taken place in our country, which are particularly acute in identifying a person with dental status, which is conducted in cases of forensic medical examination of bodies of unknown persons. In addition to the above, identification of a person can also be carried out to identify suspects who tend to leave traces of biological origin at the location of the corpse or event, as well as in all cases where the external features are dramatically altered due to various environmental factors that make it difficult or eliminates recognition in appearance.

According to the authors, in today's state of our country, students and dentists should be aware of the methods of identifying a person for the assessment of dental status and to understand not only the therapeutic, but also the identification value of dental interventions.

At the development stages of the textbook design, the team of authors also took into account the wishes and comments of the chairmen of the examining committees of 2017-2018 academic years.

The manual is aimed at activating the students' clinical thinking through independent search and creative work and the formation of professionally meaningful knowledge that will create the necessary conditions for successful learning activities and the practical application of the spectrum of the described methods with their subsequent successful interpretation.

The manual is of great value for both students of the fifth year of the dental faculty and for interns, it is created in accordance with the curriculum of the discipline «Therapeutic dentistry», section «Deepening of clinical thinking of students. Differential diagnostics of basic dental diseases approved» by the Ministry of Health of Ukraine.

The authors will be grateful for the wishes, comments and suggestions of colleagues.

Sincerely, Authors

SECTION I

GENERAL VIEWS ABOUT SUBSTRATES, DIAGNOSTIC VALUE OF MORPHOLOGICAL METHODS OF RESEARCH AND THEIR IMPORTANCE IN DENTISTRY

A modern physician of any profile today can not work without precise, qualitative indicators of the state of organs and systems, metabolism, protective reserves of the human body.

Motivation and purpose of carrying out of additional methods of diagnostics:

- the possibility of detecting the presence of a pathological process at the preclinical stage;
- determination of the risk of developing a disease in a healthy person's body;
- objectification of the diagnosis;
- differential diagnostics;
- ability to control the clinical course of the disease;
- the effectiveness of the therapy.

There are three groups of additional methods of studying the human body:

Structural diagnostics – methods that detect changes in the structure of organs and tissues (X-ray, ultrasound, endoscopy);

Functional diagnostics – methods of studying the functional activity of organs and systems by its electrical manifestations (electrocardiography, electroencephalography, electromyography);

Laboratory diagnostics – methods of detecting changes in the cell and chemical composition of bioridines and other biomaterials.

The given research methods provide 70-80% of objective diagnostic information.

Today, laboratory medicine is a complex of many subdisciplines, each of

which explores certain components:

Clinical and laboratory hematology or hemocytology – a section of laboratory medicine that studies blood cells and bone marrow, which includes counting the number, identifying structural anomalies and the degree of maturation of blood cells, determining the myelogram, using traditional microscopic and modern techniques: cytochemistry, monoclonal typing, radioisotope study.

The general blood test involves determining the amount of:

- erythrocytes;
- white blood cells;
- leukocyte formula;
- concentration of hemoglobin;
- ESR;
- the color index.

Assessment of hemogram rates in patients with dental pathology usually has differential diagnostic value and determines the plan for further treatment, the dynamics of the process after treatment and the prognosis.

Blood is a rare tissue of the body that circulates through the vessels. The blood consists of a liquid part – a plasma, which is 55-60% of volume, and formed elements, the volume of which is 40-45%. Plasma is an intercellular substance in the blood. Blood elements include erythrocytes, leukocytes and platelets.

Blood performs a number of important functions.

1. Protective blood function is to provide humoral and cellular immunity.
2. The respiratory function of the blood is realized by transporting oxygen and carbon dioxide.
3. The trophic function of blood is the transfer of nutrients.
4. The excretory function of the blood is to remove the slags.
5. The humoral function of the blood is provided by the transport of hormones

and other biologically active substances.

6. The homeostatic function of the blood is to maintain the constancy of the internal environment of the organism, including immune homeostasis.

Blood plasma is a colloidal solution containing 90-93% water and 7-10% dry residue. In the latter, about 7% consists of proteins and 3% — other organic and mineral substances. The total concentration of mineral substances in the blood plasma is 0,9%, the pH of the plasma is 7,36.

Blood plasma proteins include:

1. Albumin, which is about 4%; they bind and carry a series of substances with blood.

2. Globulins, which make up 1,1-3,1% and are divided into alpha, beta and gamma globulins (immunoglobulins).

3. Fibrinogen, whose number is 0,2-0,4%, is important because due to its ability to pass into insoluble form — fibrin — the process of blood coagulation is realized.

The plasma from which the fibrin is removed is called serum. This is a yellowish transparent liquid used to make many medicines. Blood elements include erythrocytes, leukocytes and platelets.

Erythrocytes are highly differentiated immobilized cells that have lost their nuclei and all cytoplasmic organelles in the process of development and are adapted to perform a single function — respiratory, realized through the presence of respiratory pigment in them - hemoglobin. The total amount of erythrocytes in human blood is about $2-5 \times 10^{12}$ in 1 liter.

In the calculation of the blood count, the content of the formed elements is given per unit volume — 1 liter.

In norm, the number of erythrocytes in men is from $3,9 \times 10^{12}$ to $6,0 \times 10^{12}$ per liter, for women — from $3,7 \times 10^{12}$ to $5,5 \times 10^{12}$ per liter. A greater concentration of erythrocytes is observed in the blood of newborns and the elderly. The number of

erythrocytes in healthy individuals may fluctuate depending on physical activity, stay in a rarefied atmosphere, and the action of hormones.

Erythrocytes in humans have the form of double-edged discs – discocytes. Normally, discocytes account for 80% of the total number of red blood cells. Other forms of erythrocytes – planocytes having a flat surface, spherocytes – spherical, echinocytes – have spines visualized. Such a variety of forms is normally called physiological poikilocytosis. If the number of altered forms of erythrocytes exceeds 20%, the same phenomenon is called pathological poikilocytosis. The constancy of the erythrocyte form supports β -sialoglycoprotein in an erythrocyte membrane and a special skeleton constructed from a spectrin protein that adheres to plasmolium from the inside and is associated with another protein-ankyrin. The depth in the thin central part is called physiological excavation, this form of the cell provides an increase in its surface and accelerates the saturation of hemoglobin with oxygen. Under a light microscope in blood smears, red blood cells have the form of unstructured round disks, are colored oxyphilic. Oxyphilia is caused by the presence of hemoglobin. The central part is stained less intensely. Electron microscopically, on the outer surface of plasmolium, oligosaccharides are visualized, which determine the group belonging to erythrocytes, phospholipids and sialic acid. Inside the erythrocyte are located electron-dense granules of hemoglobin.

The chemical composition of erythrocytes has 60% water and 40% of the dry residue, 95% of which accounts for hemoglobin and 5% for other substances. In an adult's blood contains about 600 g of hemoglobin.

Hemoglobin is a pigment that gives red blood, a complex protein that is constructed from the protein part, globin and non-protein group, containing iron. It is able to easily attach oxygen, forming an unstable compound in the lungs – oxyhemoglobin, which easily dissolves and gives oxygen to tissues. Partially hemoglobin is coupled with carbon dioxide to form carbhemoglobin, but most of the carbon is transmitted by the blood plasma. The person has two types of hemoglobin: HbA, characteristic for adults, and HbF, characteristic for the fetus. Adult HbA is

98% and only 2% falls on NvF. The average life span of human red blood cells is 120 days. Young forms of erythrocytes are called reticulocytes, they are not completely saturated with hemoglobin, they are characterized by polychromatophilia. Normally, the number of reticulocytes is 1-5% of the total number of red blood cells. An increase in their number is a diagnostic sign of increased hematopoiesis. The increase in the number of erythrocytes per unit volume of blood is called erythrocytosis or polycythemia, and decrease — anemia.

Erythrocytosis — an increase in the number of erythrocytes in the blood above 6×10^{12} in 1 liter and hemoglobin concentration above 170 g/l. Erythrocytosis is divided into absolute and relative. Absolute erythrocytosis is an increase in the content of erythrocytes and hemoglobin in units of blood volume due to increased erythropoiesis. By etiology, isolated hereditary and acquired erythrocytosis. The acquired erythrocytosis occurs as a result of increased production of erythropoietin in the kidneys, which occurs for many reasons: violation of neurohumoral regulation, hypoxic, respiratory, circulatory hypoxia, hyperproduction of erythropoietins by some tumors, with Duke's disease as a form of chronic leukemia.

Hereditary erythrocytosis develops as a result of a genetically determined defect of globin in a hemoglobin molecule and a deficiency in erythrocytes of 2,3 — diphosphoglycerate, which is the regulator of oxygenation and deoxygenation of hemoglobin.

Relative erythrocytosis is an increase in the number of erythrocytes and hemoglobin in units of blood volume due to a decrease in plasma blood volume. Its development is associated with the effects of factors that cause dehydration and redistribution of blood, causing polycythemic hypovolemia (shock, burns).

Anemia is a hematologic syndrome or an independent disease characterized by a decrease in the number of erythrocytes and hemoglobin per unit volume of blood, as well as qualitative changes in red blood cells. Hematologic indices of anemia are divided into quantitative and qualitative. The quantitative ones include:

– reduction of the number of red blood cells per unit volume of blood (among men below 4×10^{12} , among women – $3,5 \times 10^{12}$ in a liter of blood);

– decrease in the concentration of hemoglobin (among men below 130 g/l, among women – 120 g/l);

– reduction of hematocrit (among men less than 43%, among women – 40%);

– change of the color index (at a rate of 0,85 – 1,0).

Quality indicators of anemia:

– the appearance of regenerative forms of erythrocytes;

– degenerative changes in the cells of the erythrocytic series;

– presence of elements of pathological regeneration.

General clinical signs of anemia:

– hypoxia - syndrome that occurs in all types of anemia;

– syndromes, which are caused by peculiarities of the pathogenesis of each individual type of anemia.

Classification of anemia:

1. By pathogenesis:

– post-hemorrhagic (after acute blood loss);

– hemolytic (initiated by destruction of erythrocytes);

– due to erythropoiesis (deficiency).

2. By etiology:

– hereditary (Debras-Fankoni anemia, Thalassemia);

– acquired (chronic post hemorrhagic anemia).

3. Regenerative capacity of red bone marrow:

– regenerator (acute post-hemorrhagic);

- hyperregenerative (acquired hemolytic anemia);
- hyporegenerator (iron deficiency);
- arregenerative (aplastic anemia).

4. By the color index:

- normochromic (CP = 0,85-1,0 – acute posthemorrhagic anemia);
- hypochromic (CP <0,85 – iron deficiency anemia);
- hyperchromic (KP > 0,85 – B12-folio deficiency anemia).

5. By type of hemopoiesis:

- anemia with erythroblast type of hematopoiesis;
- anemia with megaloblastic type of hematopoiesis.

6. Clinical course:

- acute (after hemotransfusion shock);
- chronic (hypoplastic).

Quantitative changes in erythrocytes may be due to a violation of the relationship between their formation (erythropoiesis) and destruction (erythrocytes), loss of erythrocytes in violation of the structure of the vascular wall (blood loss), redistribution of red blood cells.

Qualitative changes of erythrocytes include regenerative forms, degenerative altered erythrocytes, elements of pathological regeneration. The reasons for the qualitative changes of erythrocytes are as follows: erythrocyte ripening in the red bone marrow or increased permeability of the bone marrow barrier, resulting in more immature cells with low hemoglobin content in the blood; change in the type of hematopoiesis from erythroblast to megaloblastic, when in the bone marrow and in the blood there are megaloblasts and megalocytes (cells of pathological regeneration); acquired and hereditary disorders of metabolism, composition and structure of erythrocytes and hemoglobin, which leads to the appearance of degenerative forms of red blood cells in the blood.

Regenerative forms of erythrocytes (cells of physiological regeneration) – young immature cells of the erythrocytic series, the receipt of which in the peripheral blood indicates an increase in the regeneration of cells of the erythroid number in the red bone marrow or increase the permeability of the bone marrow barrier.

Regenerator forms include:

- reticulocytes – are found in a blood smear with supravital coloring – a brilliantkryzilblau dye. Represent non-nuclear cells of dirty green color with black inclusions in the form of granules. With increased regeneration of red bone marrow, their number may increase to 50%.

- polychromatophylls – are found in a smear when stained by the Romanovsky-Gimse method and are non-nucleated cells whose cytoplasm manifests its polychromatophilia - perceives both sour and basic dyes, and has a blue hue. In essence, reticulocytes and polychromatophils are cells of the same degree of maturity – direct precursors of erythrocytes. Different names are due to their properties, which are manifested in different ways of coloring.

- normoblasty (acidophilic, basophilic, polychromatophilic) – nuclear precursors of erythrocytes, normally in the peripheral blood are absent and are found only in the red bone marrow. With enhanced regeneration of erythroid cells in the blood, acidophilic and polychromatophilic, basophilic, normoblasty may appear in the blood. Sometimes, in hyperregenerative anemia in the blood, you can detect erythroblasts – precursors of normoblast.

Degenerative are called qualitative changes of erythrocytes, which testifies to the inferiority of these cells. Such changes are characterized by the following phenomena:

- anisocytosis – a change in the size of erythrocytes. Possible appearance of microcytes - erythrocytes with a diameter of more than 8 microns, and microcytes – cells with a diameter of less than 7,5 μm (average diameter of normal erythrocyte is about 7,2 μm);

– poikilocytosis – change in the shape of red blood cells. Normally, red blood cells have the form of double-coated discs. Under conditions of pathology may appear pear-shaped, elongated, cranial, oval red blood cells, as well as erythrocytes spheroid-shaped (spherocytes).

– change in the color of erythrocytes, depending on the content of hemoglobin in them. Intense colored erythrocytes are called hyperchromic, less colored – hypochromic. Erythrocytes, in which only the peripheral part in the form of a ring where hemoglobin is painted, and in the center there is uncolored illumination, is called anulocytes. In the case of a pronounced difference in the color of red blood cells speak of anisochromy.

– the presence of pathological inclusions. These include Zolly's bodies – formations of size 1-2 microns, which are the remnants of a nuclear substance; Kebot's rings are the remains of a nuclear shell in the form of a ring or eight; basophilic granularity – the remains of the basophilic substance of the cytoplasm, indicating a toxic lesion of the red bone marrow.

When changing the type of hematopoiesis from erythroblast to megaloblastic in the blood, cells of pathological regeneration appear:

– megaloblasts – large cells (diameter 12-15 microns) with basophilic, polychromatophilic or acidophilic cytoplasm, with a large eccentrically located nucleus with a delicate chromatin net;

– megalocytes – non-nuclear cells formed during maturation of megaloblasts with a diameter of 10-12 μm with a more intensely colored cytoplasm without the maturation of mature erythrocytes in the central part. The appearance of these cells in the red bone marrow and blood is characteristic of megaloblastic anemia.

The rate of erythrocyte sedimentation (ESR) is a nonspecific indicator of the body's condition, which primarily indicates the presence of acute inflammation, as well as:

- infectious-inflammatory diseases;
- collagenous;

- endocrine disorders;
- diseases of the blood system;
- pregnancy, postpartum period;
- intoxication with chemicals (lead, mercury);
- the effect of drugs (morphine, vitamin D).

Platelets - blood plates – fragments of giant cell cytoplasm of the bone marrow – megakaryocytes. The number of platelets is $200\text{--}400 \times 10^9$ per liter. Counting these uniform elements is difficult because of their ability to be glued to conglomerates. Increased platelet content in peripheral blood is called thrombocytosis and is observed with extensive trauma and leukemia. Decrease in the number of platelets – thrombocytopenia – can accompany various forms of pathology. Each plate consists of a hyalomer, which is the base of the plate and is slightly oxyphilic, and a granulomer which has the form of basophilic seeds in the center of the plate. Granulometer does not contain DNA. Externally, the platelets are surrounded by plasmoloms, in the hyalomerum there is a boundary microtubule beam, which helps the platelet to maintain shape. With the electron microscopy in the granulomer, two types of granules were found: dense, dark alpha granules whose chemical composition was insufficiently studied and serotonin granules. The granulometer also contains glycogen grains and mitochondria. Blood plates have apoptosis of different sizes and thickness, with which the platelets adhere to each other, forming a skeleton. This process occurs when coagulating the blood. If the clotting of the blood does not find the processes in the platelets.

The function of platelets is to participate in the process of blood coagulation due to the presence of a thromboplast enzyme that initiates the transformation of fibrinogen into fibrin. In addition, the plates quickly disintegrate, adhere to the conglomerates around which fibers appear. This contributes to the formation of a thrombus that closes the damaged vessel. The refractive factor of the bunch in the hyalomerum contributes to its densification. Platelets also release substances that cause narrowing of the vessel with its damage and decrease the permeability of the

vascular wall.

Thrombocytopenia – a decrease in the number of platelets per unit volume of peripheral blood below $150 \times 10^9/l$. The origin of thrombocytopenia may be hereditary or acquired.

According to the mechanism of development, the following types of thrombocytopenia are distinguished:

1. Thrombocytopenia associated with impaired platelet formation:

- myelotoxic – arise as a result of damage to the hematopoietic cells, often associated with anemia and leukopenia, with aplastic anemia;
- deficiency – due to deficiency of folic acid and vitamin B₁₂;
- disregulatory – associated with a violation of the formation of thrombopoietins – substances that stimulate the formation of platelets;
- thrombocytopenia associated with the reduction of the hemopoietic bridgehead – develop in leukemia and metastasis of malignant tumors.

2. Thrombocytopenia associated with increased platelet destruction:

- immune defects caused by antiplatelet antibodies on the own components of the blood plate or on drugs adsorbed on the platelets (in idiopathic thrombocytopenic purpura – the disease of Verlhof);
- hyperplasm – hyperfunction of the spleen, accompanied by splenomegaly. As a result of increased activity of macrophages there is an intense destruction of all formed blood elements, including platelets;
- mechanical damage of platelets – arises with hemangiomas and overlaying of artificial heart valves;
- acquired membranopathies (hemolytic anemia of Marciafav-Michel) – somatic mutations of hematopoietic cells that lead to the formation of cell pools (red blood cells, granulocytes of platelets) with defects in membranes. As a result, the sensitivity of such cells to the action of the complement is increased and their destruction is increased.

3. Thrombocytopenia intake – arises as a result of increased use of platelets for

the formation of blood clots (Schoenlein-Genocide disease, Mushkovich's disease, DVS syndrome).

Thrombocytopathy – a violation of the functional properties of platelets, their qualitative inferiority. In this case, the number of platelets may remain normal. By the origin of thrombocytopathy are hereditary and acquired; the nature of the qualitative defects of blood platelets thrombocytopathy is divided into endo- and exotrombocyte.

Endotrombocyte thrombocytopathy is caused by a violation of the components of platelets, and, in turn, are divided into:

- membranopathies (arise from hereditary anomalies of the membrane of glycoproteins that act as cell receptors);
- granulopathy (manifested by the deficit of granules 1 and 2 types);
- fermentopathy (decrease in the activity of Krebs cycle enzymes, glycolysis, violation of ATP-az functions, cyclooxygenase, thromboxanesintetasis).

In exotrombocyte thrombocytopathies, the causes of platelet counts are beyond the blood plate. By origin, exotrombocyte thrombocytopathy is divided into:

- associated with changes in blood plasma (deficiency of plasma proteins, which are cofactors of platelet aggregation);
- associated with changes in the vascular wall (violation of the formation of the endothelium of the Villebrand factor, violation of the external mechanism of coagulation of the blood).

Depending on the nature of the hemostasis disorders, distinguish:

- thrombocytopathy with a primary violation of platelet adhesion (Willebrand's disease, Bernard-Sully's disease);
- thrombocytopathy with primary disturbance of platelet aggregation (Thrombasthenia Glansmann – defect of glycoproteins of the membrane);
- thrombocytopathy with a primary violation of the release of the platelet content (degradation of platelets – «paresis of the release reaction»);
- thrombocytopathies associated with factor 3 thrombocyte deficiency-

genetically determined defects in the structure of this factor or disruption of its release from the affected platelets (coagulation hemostasis).

Coagulopathy – a violation of coagulation hemostasis. Arise as a result:

- decrease of activity of the blood coagulation system;
- increase of anti-icing system activity;
- activation of the fibrinolysis system.

Leukocytes are cells that, unlike other blood cells, have a nucleus and all cytoplasmic organelles that are capable of exiting the vessels, of active migration and carry out a protective function. In an adult, 1 liter of blood contains $4-9 \times 10^9$ leukocytes. An increase in their number is called leukocytosis, and reduction is due to leukopenia. All leukocytes, depending on the presence or absence of specific grains in the cytoplasm, are divided into granulocytes and agranulocytes, which do not contain specific grains. Depending on the color of the granulation histological dyes, granulocytes are divided into three groups: neutrophilic, basophilic and acidophilic. Among neutrophilic granulocytes, depending on the shape of the nucleus, young, rod-nucleus and segmental ones are isolated. Agranulocytes are divided into lymphocytes and monocytes.

Granulocytes. Neutrophil granulocytes make up 65-70% of the total amount of leukocytes. Their cytoplasm is slightly oxyphilic. The grains are small, poorly visualized on both fresh and fixed colored preparations. When painted using method of Romanovsky-Gimse granularity becomes pinkish-violet color. The granules of neutrophils are divided into primary (azurophilic) and secondary (neutrophilic specific). Primary granules are lysosomes, they contain hydrolases, myeloperoxidase, as well as proteins with bactericidal properties. Secondary granules are the so-called specific granularity, for which the chemical composition is characterized by the presence of alkaline phosphatase, the main cationic proteins, phagocytes, lysozyme; there are no lysosomal enzymes and peroxidase. In the cytoplasm of neutrophils weakly developed organelles: there is a small amount of mitochondria, a small complex of Golgi, sometimes there are elements of the endoplasmic net;

characterized by the presence of glycogen and lipids.

Consequently, neutrophils contain a complete set of substances by which they destroy phagocyte microorganisms. Neutrophils have the ability to actively move, move in tissues to the site of inflammation and phagocyte microorganisms and other small particles.

In the form of the nucleus, three types of neutrophils are isolated. Young neutrophils are the least mature forms, the nucleus in them is in the form of beans, their number is small – 0-0,5%.

Patch-core neutrophils have a nucleus in the shape of a curved stick, which resembles the letter S. Their content is 1-6%.

Segmental neutrophils are mature forms. Their core consists of several segments, connected by thin filaments of chromatin. The number of segments from two to five, more often three to four, nuclear chromatin is painted on a Roman-Gimse method in a dark violet color. The content of segmental neutrophils is 47-72%.

In neutrophils of women there are colonuclear satellites – small aggregations of sex chromatin, mostly they are in the form of drum sticks. The ratio of the three types of neutrophils has a diagnostic value in the clinic. The growth of the number of young and rod-type forms in combination with leukocytosis indicates inflammation.

Eosinophilic granulocytes make up 0,5-5% of the total amount of leukocytes. The cytoplasm is painted weakly basophilic. Specific granularity of large sizes, it is well visible, it is brilliant on fresh preparations, because it refracts light well. On preparations painted on the Romanovsky-Gimse method, the specific grainy of acidophils has a bright pink color. Oxyphilia granules is due to the presence of the main protein rich in arginine.

With electronic microscopy, specific crystals of eosinophils exhibit crystalloid structures of the plate structure, which are immersed in a fine-grained amorphous matrix. Among the components of specific granules are dominated by hydrolases and peroxidases, so these granules are considered a kind of lysosomes or peroxisomes. In addition, the granules of eosinophils contain the histamine enzyme, and lysozyme and

phagocytes are absent in them. Organelles of the cytoplasm are poorly developed. Eosinophilous leukocytes are mobile, capable of phagocytosis, but their phagocytic activity is lower than that of neutrophils. They take part in the protective reactions of the organism to a foreign protein, in allergic and anaphylactic reactions. Due to the presence of the histamine estrogen, eosinophils are able to inactivate histamine, in addition, have the ability to accumulate this substance, phagocytosing histamine-containing granules, and also adsorb it on a cytoplasm containing histamine receptors. The number of eosinophils increases with allergic diseases, helminthiasis. Eosinophils are in the blood for 3-8 hours, after which they migrate to the connective tissue of organs, where they function.

Basophile granulocytes make up 0,5-1% of the total amount of leukocytes. Their cytoplasm is stained lightly oxifilically. Specific grainy is stained on the Romanovsky-Gimse method intensively basophilic, metachromatic in purple-purple color. The metachromasia of the granules is due to the presence of acidic glycosaminoglycan in them heparin. In addition, granules contain histamine, serotonin, peroxidase, acid phosphatase, as well as the histamine synthesis enzyme – histidinedecarboxylase. The basophile core has no definite form, located in the center of the cell, is relatively poor in heterochromatin and is less intense than grainy, which makes it difficult to visualize the nucleus. Basophils – mobile cells, almost not able to phagocytosis. Their function is in the metabolism of histamine and heparin. Heparin is a native anticoagulant, therefore basophils are involved in the regulation of the blood coagulation process. Histamine causes a sharp expansion of the vessels, the appearance of edema, these phenomena arise in the case of degranulation of basophils, which thus participate in allergic reactions.

Agranulocytes. Lymphocytes in the adult's blood make up 19-38% of the total amount of leukocytes. Depending on the size of the light microscopy, three types of lymphocytes are distinguished: small – have a diameter of 4-7 microns and make up 2/3 of all blood lymphocytes; medium – have a diameter of 7-10 microns and make up 1/3 of all lymphocytes; large – with a diameter of more than 10 μm , no adult

blood is observed, they can only be detected in lymphatic duct. Small lymphocytes have a large spherical core, which occupies almost the entire cell, located in the center or eccentric. In the nucleus, many heterochromatins, large lumps are compact. The cytoplasm is painted basophilic (by the method of Romanovsky-Gimse in a blue color) and surrounds the nucleus in the form of a narrow border or crescent. The cytoplasm has a light perinuclear zone. Medium and large lymphocytes contain more cytoplasm, and their nuclei have a more delicate chromatin structure.

According to electronic microscopy, four types of cells are distinguished among lymphocytes:

- small light lymphocytes, most of them – 70-75%. They have a light cytoplasm with a small amount of free ribosomes, they contain all organelles.

- small dark lymphocytes, 12-13% of them, have a dark electlectone-dense cytoplasm, many free ribosomes, a small amount of mitochondria and a small number of other organelles.

- middle lymphocytes, their 10-12% of the total. Chromatin is fluffy, a nucleolus is clearly visible; in the cytoplasm, virtually all organelles are contained.

Plasmocytes, or lymphoplasmocytes, make up 1-2%. Their characteristic feature is the presence of endoplasmic mesh concentrically located around the core of the tubules.

By origin and immune functions, lymphocytes are divided into two major varieties of T- and B-lymphocytes.

T-lymphocytes, or thymus-dependent lymphocytes, are formed in thymus, provide cellular immune response and regulation of humoral immunity. The life of lymphocytes is quite long, up to several decades. They make up 80% of all peripheral blood lymphocytes. Among T-lymphocytes are several populations: T-killers, the specific cytotoxic effect of which provides anti-tumor and transplantation immunity; T-helper cells that have the ability to recognize the antigen and enhance the formation of antibodies with B-lymphocytes; T-suppressors that suppress the ability of B-lymphocytes to produce antibodies; T-cells of memory – lymphocytes, which for a

long time store information about antigen. The action of T-lymphocytes on B-lymphocytes is realized with the help of special substances – lymphokines, which are produced by them in response to the action of antigens.

B-(or bursa dependent) lymphocytes in humans are formed in the red bone marrow, as well as in the lymphoid nodes of the digestive canal. B-lymphocytes provide humoral immunity. The duration of their life is relatively small (weeks, months) and make up about 20% of all blood lymphocytes. B-lymphocytes are capable of transforming into effector cells – plasmocytes that produce proteins – immunoglobulins (antibodies).

Monocytes make up 3-11% of the total amount of leukocytes. By diameter, these cells are the largest among the representatives of white blood, especially on smears, due to their strong dispersion of them on the glass. In a drop of fresh blood, their size is much smaller. The cytoplasm is painted basophilic, but not as bright as in the lymphocyte, and has a smoky shade. The cytoplasm contains all organelles, numerous lysosomes. The kernel is most often boboplike, but can be in the form of eight. Small grains of heterochromatin scattered throughout the nucleus. Monocytes are mobile, capable of phagocytosis and foam cytosis. Their ability to adhesion is due to phagocytic activity. Monocytes are in the bloodstream from 36 to 104 hours, after which they come out of the blood vessels and transform into tissues into macrophages – histiocytes, which are the ultimate stage of differentiation of these blood cells. Consequently, monocytes belong to the macrophage system of the organism.

In the blood of a healthy person, elemental elements are contained in certain quantitative ratios, which are called hemograms. The percentage of different types of leukocytes in the peripheral blood smear is the leukocyte formula.

Leukocytosis – an increase in the number of leukocytes per unit blood volume greater than 10×10^9 per liter.

Classification of leukocytosis:

1. By etiology:

– physiological (myogenic – during intense physical activity, emotionally – during strong emotions, static – characteristic for abrupt change of body position, nutritional – after eating, leukocytosis in pregnant and newborns);

– pathological (associated with the course of pathology in the human body: in infectious diseases, inflammatory and allergic processes, intoxications of exogenous and endogenous origin).

2. By pathogenesis:

– absolute (increase of absolute amount of leukocytes per unit volume);

– relative (an increase in the relative number of individual forms of leukocytes in the peripheral blood).

3. According to the mechanism of development:

– reactive (occurs as a reaction of red bone marrow to pathogenic factors);

– redistributive (as a result of redistribution of leukocytes from the basaltic pool into circulating);

– tumorous origin.

4. Depending on the type of leukocytes:

– neutrophilosis (characteristic of purulent – inflammatory processes, severe oxygen starvation, acute hemolysis, blood loss, endogenous intoxication – uremia);

– eosinophilia (with allergic reactions, helminthiasis, chronic myelleukemia);

– lymphocytosis (in acute infectious diseases – pertussis, viral hepatitis, some chronic infectious diseases, tuberculosis, syphilis, brucellosis and chronic lymphocytic leukemia);

– monocytosis (in case of infectious mononucleosis, infections caused by rickettsia and protozoa – malaria, typhoid, chronic infections – tuberculosis, brucellosis);

– basophilic leukocytosis (rarely found, accompanied by chronic myelleukemia, hemophilia, Vakez disease).

Leukopenia – a decrease in the number of leukocytes per unit of peripheral blood below 4×10^9 per liter.

Classification of leukopenia:

1. By origin:

– acquired (as a result of physical factors – ionizing radiation, chemical – benzene, cytostatics, biological – hepatitis viruses, infectious mononucleosis, and immune factors); hereditary (neutropenia of Kostman, syndrome of «lazy leukocytes»).

2. By type of leukocytes: neutropenia, lymphopenia, eosinopenia.

3. By pathogenesis:

– leukopenia due to violation of leukocyte delivery from the red bone marrow to the blood (as a result of damage to the hematopoietic cells, mitosis, maturation and leukocyte release from the red bone marrow, reduction of the white blood cell surface of the leukocytes);

– leukopenia, associated with the reduction of the time spent leukocytes in the peripheral blood (as a result of destruction of leukocytes, enhanced their functioning, enhanced withdrawal of leukocytes from the body – among smokers with phlegm);

– redistributive leukopenia.

4. Clinical-hematological syndromes for which leukopenia is the leading symptom:

– agranulocytosis;

– hypoplastic anemia;

– hypoplastic alike.

Leukocyte formula displacement (nuclear shift) is a violation of the relationship between mature and immature forms of neutrophils.

When calculating the leukocyte formula, determine the presence of a nuclear shift of neutrophilic granulocytes left or right. This terminology is associated with the peculiarities of the placement of immature neutrophil granulocytes (myelocytes, metamyelocytes, strayed neutrophils) in the left part of the Arnet and Shiling formula, whereas mature segmental neutrophils are conventionally located in the extreme right position.

An increase in the blood of young forms of neutrophil granulocytes indicates a nuclear shift to the left, the prevalence of mature neutrophils with a large number of segments against the background of the disappearance of younger cells – a nuclear shift to the right.

The following varieties of leukocyte formula shift to the left are distinguished:

1. Regenerative shift is an indicator of reactive activity of granulocytopoiesis (in the background of moderate general leukocytosis, increase in the number of rodenuclear neutrophils and metamyocytes, single myelocytes may occur);

2. Hyperregenerative shift indicates active hyperplasia of leukopoietic tissue with a maturation of cells and severe rejuvenation of blood composition. At the same time, the number of rodenuclear granulocytes, metamyocytes increases sharply, there are promiocytes and metamyocytes, the total amount of leukocytes can be increased, unchanged or even decreased due to the desertification of the myeloid sprout after the previous activation;

3. Degenerative bias indicates a reduction and violation of leukopoiesis when, on the background of general leukopenia, the number of rodenuclear neutrophil granulocytes with degenerative changes in their cytoplasm and nucleus increases with decreasing of the number of segmental forms and the absence of metamyelocytes.

4. Regenerative-degenerative shift is observed in hyperproduction in the bone marrow of pathologically altered leukocytes and in case of violation of their ripening. In this case, leukocytosis is noted, and in the blood smear there is an increase in the number of rodenuclear granulocytes, metamyocytes, and myelocytes with signs of degeneration.

Age-related changes in blood. The number of erythrocytes in newborn babies is $6-9 \times 10^{12}$ in 1 liter. The number of leukocytes during the birth of a child is also greater and reaches $10-30 \times 10^9$ in 1 liter. It differs from the leukocyte formula of adults and the leukocyte formula of the child, which varies during 14-15 years of life. These changes relate to neutrophils and lymphocytes. During the birth of a child, the percentage of these white blood cells is the same as an adult – white blood has a

neutrophilic profile (neutrophils more than lymphocytes), subsequently the number of neutrophils begins to decrease, and lymphocytes – to rise, and for 4-5 days postnatal period, the percentage of neutrophils and lymphocytes become the same (about 45%). The process of reducing the number of neutrophils and increasing the number of lymphocytes lasts for 1-2 years when the child's leukocytic formula, which has a lymphocytic profile (65% of lymphocytes and 25% of neutrophils), stabilizes. In the next period, the number of lymphocytes begins to decrease, and neutrophils – to grow, which again leads to a leveling of their percentage ratio for 4-5 years of life. The process of reducing the number of lymphocytes and increasing the number of neutrophils lasts up to 14-15 years, when the leukocytic formula becomes the same as an adult. These periods were called the first and second physiological intersections.

A practitioner-dentist should know that among patients with inflammatory diseases of periodontal tissues, in particular with various clinical-morphological forms of papillitis, with chronic catarrhal and atrophic gingivitis, clear specific changes in peripheral blood are usually absent.

Among patients with acute ulcerative gingivitis, changes in the hematological parameters are characterized by leukocytosis, a shift in the leukocyte formula to the left, which manifests itself in the form of an increase in the percentage of young people up to 2-4% and the rodenuclear leukocytes to 8-10%, an increase in the rate of erythrocyte shedding to 20-30 mm/h.

The presence and nature of changes in hematological parameters in patients with hypertrophic gingivitis depends on the general-related concomitant pathology of the endocrine or nervous systems.

The morphological picture of blood among patients with generalized periodontitis, characterized by chronic course, is almost unchanged, but the attention of an experienced clinician should attract the tendency to change the hematological parameters within the upper or lower boundary of the norm, which gives an idea of the macrophage activity of the organism as a whole. The quantitative composition of erythrocytes among patients with chronic course is characterized by a tendency to

develop an anemic condition with a normochromic color index, both in case of men and women, regardless of the sexual aspect.

Cell fractions of leukocytes are characterized by the formation of a tendency to eosinophilia as an indicator of sensitization component, an increase in the percentage of young forms of leukocytes, which characterizes the tendency to leukocyte shift to the left. Redistribution of the cell pool refers to the segmental forms of leukocytes in the direction of the lower boundary of the norm, subject to the tendency to lymphocytopenia and monocytopenia, which is an indicator of involvement in the process of the humoral chain of the immune system.

The rate of erythrocyte sedimentation also has a tendency to increase in the persons of both sexes.

The morphological picture of blood among patients with generalized periodontitis with an acute course is characterized by anemia, characterized by a normochromic color index and indirectly indicating the toxic effect of parodontopathogens on the process of hematopoiesis. Observe leukocytosis at the expense of granulocytes. At the same time, the percentage of lymphocytes decreases, which makes it possible to redistribute the cell pool to activate phagocytosis and cellular immunity.

Phagocytic activity of neutrophil granulocytes in the chronic course of generalized periodontitis is within the lower norm, in the case of an acute course – at its highest.

An extremely informative hematological index is monocytoqram, the results of which enable to predict long-term results of treatment and recurrence of inflammatory and dystrophic periodontal diseases. Given the chronic course of generalized periodontitis, monocytoqram is characterized by a decrease in the number of young forms of monocytes and actually monocytes and an increase in the number of cells whose nuclei tend to fragmentation, which is an indicator of lowering the body's defenses and, consequently, a decrease in the immune response.

With the aggravation of chronic generalized periodontitis, the percentage of cellular fractions of monocytes varies and is characterized by the growth of young

and mature monocytes with a parallel decrease in the percentage of polymorphonuclear monocytes and polynuclears. The above changes in the percentage ratio in the form of young forms of monocyte series cells indicate the mobilization of the body's protective forces.

Dystrophic diseases of periodontal tissues are characterized by a lack of changes in peripheral blood from the side of the leukocyte fraction of cells. Possible changes from the side of the erythroid fraction in the form of a tendency to develop anemic states, as a manifestation of hypoxia and vascular disorders.

Changes in peripheral blood in idiopathic diseases of periodontal tissues reflect the specifics of the underlying disease, namely, in the case of myeloid leukemia, characterized by the presence of blast cells, the percentage of which makes it possible to confirm the course of the disease and the presence of leukemic dysfunction, characterized by high percentage of blast, with a small percentage of mature phagocytic- active forms of leukocytes and lack of transitional forms. Provided that the percentage of blast cells increases to 95-97%, hematological changes are treated as «blast crisis». Secondary at this nosological unit is anemic changes in the form of a decrease in the percentage of red blood cells and hemoglobin in units of volume of circulating blood. Changes in erythrocytes manifest in the form of anisocytosis and poikilocytosis, and the appearance of elements of pathological inclusions in the form of bodies of Howell and rings of Cabot.

Changes in peripheral blood in chronic lymphocytic leukemia are characterized by the presence of shells of destroyed nuclei of lymphocytes – Dutkin-Gumprecht shadows, and an increase in the rate of erythrocyte sedimentation as a manifestation of a non-specific inflammatory process.

Blood changes in cyclic neutropenia are characterized either by the complete absence of neutrophilic granulocytes, or by their index of 1-6% at a rate of 47-72%. At the same time, the number of red blood cells, leukocytes and platelets corresponds to the norm. In some clinical cases, thrombocytosis, eosinophilia and monocytosis are observed. An important prognostic value at the diagnostic stage is a myelogram, in

which a large percentage of pro-myelocytes is observed in the almost complete absence of mature forms.

Hematologic changes in agranulocytosis are characterized by a sharp decrease or complete absence of granulocytes in the peripheral blood with a decrease in cells of this fraction of less than 750 in 1 μ l or a decrease in the total amount of leukocytes to less than 1000 in 1 μ l of blood.

Changes in peripheral blood in histiocytosis have no clear specificity and are characterized by an increase in the rate of erythrocyte sedimentation, neutrophilosis, eosinophilia and monocytosis, thrombocytosis and, in severe cases, pancytopenia.

Periodontological manifestations that accompany metabolic disorders do not have a clear hematological picture.

An obligatory preventive aspect of preventing the emergence of accumulation diseases is the consultation of a geneticist at the planning and pregnancy stage, since most of them are inherited by an autosomal recessive type.

Particular attention of clinicians deserves patients with periodontal syndrome on the background of diabetes mellitus. In this contingent, individuals of peripheral blood changes are characterized by the development of anemic conditions and a steady rate of erythrocyte sedimentation within the upper norms.

Defeat of periodontal tissues in immunodeficient conditions is characterized by nonspecific changes in peripheral blood in the form of leukocytosis against a background of lymphopenia and an increase in the rate of erythrocyte sedimentation.

The most informative here are specific and non-specific research methods. The non-specific should include the definition of absolute content in the blood of the patient T-helper and T-suppressors with the following definition of immunoregulation index with the norm CD/CD – 1,8-2,2; with a sharp decline there is an increase in the immune deficiency – AIDS – 1,0). AIDS patients are characterized by a sharp decrease in the number of T-helper and interleukin.

Non-specific laboratory diagnosis allows only suspect the presence of HIV infection in the body.

Specific diagnostics includes:

1. Virusological method (isolation of viruses in the culture of T-helper cells with subsequent identification);
2. Serological method (ELISA – immune enzyme for the detection of IgG and IgM to HIV-1 and HIV-2 in human serum (plasma) and western blot (immunoblot) to determine the presence of specific antibodies to HIV-1 and HIV-2 in serum);
3. Molecular genetic method (PCR allows identification of 1 viral particle in 10 ml of blood).

Antibodies to HIV appear in the blood 4 months after infection, therefore, seronegative and seropositive periods of HIV infection are emitted.

Evaluation of hemogram parameters in patients with benign and malignant tumors of the tissues of the maxillofacial area often has a differential diagnostic value and determines the plan of preoperative preparation and treatment.

Most benign tumors do not provoke significant changes in hemogram rates. On the basis of this, according to the general blood test, differential diagnosis is performed with leukemia, as well as non-specific and specific (tuberculosis of the lymph nodes, actinomycosis) inflammatory processes. They are characterized by an increase in the rate of erythrocyte sedimentation, leukocytosis, changes in the leukocyte formula, and the nature of these changes depends on the duration and activity of the inflammatory process.

Changes in the hemogram in tumors of the maxillofacial area most often indicate secondary processes, such as suppuration. They are non-specific and correspond to the picture of acute inflammation. Increasing the rate of erythrocyte sedimentation is observed in the range of 15-30 mm/h, leukocytosis due to the fraction of neutrophil granulocytes, sometimes lymphocytes, and the shift of the leukocyte formula to the left.

In tumors with a tendency to bleeding, ulceration and disintegration, post-hemorrhagic anemia is observed at later stages.

Changes in the overall blood test for malignant tumors may occur as a sharp

increase in the rate of erythrocyte sedimentation and anemia, with some forms of moderate leukocytosis and lymphocytosis.

They are usually manifested in later stages of cancer, when a deployed clinical picture is available and the diagnosis is not difficult. In the early stages, especially important for differential diagnosis, changes in most cases are absent. In this period, diagnostically valuable information can be obtained by studying the size of lymphocytes by V. I. Gowallo, while reducing the proportion of small lymphocytes indicates a high degree of cancer patient's ability.

The above shows that the analysis of hemogram parameters in patients with tumors of the maxillofacial area does not allow to establish one or another diagnosis, but it gives an opportunity to obtain important differential diagnostic information, which, in combination with the results of other methods of examination, will allow to clarify the nature of the process.

A coagulogram is required to carry out a specified contingent of patients in cases of surgical intervention for the removal of tumor formations and when the intervention is associated with a risk of blood loss.

The coagulogram makes it possible to detect diseases associated with impaired blood coagulation, carry out the necessary preoperative preparation and avoid complications in the treatment.

The tumors of the maxillofacial area in most cases are not accompanied by changes in the blood coagulation system. Deep changes occur with significant hemangiomas. Violations of the rheological properties of blood of varying degrees may be seen in malignant tumors at later or terminal stages.

The results of hemograms of this contingent of patients allow to suspect the presence of certain disorders of health and determine the plan of complex examination and preoperative preparation of the patient (correction of anemia with iron preparations, planning of blood transfusion and blood substitutes during surgical interventions).

Blood test is one of the most important diagnostic methods. It reflects the

response of the hematopoietic organs under the influence of various physiological and pathological factors on the body and plays an important role both in diagnosis and in the treatment of periodontal diseases and oral mucosal mucosa (Table 1).

Table 1

Hematologic parameters taking into account sexual norm

Indexes	Value	Indexes	Value
Red blood cells		Leukocytes	4,0-9,0×10 ⁹ /l
Women	3,8-4,5×10 ¹² /l	Neutrophilic white blood cells:	
Man	4,5-5,0×10 ¹² /l	rod-core	1-6 %
Hemoglobin		segmental	47-72 % (66 %)
Women	120-140 g/l	Eosinophils	1-5 %
Man	130-160 g/l	Basophils	0-1 %
Colored Indicator	0,9-1,1	Monocytes	6-11 %
RES		Lymphocytes	19-37 %
Women	2-15 mm/h	Reticulocytes	0,8-1 %
Man	1-10 mm/h	Platelets	200-300×10 ⁹ /l

Time of blood clot formation: beginning – 1 min 35 sec – 2 min, end – 2 min 50 sec – 4 min.

Bleeding time – 3 min.

In recent years, hemocytological studies are performed on automatic hematologic analyzers: «ADVIA 70» (Bayer) defines 25 parameters with differentiation of the leukocyte formula; Cobas micros (Roche Diagnostica) – 18 parameters. In order to simplify the understanding of the results we present the most commonly used parameters.

Erythrocyte parameters:

(RBC) – erythrocytes (red blood cells);

(HGB) – hemoglobin;

(HCT) – hematocrit;

(MCV) – the average volume of erythrocytes;

(MCH) – the average content of hemoglobin in erythrocyte;

(MCHC) – the average concentration of hemoglobin in one erythrocyte;

(RDW) – redistribution of red blood cells (degree of anisocytosis).

Platelet parameters:

(PLT) – platelets;

(MPV) – the average volume of the platelet;

(PCT) – thrombocyte (a fraction of blood volume represented by platelets);

(PDW) – platelet distribution width (platelet anisocytosis).

Leukocyte parameters:

(WBC) – the total number of leukocytes;

(LYM) – lymphocytes in % and g/l;

(MON) – monocytes in % and g/l;

(NEU) – neutrophils in % and g/l;

(EOS) – eosinophils in % and g/l;

(BAS) – basophiles in % and g/l.

Pay attention! The analyzer produces such a group of leukocytes as NEU – neutrophils (in % and g/l) and does not isolate the form of neutrophilic granulocytes as malignant neutrophil granulocytes. These forms of cells automatically contribute to the total number of neutrophils (NEU group).

Today, according to the recommendations of the Institute for Standardization in Clinical Laboratory Diagnosis (CLSI), stem-cell neutrophils should not be considered as a separate parameter for the analysis of the leukocyte formula (CLSI). Reference leucocyte (WBC) differential count and evaluation of instrumental methods, approved standard – 2nd edition. 200 CLSI, 2007).

This is due to the fact that when calculating rod-core neutrophils, the following errors are always present:

- mistake of subjective interpretation;
- a statistical error due to a small number of analyzed cells.

As for microscopy of blood smears by a haematologist, this study is usually irreplaceable when it comes to monitoring and detecting blood diseases, atypical mononuclear cells, pathological inclusions in cells, and plasma cells. The analyzer automatically differentiates leukocytes into the 5 groups mentioned above. Moreover, in the distribution of leukocytes, the analyzer calculates about 5000 cells, unlike 100-200 cells in the case when the leukocytic formula is calculated microscopically. Consequently, the result of the percentage correlation of types of leukocytes is ten times more precise.

Clinical biochemistry – a section of laboratory medicine, which includes the study of the content of organic and inorganic substances that are formed in the process of biochemical reactions of the organism, the activity of enzymes in serum of blood, plasma, urine and other biological fluids. Usually a substrate for this method of study is blood plasma.

Tactics and differentiation of the selection of tests depending on the pathology of internal organs and systems. Systemic connective tissue diseases: – total protein, protein fraction, uric acid, transaminase, lactate dehydrogenase-1, C-reactive protein, ceruloplasmin.

Disease of the digestive canal:

– total protein, protein fractions, blood fibrinogen, total, free and bound bilirubin, hepatic panel, LDH, gamma glutamintranspeptidase.

Diseases of the cardiovascular system:

– total protein, alanine aminotransferase, aspartate aminotransferase, lactate dehydrogenase-1,2, creatine phosphokinase, troponin-test, myoglobin, acid phosphatase, sialic acids. When performing differential diagnosis of diseases of periodontal tissues and oral mucosa, changes in the body should be taken into

account in general somatic diseases, which are often accompanied by changes in parameters of blood and urine (Table 2, 3).

Table 2

Normal Biochemical parameters of blood

Indexes	Values	Indexes	Value
Urea	2,5-8,5 mmol/l	Protein general	65-85 g/l
Residual nitrogen	14,28-28,56 mol/l	Protein fractions	
Creatinine	44,0-88,0 μ mol/l	albumin	56,5-67 %
Glucose	3,3-6,5 mmol/l	globulins	33,5-43,5 %
Bilirubin general	8,55-20,5 μ mol/l	α 1	3,5-6 %
Cholesterol	3,6-6,7 mmol/l	α 2	7-10,5 %
Uric acid	170-450 μ mol/l	β	7,5-12,5 %
Iron serum		γ	13-19 %
		Chlorine	96-110 mmol/l
women	10,7-21,5 μ mol/l	Calcium (plasma)	2,25-2,75 mmol/l
man	14,3-25,1 μ mol/l	Potassium (plasma)	3,6-5,4 mmol/l
Magnesium	0,7-1,07 mmol/l	Copper	11-22 μ mol/l

Table 3

Normal Biochemical parameters of urine

Indexes	Values	Indexes	Value
Albumen	Absent	Calcium	2,5-7,5 mmol/day
Glucose	Absent	Potassium	38-77 mmol/day
Urea	333,0-583,0 mmol/day	Magnesium	1,69-8,23 mmol/day
Uric acid	2,36-5,90 mmol/day	Manganese	0,36-1,27 μ mol/day
Creatinine Clearance	3,3-6,5 mmol/l	Sodium	Depend on diet
Man	97-137 ml/min	Chlorides	4,1-13,7 μ mol/day
Women	88-128 ml/min	Oxalate	90-445 μ mol/l
17-keto steroids			
Man	22,9-81,1 μ mol/day	Women	22,2-62,5 μ mol/day

Tests for the diagnosis of allergic lesions.

According to the order of the Ministry of Health of Ukraine No. 127/18 of 02.04.02, for skin tests, it is necessary to use a piercing test. Other skin tests are used as auxiliary. Non-specific and specific tests are used to diagnose allergic lesions.

Non-specific tests:

- eosinophilia in the area of the focal point of defeat (U. K. Kupchinskas) and peripheral blood;
- thrombocytopenia and leukopenia, up to agranulocytosis;
- increase in serum globulins.

The above tests give an opportunity to state the fact of sensitization of the body, but they do not constitute a complete picture of the nature of the allergen. The reliability of these tests is 30-40 %.

Specific tests:

- mucous and skin tests;
- cell test in vivo (thrombocytopenic index, leukopenic test);
- cell test in vitro (leukocytolysis reaction, neutrophilic injury rate by V. A. Fradkin), leukocyte agglomeration reaction, platelet agglutination index, basophilic leukocyte degranulation reaction – Shelley test.

These tests provide an opportunity to determine the sensitivity of the body to a specific type of allergen.

Mucosal and skin tests, as well as in vivo cell tests, are not allowed to undergo acute allergic lesions, but only during remission, in order to diagnose latent sensitization of the body.

Clinical Microbiology – section of Laboratory Medicine aimed at identifying infectious and inflammatory diseases, determine their sensitivity to drugs and monitor the effectiveness of treatment (modern immunological and molecular genetic techniques that determine spetsyfychni surface antigens and DNA fragments of viruses, bacteria, fungi using immunoassay analysis, polymerase chain reaction). This is an alternative to detecting pathogens when they can not be verified by traditional culture and serological methods.

The purpose of microbiological research:

- definition of the cause of the disease (pathogen);
- diagnostics of specific diseases;
- determination of microflora sensitivity;
- evaluation of the effectiveness of antibiotic therapy.

Clinical cytology is a section of laboratory diagnosis based on the microscopic examination of cells and cellular systems obtained from the lesion. An important consideration is the assessment of changes in the structure of nuclei and cells, which allows differentiating benign and malignant tumors. The cytological study does not replace the histological method, but precedes and complements it. This method makes it possible, in the conditions of minimal time and invasiveness, to establish a probable accurate diagnosis of 70% and detects a violation of the normal course of the process of differentiation of the epithelium in the development of inflammatory, dystrophic pre-tumor and tumor processes.

The reliability of the cytological study depends on the nature, localization of the process and the method of harvesting the material. For some nosological units, the diagnostic value of the method is quite high.

Methods for collecting material for cytological examination:

- smear-imprint;
- smear-re-release;
- smear-scratch;
- washed away;

The most informative is a smear-scrubber with preliminary purification of the affected surface with isotonic solution (t 37 °C). The material is taken with a spatula, which is convenient on a dental reception. Subsequently, the material is transferred to the skimmed glass, dried under open air access, fixed for 3 minutes in alcohol, then painted on the method of Romanovsky-Gimse and studied under a microscope.

The substrate for cytological examination is:

- material obtained by puncture aspiration biopsy;

- scratches and smears-imprints (with tumors on the skin and mucous membranes);
- discharge from the nose and rinsing water from the paranasal sinuses;
- secretion of fistulae, saliva, fluid obtained during the puncture of the cavity tumors.

Quite often, with generalized diseases of periodontal tissues, it is advisable to determine the amount of migrated white blood cells in the oral cavity and the number of epithelial cells. This method was first suggested by the clinic for the first time to use M. A. Yasinovsky (1931) to determine the degree of reactivity of the cells of the "reticuloendothelial system" – the outdated name of intrathecal macrophages, which is widely used in practical periodontology in the modification of G. F. Senatorova (1960). Migration of neutrophilic leukocytes between intraepithelial gum intervals and oral mucosa indicates their involvement in the process of phagocytosis. Fused leukocytes serve as macrophages, taking part in nonspecific protection of the body.

To determine the sample for M. A. Yasinovsky in the modification of G. F. Senatorova, rinsing the oral cavity of 10 ml of the physiological solution (0,9 % NaCl solution) is performed 8 times according to the scheme (Table 4).

Table 4

Characteristics of washing method after M.A. Yasinovsky

Number of portion	Physiological solution	Procedure duration	Duration of rinsing
1	10 ml	30 sec.	30 sec.
2	10 ml	30 sec.	30 sec.
3	10 ml	30 sec.	30 sec.
4	10 ml	30 sec.	30 sec.
5	10 ml	30 sec.	5 min.
6	10 ml	30 sec.	5 min.
7	10 ml	30 sec.	5 min.
8	10 ml	30 sec.	–

7 and 8 portions of flushing liquid are taken in two tubes with further counting of leukocytes and desquamated epithelial cells in the Yasinovsky cell.

Normally, the number of mature leukocytes is 80-120 cells per 1 μl , 90-98% of viable, desquamated epithelial cells – 25-90 in 1 μl .

In the dynamics of treatment, the number of mature leukocytes is reduced, and the number of viable cats is restored to normal values.

In addition, it is possible to use methods of cytochemical, immunocytological and fluorescent cytological identification, which increase the resolution of the method. Although the cytological method of research allows diagnosing most of the pathological states according to a characteristic cytological picture, the diagnosis is not final. The cytological study is conducted fairly quickly and can be used for rapid diagnosis before surgical intervention, which allows the surgeon to navigate the nature of the process and determine the optimal type and volume of surgical intervention.

Modern histology uses a wide range of diverse research methods. All these methods combine the requirement of a microscope, so they are all microscopic. Depending on the state of the subject under study, these methods are divided into living rooms, when living cells, tissues, organs, and even whole organisms are studied, and postvital when studying dead dead objects.

Greeting methods of researching cells or tissues can provide information on how they process their lives, trace motion, division, interaction of cells, their response to the action of various factors. To study living cells, methods of guttural and supravital coloring are used. For this purpose, special non-toxic dyes for living tissues are used. In the case of a welcoming color, the dye is introduced into the body and selectively paints certain cells. So investigate the cells of the macrophage system, provided that the trypan blue or lithium carmine is introduced.

Superlative coloring is the coloration of living cells that are isolated from the body. So find lysosomes (neutral red dye), mitochondria (junusa green), reticulocytes of blood (blue diamond of cresols).

For the salute, as well as postvital studies of unpainted histological objects, a number of special methods of light microscopy – phase contrast, dark-field, fluorescence-are used.

The method of phase contrast provides the required contrast of the studied non-colored structures at the expense of a special ring diaphragm fitted in the condenser and the phase plate contained in the lens. Such a design of the optics of the light microscope makes it possible to convert the phase changes in the light passing through the object in the amplitude that the visual analyzer perceives as brightness changes, which makes it possible to distinguish structures having different refractive indices.

The method of dark field microscopy makes it possible to see unpainted structures by using a special dark-field condenser, which makes it possible to see silvery contours of objects on a dark background.

The fluorescent microscopy is based on the luminescence phenomenon, that is, the properties of living structures shine under the condition of absorption of the rays of the short-wave (ultraviolet, violet or blue) part of the spectrum. In this case, the wavelength of the fluorescence is always greater than the wavelength of the excited light. All living cells are characterized by fluorescence, which has the name of its own, or primary; it is weak, so the so-called secondary fluorescence is often used when the object is pre-treated with special dyes – fluorochromas. Of the latter most often use acridine orange. In the case of its use, the nucleus of cells containing DNA has a bright green glow, and the cytoplasm, due to the presence of RNA, is bright red.

Over the past decades, the methods of histochemistry, autoradiography, immunomorphology, cytospectrophotometry have become widespread.

The histochemical method makes it possible to determine the localization of certain chemicals in different structural components of cells and tissues. During histochemical investigations, the substances that are part of the cells react with chemical reagents and form colored reaction products, which can be defined as localization, and quantitative content of substances in those or other structures.

Immunohistochemical methods are based on antigen-antibody reactions. Each cell in the body has a specific antigenic composition, which is determined predominantly by proteins. By immunization, specific antigens corresponding to the antigens can be obtained. The antibodies bind to fluorochromes or enzymes. After treatment of the histological investigations at the localization sites of the corresponding antigens, the labeled antibody molecules that are detected either by glare – by luminescent microscopy, or by the ligation of stained products of the histochemical reaction – by light microscopy are concentrated.

With this method, it is possible to identify any cells or substances produced by these or other cells, for example, the hormones on which the synthesis of antibodies is carried out.

At the heart of the autodiagnostic method is the use of radioactive isotopes and labeled compounds. Such compounds are introduced into the body, and then the radioactive substances are detected on the histological sections with the help of a photoemulsion, which covers the drug and manifest. In places where the photo emulsion comes in contact with the radioactive substance, illuminated areas – tracks remain. This method can investigate the exchange of iodine in the thyroid gland, the formation of nucleic acids, proteins.

Cytospectrophotometry – a method for quantitative measurement of the content of various substances in a cell based on the study of the absorption spectra of light beams.

The flow cytometry method makes it possible to analyze cell characteristics in a suspension that cross the focused laser beam. An instrument for conducting this study is called a cytofluorograph. With this method, it is possible to determine the size and shape of cells, their viability, to separate the cells of the initial suspension on the subpopulation.

Electronic microscopy is a research method that involves the use of electrons with a much shorter wavelength than the visible light to illuminate an object of light, and results in a high resolution of an electron microscope.

The latest achievement of modern cytology is the technique of cryo-electron microscopy, which exceeds the resolution of even an electron microscope and gives the opportunity to study the organelle studied in three-dimensional space.

Histological study – the study of specially colored histological sections of the tumor or a part of it at different magnifications. It is conducted for the purpose of differential diagnosis of tumor diseases, verification of a diagnosis with tumors and other pathological conditions.

Histological examination allows to assess the degree of changes in tissues and cells, to study the structural organization of tumor tissue, the morphology of cellular elements, the degree of severity of secondary changes, the ratio of tumor to surrounding tissues, including the infiltrative nature of growth.

Material for histological examination is obtained during diagnostic (puncture biopsy, incision biopsy), treatment and diagnostic manipulation (excision biopsy, block resection).

Biopsy is a microscopic examination of a patient's life-time tissue or cellular material. It is used not only in doubtful cases, but also at clinically established diagnosis for obtaining the exact morphological characteristics of the pathological process within its location. Often, the biopsy determines the method of treatment (surgical, radiation, medication), its volume and helps to make a prognosis of the disease. Repeated examination of affected tissues during and after treatment provides an opportunity to trace the dynamics of changes and the effectiveness of the applied therapy.

Distinguish the following types of biopsies:

1. Excision biopsy – surgical removal of the entire pathological center within apparently healthy tissues;
2. Incision biopsy – partial removal of one or more fragments of the tumor and surrounding tissue;
3. Puncture biopsy – taking the material with a puncture needle;
4. Trepanobiopsy – receiving columns of different diameters using special

needles;

5. Biopsy under the control of an endoscope with the use of additional devices (catheters, tongs);

6. Aspiration biopsy – removal of liquid contents of cysts, cystic forms of tumors, cavitory organs.

Puncture biopsy is most often used for cytological diagnosis. Since it usually does not allow sufficient volume for detailed histological analysis, puncture biopsy is considered as a preliminary study that helps the physician to orientate in the nature of the lesion. This study is indicated for neoplasms of the salivary glands, tumors that affect the lymph nodes of the neck, and the like. Puncture biopsy is performed under local anesthetizing aspiration needles, observing all the rules of aseptic and antiseptic. The needle is inserted at different depths, pushing in different directions, changing the angle of its inclination and turning around its axis, each time carrying out aspiration of the contents with a syringe. The disadvantage of puncture biopsy is its relatively low informativeness, due to the inability to obtain sufficient material for research and the difficulty of accurately visualizing the needle in the tissues.

Other biopsy methods – incidental and excisional – allow you to get enough amount of material and to diagnose more precisely.

Inclusive biopsy – removing part of the tumor for microscopic examination. It is performed under the potential of local anesthesia, rarely – under anesthesia. Conducting wedge-shaped excision of the tissue of the tumor at the border with healthy tissues, sometimes removing several fragments from different parts of the tumor, and then conducting diathermocoagulation of the wound surface to provide hemostasis. An inclusive biopsy allows you to obtain a sufficient amount of tissue from areas that are least subject to secondary changes and located on the border with healthy tissues. At the same time, the incident biopsy has only a diagnostic value, may activate the course of the tumor process and requires a radical tumor removal at a subsequent stage of treatment. In connection with the above, the indications for incisive biopsy are very limited. It is used in tumors of a large size, if the malignant

nature of the tumor can not be ruled out for clinical symptomatology. Significantly more often use an excision biopsy – the removal of the entire tumor within the limits of consciously healthy tissues with subsequent histological examination.

Excise biopsy is a curative operation to confirm the benign nature of the tumor. If at a histological examination the clinical diagnosis is not confirmed, and the malignant tumor is diagnosed, then, depending on its type and stage, the question of the necessity and nature of further treatment is solved.

When conducting a biopsy you must follow the following rules:

1. Ensuring adequate access and visual inspection, the ability to remove tissues along the biopsy channel;

2. Tumor material should be taken at the border with healthy tissues (taking a fragment of healthy tissue and removing the unit) in zones that were not subject to secondary changes;

3. The biopsy material is fixed in 10% formalin solution;

4. The material should be sent to the pathomorphological study without fragmenting it, the only block;

5. By removing the biopsy material, they are seeded on the microflora from the hearth of the lesion, which may be important for differential diagnosis;

6. In the direction of the accompanying material, it is necessary not only to specify the passport data of the patient, but also to provide short anamnestic data, characteristics of the clinical course of this disease, variants of clinical diagnoses. For histological research different methods of making sections and methods of coloring are used, depending on the nature of the tissue being studied and the research tasks.

At the level with traditional methods, which require a sufficiently long time to obtain the final result (5-15 days), use of techniques of rapid biopsy – the study of frozen sections, which lasts 30-40 minutes. Express biopsy after removal of the main focus allows to establish with high reliability the main characteristics of the tumor process, leaving the patient in the chair to decide on the need to expand the volume of surgery to increase its radical.

Modern histochemical and immunomorphological techniques used in the complex morphological study of the sample, allow to significantly expand the concept of the nature of biochemical processes, chemical composition and antigenic properties of tissues. These techniques do not replace the traditional histological study, but only complement it, allowing you to establish a more accurate diagnosis. It should be borne in mind that, although histological examination is crucial for the oncological diagnosis, the differential diagnosis of tumors according to the histological picture requires high qualification of the morphologist. Interpretation of the histological picture can only be made taking into account clinical and radiological data, therefore, histological studies do not replace clinical and laboratory diagnostics. In connection with the difference in histological findings, its various variants are possible: nosological (with a clear definition of the type of disease), process (description of the histological picture and characteristics of the process, which does not allow to clearly identify the diagnosis), organ-tissue (description of the type of tissue in the drug, in those cases when the drug does not capture the focal point of the lesion).

The most highly specific and innovative in experimental molecular genetics today is the method of polymerase chain reaction, which aims to significantly increase the small concentrations of DNA fragments in a biological material (blood, plasma, buccal epithelium cells). In addition to simply increasing the number of copies of DNA (this process is called amplification), the polymerase chain reaction allows for many other manipulations with genetic material and is widely used in biological and medical practice, for example, for cloning genes, introducing mutations, isolating new genes, sequencing, for creating and definition of genetically modified organisms, diagnostics of diseases (hereditary, infectious), identification of small quantities of DNA, establishment of paternity. This method has been used successfully to predict the development and clinical course of generalized periodontitis. The isolation of the polymorphic portion of the NF- κ B1 transcription factor gene gene is carried out from the buccal epithelium cells of the patients by

polymerase chain reaction. The material is taken with sterile disposable dental brushes, followed by insertion in the ependorf with the DNA-Express reagent. Genomic deoxyribonucleic acid is isolated using the DNA-Express kit. The polymorphic portion of the transcription factor gene NF- κ B1 (rs28362491) is amplified by a polymerase chain reaction.

Three polymorphic variants of the gene of the nuclear transcription factor (Del/Ins) – heterozygote, (Ins/Ins) – homozygote, (Del/Del) – homozygotes are identified and according to them the systematization of the generalized periodontitis is proposed for the «stable», «conditionally stable» and «progressive». Based on the results obtained and taking into account the high specificity and sensitivity of the applied method, we consider it expedient, in order to predict the development and clinical course of generalized periodontitis and, accordingly, the substantiation of individualized therapy, to supplement the complex of clinical and functional methods of diagnosis by the method of polymerase chain reaction.

Factors that cause deviation of the results of laboratory diagnosis from the true indicators:

Outside Laboratory:

- Daily and seasonal fluctuations of concentration in biological fluids;
- Genital and age characteristics;
- The nature of the food;
- Emotional lability of patients;
- Stress;
- Physical activity;
- Postoperative condition; bed rest;
- Pregnancy;
- Incorrect patient training;
- Acceptance of medicinal substances.

Laboratory at the advanced stage:

- Non-compliance with the rules of taking the biological material, preparing samples for research and storage of samples.

At the instrumental stage:

- Timely delivery to the laboratory;
- Correct marking of the samples.

To date, the full range of clinical laboratory studies is over 1100 tests (V. V. Menshikov, 2010).

A complex of laboratory tests conducted for all patients (regardless of the form of the disease):

- general blood test (number of red blood cells, hemoglobin, color index, leukocyte formula, ESR);
- general urine analysis;
- blood test for glucose content;
- feces analysis on eggs of worms and hidden blood;
- diagnostic tests for syphilis based on the reaction of microprecipitation, Vaserman's reaction;
- research on HIV infection.

SECTION II

CHARACTERISTICS OF FUNCTIONAL METHODS OF EXAMINATION

Electroodonto diagnostics – a method for studying the pulp excitability, which involves the use of electric current. The essence of the method is to determine the threshold stimulation of the receptors of the pulp of the tooth under the influence of electric current. Intact pulp reacts to current strength within 2-6 μA . In the pathological process in the tooth, the excitability threshold rises and, accordingly, within 10-60 μA , indicates the damage to the coronary pulp, 60-100 μA – the root pulp. The index of more than 100 mA makes it possible to ascertain the death of the pulp and the reaction to the electric current of periodontal nerve endings. To date, in dentistry pulp testers are used to determine the viability of the pulp. These devices are easy to use, but only two states of the pulp can be identified: vital and necrotic.

Luminescent diagnosis – a method based on the ability of tissues to emit light of a certain color under the influence of ultraviolet rays on them (the phenomenon of its own fluorescence of matter). In order to enhance the effect of their own fluorescence, the tissues are pre-treated with fluorochromes (fluoresceine, fluorochrom) to achieve the effect of secondary fluorescence. The method is informative in assessing the state of boundary adherence of seals, in the diagnosis of initial dental caries and, especially, in the differential diagnosis of diseases of the mucous membrane of the oral cavity.

Transluminescent diagnosis is a method stereotyped to luminescent, and is based on the ability of fluorescence of tissues under the influence of light green. The diagnostic value is to change the fluorescing properties of demineralized hard teeth (enamel and dentin) due to the development of a carious process, which acquires a brown glow in the green rays.

Vacuum test V. I. Kulazhenko, 1958 (determination of stability of periodontal capillaries). The method of conducting this test is based on determining

the rate of formation of hematoma on the mucous membrane under conditions of influence on it of negative pressure, which is created with the help of the apparatus for vacuum therapy periodontal diseases. Normally, in the frontal area of the gum, the hematoma develops for 50-60 seconds, in the lateral areas – 70-80 seconds.

In case of inflammatory diseases of periodontal tissues and during periodontitis, the time of formation of a hematoma is reduced by 3-5 times, depending on the degree of severity and clinical course of the disease.

Stomatology, capillaroscopy – methods of life-time study of the capillary net of its own plate of gums and mucous membrane of the oral cavity. It is carried out with the aid of a capillary scanner or biomicroscope with polarized reflection or luminescent light. Is one of the priority in the diagnosis of pathology of the oral mucosa.

Reorography (rheodontography and reoparadontography) is a method of non-invasive life-time study of the intensity of blood flow and circulation of the vascular tissue of the body, which is based on the recording of pulse fluctuations in electrical resistance of tissues. The method of rheography in the study of the functional state of blood vessels of the pulp of the tooth is called rheodontography, this technique allows to determine the state of the vascular wall of the pulp microcirculation, their tone, the ability to vasoconstriction and vasodilation.

Reoparadontography – a method for recording changes in the electrical resistance of periodontal tissues, which are due to the pulse dynamics of their blood flow due to cardiac activity. This method makes it possible to evaluate the tone and structures of periodontal vessels on the basis of the analysis of the graphic image of peripheral hemodynamics. The method is informative on the early stages of diagnosis of periodontitis, for differential diagnosis and evaluation of the effectiveness of the therapy.

Photoplethysmography is a method for the life-time assessment of blood circulation in periodontal tissues, which is based on the recording of optical density of tissues and its reflection on the basis of recording pulse oscillations of the optical

density of the light flux.

Polarography – a method for determining the oxygen balance in periodontal tissues. At the heart of the method is the restoration of oxygen on a platinum electrode, which is fixed on the gum surface with subsequent recording of the polarogram. A detailed analysis of the polarogram allows determining the rate of absorption of oxygen by periodontal tissues, the state of microcirculation and transcapillary metabolism, and is used both for diagnosis and for assessing the effectiveness and dynamics of periodontal disease treatment.

Echoosteometry is a method of studying the density of jaw bones, which is based on the sound conductivity of bone tissue, by recording the time of passage of the ultrasound pulse through the bone tissue, which is directly proportional to its density. With the development of osteoporotic changes, the parameters of echoosteometry are reduced.

X-ray methods are used as additional in the diagnostics of lesions of hard tissues of teeth, pulp diseases, parodontal and periodontal disease, as well as to control the effectiveness of treatment.

Usually, most often use:

- intraoral contact radiography in bite;
- close-focal contact x-ray;
- panoramic radiography;
- orthopantomography;
- tomography;
- contrast X-ray;
- digital X-ray radiography.

To carry them out, special compact devices have been developed, which, if necessary, can be installed in both universal dental units and autonomous highly specialized units with computer systems for obtaining and further analysis of the radiological image.

Intraoral contact radiography in bite – a method that involves the location of

the X-ray film between the dental rows, and the X-ray machine – from the vestibular side, which makes it possible to receive reflection of relatively large areas of the jaw with spatial placement of teeth on her. Technically, this technique is the simplest, therefore, it is widely used in the practice of pediatric dentistry and in patients with limited opening of the mouth.

A rather high-quality image of periapical tissues of teeth gives the method of «parallel» X-ray, which involves holding the tubes of the X-ray machine and film fixator – positioner. Due to this X-ray is always carried out in the standard position: the film is parallel to the longitudinal axis of the tooth, and the central beam is directed to them at right angles. It should be noted that the use of this technique significantly reduces the dose of exposure to the patient by reducing the scattering of R rays in the long-focus tube.

Intraderntal contact close-focal radiography – a method that is most common in dentistry and gives an opportunity to get an image of the teeth and surrounding tissues by isometric method for the bisector of the angle, which allows you to get an image of a tooth in the picture, the size of which is almost equivalent to an actual anatomical one.

When describing X-rays, it should be borne in mind that on X-rays the dense shadow gives the tooth enamel, dentin and cement to be less dense. The tooth cavity has a typical shape, according to the anatomical group of teeth, and clear contours. Root canals, especially narrow ones, are not always clearly visualized and are often flattened. The periodontal gap is located between the contours of the root of the tooth and the walls of the well and has the appearance of a thin light strip.

The restorative materials on X-ray images are visualized in the form of a dense shadow or hearth of enlightenment. Almost all materials for the direct repair of defects in hard tissues of the teeth, for the obturation of the root canals give a dense shadow with clear contours due to the presence in their structure of X-ray contrast agents, which makes it possible to objectify the condition of the seal, periapical tissues (foci of destruction and dilution of bone tissue, deformation of the

periodontance gap).

In case of periodontal diseases, radiography allows objectifying the condition of the bone tissue of the alveolar appendix and the body of the jaws and determining the degree and type of resorption of interalveolar membranes, the depth and configuration of bone periodontal pockets, and visualizing the centers of osteoporosis.

This method makes it possible to identify local risk factors for the occurrence of periodontal tissue pathology (hanging crowns and seals, dental stone, intermediate parts of bridge prosthesis) in places not available for direct visual assessment.

Extraoral X-ray is a method that allows you to get images of the temporomandibular joint, large jaw regions and simultaneous image of both jaws. It makes it possible to estimate the spatial arrangement of teeth, to study the state of periapical tissues, to conduct diagnostics and differential diagnostics of lesions of bone tissue and lesions of the temporomandibular joints.

Panoramic X-ray is a method that allows you to get an image of the jaws and teeth enlarged up to two times on an X-ray film of 13x18 cm. The advantage of this method is the possibility of objectifying the condition of all teeth, periodontal and jaw bone, provided a small dose of the patient's radiation. The method makes it possible to determine the ratio of upper molars and premolars to the bottom of the maxillary sinus, lower molars and premolars, with the mandibular canal, and the like.

Tomography is a method that allows you to obtain a radiographic image of a specific layer at the diagnostically necessary depth of the anatomical object being examined.

In dentistry, its type is used – **orthopantomography**, which allows to obtain on the same film a plane-shaped image of both closed (or opened) jaws with orthopantomograph on a single film. The method allows to estimate the ratio of jaws, to get an idea of the condition of the teeth, the structure of jaw bone tissue, temporomandibular joints, the condition of the maxillary sinuses, mandibular canal.

Electro-radiography – a method that gives an opportunity to get an X-ray

image of the investigated anatomical object on paper, by means of a device adapted to an X-ray machine, the image of the subject under study is obtained on a special plate. In this case, the X-ray radiation during the exposure discharges the charge of the plate, depending on the degree of density of the structure of the anatomical object. On an electroregraph, a contrast image of the structure of the bone, teeth and soft tissues remains.

Radiovisualography – a method of digital intraoral radiography, based on a film-free computer technology for obtaining an X-ray image. Radiovisitors are comprised of a computer system, an intrinsic sensor, an X-ray machine and software.

This method makes it possible to minimize the radiation dose of the patient and the medical staff. The X-ray image from a computer is visualized on the monitor screen, which allows for a comprehensive analysis through the possibility of increasing and allocating the required fragment, giving the image of the volume, color change.

SECTION III

BRIEF HISTORICAL ESSAY AND COMPOSITION OF THE JUDICIAL DENTISTRY

For comprehensive research in medicine in general and in dentistry and forensic medicine in particular, both practical and theoretical, integration of knowledge of forensic doctors and dentists is necessary. In the literature, there are many examples of expert practice and historical essays on the emergence of forensic odontology. In our time, forensic dentistry as a science is also associated with forensic medicine. Premature loss of teeth leads to a violation of a number of functions in the body and triggers the emergence of many somatic and occupational diseases, contributes to injuries, etc.

Under current conditions, forensic dentists use the scientific and clinical achievements of various dental specialties – therapeutic, surgical, pediatric and orthopedic dentistry for objects of dental origin. The close connection between dentistry and forensic medicine is evidenced by the use of general forensic knowledge and forensic medical approach to addressing a number of issues, such as traumatology and examination of evidence. Thus, the prescription of the onset of death can be determined by analyzing post-mortem changes in the maxillofacial area, including teeth. For this reason, forensic experts, together with court dentists, use congenital and acquired signs of the maxillofacial area, in particular teeth or other objects of dental origin, monitoring all aspects of expert research.

The use of criteria for odontological and odontoglyphic research is necessary not only for the theoretical study of forensic medicine, but also from the practical point of view – for data expansion, increasing the objectivity and effectiveness of forensic examination when conducting forensic identification of a person with a dental status.

When conducting a forensic examination of corpses of unknown persons, an

odontogram is filled, which, in addition to the deployed dental formula, can count more than 200 indications that characterize the dental or odontological status.

The data of odontological and odontoglyphic research used by the forensic expert during the compilation of the «Identification Card» give a more complete and expanded picture.

The subject of study of forensic stomatology is forensic medical issues that are limited only to the maxillofacial area of the head, the oral cavity, its organs and other anatomical formations, as well as its physiological fluids, which may be of a medical or biological nature in the investigation or court.

According to B. M. Mikhailichenko (2004), the sections of forensic stomatology include:

1. Organizational and procedural principles of forensic examination of objects of dental origin;
2. Forensic-dental Tanology;
3. Forensic and dental Traumatology;
4. Forensic-dental Toxicology;
5. Examination of substantive evidence of forensic-dental origin;
6. Forensic and dental identification of an unknown person;
7. Professional misconduct of dental staff.

The age of the onset of death can be determined by post-mortem changes in teeth, forensic medical patterns are used to establish the limitation of damages, their viability and degree of severity; speciesist, sex, group, individual belonging to the teeth and other objects of forensic origin are established by forensic immunological, forensic cytological methods, using the latest computer programs, etc.

Judicial dentistry can not be separated from general forensic knowledge. Forensic medical practice has confidently proved that such a gap is the source of errors. Instructive is given by A. M. Hamburg in the literature, when a dentist who was involved in forensic examination, without knowledge of forensic medicine, in the study of an exhumed corpse made a false conclusion regarding the cause of tooth loss

from the alveolar hole. Unfortunately, statistics of such cases exist in our time.

The development of forensic stomatology is also influenced by legal science, criminal procedure and civil procedural law, which regulate the conduct of forensic examinations, during which judicial and dental questions can be resolved. And such a section of jurisprudence as criminology, which involves the use of specific forensic research methods – an integral part of forensic science and expert practice, which is why it is widely introduced in forensic medicine.

Forensic practice shows that often in the investigation there are issues of dental nature. They are narrow-profile and have not been fully reflected in forensic medicine.

The term «forensic dentistry» has gained true meaning through the work of foreign specialists. Forensic dentistry is a separate section of forensic medicine as a science and forensic expert practice. In world practice, identification studies to determine the identity of a particular person are based, mainly, on the study of odontological status.

In the world of science, forensic dentistry is part of dentistry and is interpreted as «judicial odontology», respectively, specialists in the field of this science – forensic odontologists. European Court Odontology deals with questions of identifying a person in mass disasters, identifying bone remnants according to dental documents or data banks, establishing gender, age, occupation, dental prosthesis locations, examination of bite tracks, assessment of cases of harsh treatment, and professional criminal liability medical staff of dental offices. Among the domestic specialists, the field of medical knowledge, through which the dental issues are addressed, was called forensic dentistry.

Judicial dentistry, starting with its sources, has always been closely linked to forensic medicine. It is worth recalling that the famous forensic doctor prof. P. A. Minakov was the official opponent of the first national dissertation G. Vilya «On teeth in forensic medicine». Damage to the teeth, damage to the soft tissues of the person and his bones, identification of the person, including the dental status,

always belonged to the profile of the medical doctor. Forensic physicians were involved in the scientific development of forensic dentistry. The term «forensic dentistry» indicates an organic connection between forensic dentistry and forensic medicine, while emphasizing that this is a separate section of forensic medicine.

Forensic dentistry is a branch of forensic science, which, in accordance with the needs of law enforcement and justice, is engaged in forensic medical development of dental issues. The teaching of dentistry to medical students began in 1968, when the International Federation of Dentistry decided on the feasibility of introducing such discipline into the general training of a dentist. Teaching of forensic dentistry should provide future dentists with a system of knowledge and teach them a clear and thorough record of the disease and special records, since the success of identification often depends on the completeness and accuracy of the records in dental documents for the life of a person and the study of the corpse. Forensic dentistry belongs to the sciences that are rapidly and dynamically developing in our time.

In 1961, the Scandinavian Scientific Society of Forensic Dentists, founded in Denmark, set up the objective of popularizing dentistry among dentists, forensic doctors and police officers. Problems of forensic dentistry are actively included in international congresses not only in dentistry but also in forensic medicine. Considerable attention is paid to the judicial dentistry by the National Societies of Dentistry. In particular, in 1967, the American Academy of Oral Pathology established the Committee on Forensic Dentistry, whose functions include reviewing textbooks on forensic dentistry and the development of recommendations for a lecture course. The agenda of the meetings of the National Association of Dentistry includes the problems of identifying a person with a dental status, studying and identifying bites and traces of teeth, etc.

At the initiative of the Scandinavian Society of Dentistry, the International Association for the Identification of Persons with Dental Status, which has offices in many countries, was established. A number of measures aimed at improving the identification method – the creation of a unified registration system for teeth, the

unification of records of dentists during oral cavity rehabilitation and treatment procedures – were also introduced. At the International Conference on Forensic Dentistry (Moscow, 1997), it was decided to establish a Russian Society of Forensic Dentists, whose main activities are aimed at improving the work of identifying a person by the dental implant apparatus.

Recently, the problems of forensic dentistry, attracting the attention of scientists, are becoming increasingly widespread, and its results are introduced in the practice of forensic examination.

In the historical development of forensic stomatology there are 4 stages:

The stage is the formation and official recognition of forensic medicine and dental treatment as medical branches (from the XVIII century until the end of the XIX century);

II stage – the appearance of judicial odontology (from 1902 to 1917);

III stage – scientific processing of forensic and dental questions (from 1918 to 1971);

IV stage – official registration of judicial dentistry as a science in the system of forensic knowledge (from 1972).

In the history of forensic dentistry, or rather, judicial odontology, there are many cases in which the answer to the questions of forensic experts could be given by dentists or odontologists. Until our time there have been references to using the teeth to identify the person. A number of cases have been described that have become loud historical significance and are known up to now.

Agrippina younger - Lolia Paulina. Agrippina the younger – the fourth wife of Emperor Claudia I and the ambitious mother of Nero - were the customers of the murder of Lola Pauline. To confirm the murder, Agrippina demanded that Lolia's head be brought to her. The main evidence in identifying the individual features of the teeth - the presence of improperly located teeth.

Jaya Chent, last rasa Kanauji. During the siege of Kanaudi (the holy city of Hindi religion, the birthplace of Krishna), Jaya Chenatraja Kanauji was killed.

Recognition of his body among other dead was made possible by the presence of artificial teeth.

Earl Shrewsbury. In 1453, the Count of Shrewsbury was killed in the Battle of Castellon. His servant recognized the body for his teeth.

Charles the Courageous, Duke of Burgundy. After the inheritance of additional lands, Charles the Courageous, Duke of Burgundy, decided to create an independent country between France and Germany. In the Battle of Nancy in 1477, he perished in an attempt to achieve his goal. The Duke's pal was able to identify him according to the location of the teeth — the duke lost several teeth when falling.

Peter Holkit. During the Franco-Indian War, Peter Holkit died in a battle near Fort Ducusne in 1758. After grabbing the fort by General Forbes, the bodies of most of the dead were taken to Philadelphia, but Peter's relatives did not find him among the dead. Three years later, the Indians who participated in the battle, were able to indicate the son of Peter Holkit the place of death of his father. The son was able to recognize his skeleton only with artificial teeth.

The case is Joseph Warren and his dentist Paul Rivera. In 1776, Dr. Joseph Warren was killed in the Battle of Bradshaw. His face as a result of a shot on the left side was distorted. Paul River, a jeweler and a dentist, was able to identify Waren's body with a small prosthetic that he had made for the deceased. The prosthesis was cut from ivory and fixed with silver wire. Due to the peculiarities of manufacturing this orthopedic construction, it was possible to identify Dr. Waren's body.

Case Janet Makalister — Dr. Patiison. One of the first mentions of involving a dentist as a expert-witness in court was recorded in 1814, in the case of Janet Makalisister in Scotland. The Edinburgh High Court accused the teacher of anatomy and two of his students in an uproar over the grave of Mrs. McAlister, a deceased 40-year-old woman. On the night after burial, three unknowns transferred her body to a nearby medical school for use in educational purposes. The decisive evidence of the accusation was that Mrs. McAlister's husband believed that there was an artificial crown in the deceased. He also provided artificial teeth that were used by his wife, a

family dentist – Dr. Patison, to fix a skeletal prosthesis. But the lawyer of the suspects argued that the prosthesis could be fixed on any skull, and not just that. The jury issued a verdict – «not guilty».

Mr. Hverin's case. Three years after the disappearance of Mr. Gverin in 1829, the new owner of the house found a human skeleton in the foundation. The recognition of Gverin became possible due to the presence of tooth erosion from the habit of smoking with the use of clay tubes. The erosion areas were unique and many witnesses mentioned them.

Caroline Walsh Case. Caroline Walsh at an advanced age moved to another city with a young Irish couple in 1831. No one has seen her anymore. Later, the son of the couple accused his parents of murder, relying on what he had seen the mother leaving the house with a heavy, big suitcase. At the same time, a woman, similar in description to the disappeared, was found on the street in a beggar's condition and claimed that her name was Caroline Walsh. She was hospitalized and died soon. During the trial, it was found that Caroline Walsh had all the teeth healthy and intact, and the found teeth were absent in the found pigeon. The body of the missing Mrs. Caroline Walsh has never been found, but the accused have been convicted.

Case of Louis XVII. Louis XVII died at the age of ten from tuberculosis in prison in Paris. In 1816, the idea of erecting a monument to a young prince gave rise to rumors that he was alive, that he was 31 years old, and that another child was buried in his place. This story is not over. In 1846, during the reconstruction of the church, a lead coffin was found at the central entrance, in which there was a skeleton of the child. Invited Dr. Millisent, a physician, examined the bones and suggested that the child died of health problems and poor care.

Another recruited doctor, Reckamier, concluded that the bones belong to a child aged 15-16 (all 28 permanent teeth were available and third molars began to break through). The assessment of the age of the skeleton, given by physician Reckamier, was taken into account, and the body was reburied in an unmarked place. Native Louis XVII insisted on restoration of the search for the grave, they lasted until

1897. A coffin was found with the body of a young male. Based on data on the development of teeth, three experts determined the age of the deceased between the ages of 16 and 18+. It was concluded that the body does not belong to Louis XVII. This case is often mentioned in the literature as one of the first cases in the forensic dentistry of determining the age for teeth.

The case of Dr. John Websta and Dr. George Parkman. Dr. George Parkman, a 64-year-old professor at Harvard University, disappeared, returning from supper on November 23, 1849. Dr. Parkman was not only a therapist, but also a foundry. When he did not return, the suspicion fell on his colleague, Dr. John Websta, a professor of chemistry at the same university. Dr. Websta, according to eyewitnesses, has behaved quite strangely recently. In addition, he was to blame Parkman a significant amount of money. The labs of Websta were searched and found in tealers burned human remains: lower jawbone and three blocks of artificial porcelain teeth and melted gold. Dr. Parkman's dentist, who was called as a witness, recognized teeth as parts of the upper and lower jaw prostheses, made three years earlier. He also was able to describe in detail the features and circumstances of the manufacture of prosthetics. Doctor Parkman had special requirements for prosthetics, as he was preparing to make a speech on the occasion of the opening of a new medical college. During the manufacture of individual orthopedic structures, the lower artificial teeth were destroyed when burning porcelain. The dentist and his assistant were forced to work the whole night to process the prosthesis and passed it to the patient only 30 minutes before the ceremony. Soon, Dr. Parkman returned with complaints that the denture injures him the surface of the tongue. When adjusting the demountable structure to the lower jaw, its inner surface was polished. During the trial, the dentist compared the remains of the prosthesis with the preserved model of the mandible and indicated the location of the grinding. The dental evidence was uncontested, so Dr. Webster was found guilty. The case of Parkman-Webster was the first time a dentist was testified to a court in the United States.

Case of William I, the conqueror. At the age of 44, William I, the French

conqueror, died of a random shot of arrows. His body was exhumed. All witnesses noted the good condition of the bones and teeth, as if the king died recently, not more than a few centuries ago.

Case of A. Robinson. Mr. A. Robinson was suspected of murdering his mistress. On her hand, five distinct teeth were found. During the investigation, for the sake of clarity, the dentist deliberately biting the deceased's hand, and then asked Robinson to bite his own (dentist) hand for comparison. The bite on the body consisted of 5 teeth of the upper jaw. One of the suspects had a complete set of teeth in the upper jaw and was charged with being removed from him. Mr. Robinson had 5 teeth on the upper jaw in the frontal area, but he was not found guilty of a crime. Such were the first attempts of trassological examination in an experiment in judicial odontology.

Mr. Gros and Mr. Anderzuk case. In 1873, in Maryland, a body was found on the back of the house, which was previously identified as Mr. Gros. Eight days before the fire, Mr. Gros insured his own life worth 25 thousand dollars. The insurance company refused to pay at the request of the widow of the mistress and asked for consultation of the dentist. Mrs. Gros claimed that her husband had no artificial teeth and that he had never complained about toothache. The remains were investigated in the Baltimore Dental College, where the doctor Gorgas gave an exhaustive description of the jaws and the remains of the teeth. It was described by 2 teeth on the upper jaw and incorrectly located moving teeth on the lower jaw. This testimony did not coincide with the testimony of Mrs. Gros and other witnesses. The insurance company said in court that the remains are not owned by Mr. Gros. But the verdict of the jury was in favor of Mrs. Gros. The insurance company appealed the verdict. A month later, the body of the murdered husband was found in Pennsylvania. Mr. Gross's brother-in-law, Mr. Anderzuk, was noticed during a trip to Pennsylvania with an unknown companion. All the characteristics of the dead coincided with Mr. Gros's characteristics. The teeth were in good condition and stable. Mr. Anderzuk was charged with suspicion of Mr. Gros's murder. He was found guilty and executed in 1874.

The Case of John Wilkes Bus. Following the assassination of President Lincoln on April 14, 1865, John Wilkes Bus escaped and found a storehouse in a farmhouse in Virginia. The US cavalry discovered it on April 26th. The pantry was surrounded and burned. Bus ran, was shot when trying to escape and died on the spot. Later, there were rumors that he was alive and fled abroad. To find out the situation, his body was exhumated and investigated in 1893. His relatives were not able to visually identify the body, but the family dentist recognized the distinctive features of his work due to certain anatomical features of the jaws that he introduced into the medical card.

Dr. Oscar Amiodo – the fair of charity in 1898. Doctors Oscar Amido are considered to be the father of forensic odontology. He was born in 1843 in Cuba. He began his studies at the University of Cuba and continued – at the New York Dental College. Then he returned to Cuba. In 1889 he was nominated as a delegate to the International Dental Congress in Paris, where he was interested and suggested to stay. Oscar Amido became a professor of dentistry. Has written about 120 scientific articles in different directions. His dissertation on odontological subjects, allowed to get a doctoral degree. This scientific work was the first voluminous and meaningful work devoted to judicial odontology.

In his scientific work, which was presented at an international congress in Moscow and published in England in 1897, Amiodo argued that forensic doctors become helpless when the usual signs of identification disappear and the dentist is able to identify the dentistry.

Chicago, 1903. In 1903, in Chicago, furious fire broke out in the theater, then 602 people died from 1842 spectators. Such a large number of victims was due to the fact that the doors on the inner stairs were closed by the theater administration to prevent viewers from accessing cheap tickets to the places for the wealthy. In addition, the front door opened inside, which became an obstacle to evacuation. Although no identification records were found, Dr. Sigrand stated in his article that hundreds of victims were unambiguously identified by records in dental cards.

«Cheese with bite» (1905, 1906). In 1905 and 1906 there were two cases of tooth impressions that were found in pieces of cheese.

In 1905, in Germany, a thief bit off a piece of cheese and left him on the windowsill. The gypsum print of the traces on a piece of cheese pointed to the fact that the offender smoked using a crib, and among the suspects was discovered a person who fitted this description. In 1906, the case of a robbery shop in England was described. The description of the teeth of one of the shop staff coincided with the description of the teeth prints that were obtained from a piece of cheese found on the crime scene. The store employee was arrested, but he appealed to the court requesting a re-examination of the oral cavity, arguing that he had a broken tooth from which the crown had been lost. Given that this was not a very good way to take away the charges and, in the absence of indisputable evidence, the employee was found guilty.

Chilean – German diplomatic misunderstanding. In the early 1900, court odontologists earned the trust of the community and government of Chile and received assistance in establishing a dental school. The inhabitants of the small village of Calais mistakenly accepted a group of German tourists for bandits and, fearing an attack, burnt them in the house. This led to a diplomatic misunderstanding between Chile and Germany. In addition, it was at this time, in the unclear circumstances, a fire occurred at the consulate of Valparaiso. Soon after, the building of the German Consulate in Santiago was burned down. The body was found in the trough, which was previously identified as William Becker – secretary of the court, confirming clothes, wedding rings with the initials of his wife, watches and glasses. At autopsy, the body was also identified as William Becker's body. However, the German minister was not confident in the authenticity of the identification and invited two German doctors, correspondent members of the medical university in Santiago, to conduct a re-opening. The front teeth of the corpse were very damaged by fire, but the distal part of the jaw was preserved and was described in detail and photographed. A heart wound was also found. At that time, it became known that a large amount of money had disappeared from the Consulate. Under suspicion came

Ezekiel Tapia. During the trial, the judge drew Dr. Valenzuela from the Chilean dentist to re-examine the body found. This time the body was identified as Ezekiel Tapia and, of course, that William Becker was his murderer. Becker transformed the victim into his suit, put his personal belongings in his pocket, and then made a fire to hide the gold bridge prosthesis, which was the secretary. The witness claimed that Mr. Becker had seen the night after the fire in Santiago. The judge in this case requested the testimony of Mr Becker's dentist. According to his records, Mr. Becker had gold and platinum seals, as well as removed teeth in the lateral portion of the upper jaw. These records did not coincide with the data obtained when reviewing the scorched remnants. Under pressure from official authorities, general anxiety was reported, and the secretary was detained while crossing the border with Argentina. Ironically, Mr. Becker, to be unrecognizable, traveled, wrapped his cheek with a handkerchief and simulated toothache. He was convicted of multiple offenses and executed on July 5, 1910. The Chilean Government was grateful to the Valencia Dentist for help in arresting a criminal and resolving the diplomatic problem between countries. Instead of the proposed remuneration, Dr. Valenzuela asked to accelerate the construction of the dental school, which was completed in 2 years.

Dental Counting and Marking Systems for Dr. Zsigmondy, Dr. Palmer, Dr. Cunningham. Dr. Zsigmondy in 1861 published a method for calculating teeth. He denoted the permanent teeth from one to eight in Latin numerals from the middle line, the quadrants, which symbolized the upper and lower jaw and the left and right halves, were denoted by the cross as a «plus». Temporary teeth were marked by Roman numerals with the same principle. In 1891 Dr. Palmer similarly suggested making teeth. Also, in 1883, Dr. Cunningham proposed to make digital teeth from 1 to 32. The beginning of the calculation is made from the upper right third molar (1) and ends with the lower third molar (32) – this dental formula is known as universal and widely used in the United States. Under this system, temporary teeth are indicated by letters in a similar manner. The world's most widespread worldwide denomination of teeth is the FDI (International Dental Association) system, which is

similar to the system proposed by Dr. Zsigmondy Undoubtedly, the identification of teeth helps not only partly in identification studies, but also in complex studies for the establishment of unknown individuals.

Case of John Haig – Identifying the state of the teeth. Dr. Kate Simpson described an interesting case in which dentures helped identify a body that was immersed in an acid bath.

The widow living in a hotel in England was last seen living when she left the hotel with John Haig, who lived there. During the investigation, it was found that Mr. Haig had repeatedly been summoned to the police for experiments in an old room adapted for the laboratory. When conducting a thorough investigation of the investigation in his laboratory, the police found two containers with sulfuric acid, papers belonging to previously missing persons, a gun, blood prints on the wall, which could be regarded as splashing blood from bullet wounds. During the interrogation Haig confessed to the murder of the widow and the destruction of her body in acid. After sifting soil with dirt, taken under the so-called lab, the remains of prosthetics from the upper and lower jaws were found. These designs were identified by the involvement of a widow's dentist.

The result of artificial teeth identification – Australia. In a case concerning the assassination of Carron in Australia, a dentist helped to figure out. The victim was burned, but one artificial prosthetic tooth survived. Under this tooth the dentist of the deceased was able to help with the identification examination.

Reconstruction of the face after Colman – Buchley. Doctors Colman and Buchley wrote the first scientific work on face reconstruction. They offered 23 criteria for the thickness of the skin, shown in the form of a table, and for the simulation of the face used plastic materials. Such techniques in various modifications exist until today.

Adolf Hitler's Case. After the end of the Second World War, rumors of the escape of Adolf Hitler and Eve Brown were rather widespread. In fact, they died together in 1945, but their bodies were burned and secretly buried. Due to insufficient

life-time and post-mortem records, it was not possible to refute these rumors. But fragments of the jaw of Hitler with the remains of a bridge-like prosthetic of a special shape, due to diseases of periodontal tissues, were found. The identification of the remains was completed when the findings of the investigation coincided with the data of Hitler's dentist - Hugo Blasche. Analyzing a number of known historical data, it is necessary to reiterate that the durability and durability of the teeth makes forensic odontologists, and later - dentists, to identify, even in those cases where the body parts are seriously damaged or have passed long after the burial. Known cases are a vivid example of the importance of odontological data.

The above historical examples point to the significant contribution of forensic dentists to solving complex expert problems and to resolve issues when conducting medical-forensic, identification studies. Judicial odontology, as a component of forensic science and practice, is rapidly developing, like all areas of dentistry, proving its importance to society and forensic medicine in particular.

SECTION IV

JUDICIAL AND DENTAL METHODS OF IDENTIFICATION OF PERSONS.

The identification of a person with dental status is carried out in cases of forensic examination of corpses of unknown persons who died as a result of a natural disaster, man-made disasters, acts of terrorism, military conflicts, aviation disasters, fires, as well as in cases of examination of dissected, skeletal corpses or bodies with various post-mortem changes.

Identification is carried out not only for the identification of the deceased person, but also in cases of detection of fragments of bones or bone remnants. In addition, the identification of a person can be carried out in all cases listed and for the identification of suspects who usually leave traces of biological origin at the place of the corpse or event detection, as well as in all cases where abruptly changed the external features as a result of action various environmental factors, which complicates or eliminates the identification of the appearance.

Identification methods can be used during a forensic examination of a corpse (autopsy) or in the study of material evidence of biological origin, forensic dentistry (saliva, traces of teeth, etc.), as well as in the examination of bodily injuries of both deceased and living persons (victims, accused, etc.). The investigating authorities and the court must provide for the forensic examination the life-styles of the person being identified or suspected and the medical documents that contain data on the features of the dental status (outpatient cards, history of the disease, X-rays of the teeth, jaws, bones of the facial skeleton, or other data types of research, including visual and analytical information programs, in accordance with DVI/Interpol recommendations), protocols of pre-trial investigation, expert studies, testimonies of dentists, dentistry s technicians, relatives, friends and others.

Dental status is a complex of congenital and acquired individual features of the tooth-jaw machine. The organs of the oral cavity and teeth are extremely resistant to

various destructive factors, which is why their research is very important during a series of stages of identification of forensic medical examinations. Forensic and dental identification uses anatomical, odontological, odontoglyphic features of the teeth, data on dental or dental interventions, as well as individual signs of bones of the facial skeleton. The following methods are most commonly used:

- photoconductive method of lifetime photography and skulls;
- comparative study of the anterior teeth on the life-long photograph of the face and skull;
- comparative study of in vitro and post-mortem X-ray of the maxillofacial area or other methods of X-ray diagnosis;
- study of the features of the structure of the tooth row and individual teeth;
- research of features of traces and teeth prints;
- method of enlarged panoramic radiography;
- study of the features of the relief of the mucous membrane of the tongue and the relief of the solid palate;
- methods of computer identification of a person with a dental status that take into account the features of treatment and restoration of basic dental diseases (computer program «Dental identification», mathematical models and methods of determining the biological age for morphological changes, as well as changes in the dental status – the standard methodology Kvaal et al.);
- molecular genetic research methods (saliva, buccal epithelium, tartar, oral cavity, micronutrition of epithelial cells on proprietary evidence, etc.).

In world practice, forensic experts and forensic dentists use international analytical and informational computer programs that meet global standards, especially when identifying victims of a mass character, and DV / Interpol recommendations that involve the use of a number of complex criteria that provides integration the interaction of program components at all stages and the complexity of the identification process. Two objects that have the same characteristics and, therefore, belong to the same type, are considered identical, which confirms the term

- identification. To identify the dental status, ciphers and codes of form No. 43 of the Dental Reporting of the Ministry of Health of Ukraine are used, supplemented by ciphers of orthopedic and orthodontic constructions, features of treatment associated with firearms, other injuries and compared with ciphers and Interpol program codes, which greatly enhances effectiveness and objectivity of forensic medical examinations (according to E. Y. Kostenko, Y. V. Tsotsko, 2013).

In the study, the corpse of the unknown describes the state of the teeth: the presence and localization of carious cavities, seals and sealed carious cavities indicating the type of material, broken crowns, signs of orthopedic, therapeutic and surgical treatment - tooth extraction, resection of the root, the presence and types of prosthetics (artificial crowns, removable and non-removable designs, etc.); presence and localization of teeth in the tooth row (indicating the inclining: vestibular, oral), as well as the presence of overcomplete teeth and their inclination; kind of bite; state of periodontal disease (presence of gingivitis, periodontitis); Description of the roots of the teeth (their condition and number of each tooth).

To evaluate the condition of teeth and jaws, panoramic radiography is used. Orthopantograms, according to E. Y. Kostenko, V. D. Mishalova et al. (2013) also provide an opportunity to fully appreciate the anatomical and clinical dental status, which includes cariogenic cavities filled with various materials, endodontic interventions: sealing, apexification, resection of the tops of the root, dental artefacts and all types of removable and non-removable orthopedic structures, implant manipulations, orthodontic structures and apparatuses, as well as the absence of these dental interventions.

In order to improve the effectiveness of forensic examinations in dental status, it is expedient to use a database of orthopantomograms of patients aged 18 to 65 years, and, given the informativity of this method, it is necessary to take into account the dental status available for identification and to classify patients in the following groups:

group 1 – persons without dental intervention;

group 2 – persons who have been given therapeutic manipulations;
group 3 – persons who have been orthopedic treatment;
group 4 – persons having changes in dental status (replacement of orthopedic structures or complex interventions);
group 5 – persons with partial loss of teeth;
group 6 – persons with distal unrestricted and full defects;
group 7 – unclassified defects (jaw fractures, nonconvergent occlusal contacts, etc.).

X-ray images (in-and-out, sight) of a patient's tooth usually include images of healthy teeth adjacent to it, which sometimes allows you to identify a person by accidental coincidence of unusual morphological signs of teeth and their roots. According to the type and features of orthopedic structures, you can even establish the person of a dentist and dental technician who carried out prosthetics, on the basis of repetitive defects and certain technical methods of work. Identification of a person is also possible with fingerprints left on any subject. Objects for identification sometimes are X-rays of the skull and photographs on which the front teeth are clearly visible, that is, the method of photocomposition is used.

For identification, the relief of the solid palate and back of the tongue, the cuffs of the upper jaw and back of the tongue of a living person or corpse can be used. Practically this method is practically used in the presence of the so-called «archive» or databank, which is now intensively created in all countries, for lifelong relief maps of the palatine and back of the tongue (primarily for representatives of occupations associated with life-threatening or so-called special contingents: servicemen, policemen, rescuers, firefighters, etc.). In the absence of such data, identifying materials for the backbone of the tongue allow to establish gender, age and racial and ethnic identity of a person. Conducting expert researches also use the data of a survey of relatives of the missing persons, detailing the description of the dental status as much as possible. The results of computer data, analyzed together with the information from the database, allow to determine and match the description.

The dental status reflects the age, individual, congenital and acquired features of the tooth-jaw machine. The acquired features include injuries and illnesses of the tooth-jaw system, harmful habits. Closer definition of age is possible in the childhood period of human life. Cutting teeth in children occurs in a certain order, which allows you to determine the age with the accuracy of up to several months. In addition, you can roentgenographically examine the stages of development of teeth.

There are certain anatomical and functional patterns of the belonging of the tooth to be studied, for example, up to the age of 20 years, the study can determine the graininess of the dentin at the root of the root of the tooth (multiple fragmentation of the dentine, they become isolated until age 20); absence of pronounced atrophic pulp changes; At the age of 20 years, partly determined dystrophic changes: petrification, fibrosis, and the like.

To determine the age the most valuable and most informative are the study of the upper canine, the least informative – the first upper premolar. The cutters are eroded faster than the side teeth. The study of the teeth of the upper jaw has a more diagnostic value than the lower one. In addition to the position of the tooth, when assessing its age changes should take into account gender, race, bite, pathology of teeth, as well as the presence or absence of dental interventions.

The first signs of abrasion of teeth can appear before the age of 20 years, even from the puberty age, somewhere from 13-14 years old. From the age of 21 and up to 30 years, the formation of teeth continues: the volume (thickness) of dentin increases (the crown erosion in this period is offset by the continuing development of the teeth); up to 50 years, a gradual decrease in the volume of the cavity of the tooth through the postponement of secondary dentin; signs of abrasion of teeth appear.

With age, the degree of dystrophic changes in periodontal tissues increases. On the cuts of the teeth there are cells of resorption of the root zone: first in the form of gaps in the cement, then – in the dentin. Over the years, the number of "rings" in the cement of teeth, which is also used as a sign for age determination, is naturally increasing.

In addition to the microscopic study of teeth, an increase in X-ray images with the measurement of volumetric indices of different structures and their optical density is used. The most age-related changes are related to the deformation and decrease in the volume of the cavity of the pulp, the pulp's petrification, the zones of demineralization of the dentin, hypercementoma, wedge-shaped defects of the cervical area, changes in the periapical regions.

Diagnosis of sexual affiliation on odontological grounds is carried out according to a special formula based on measuring the vestibular-oral and mesio-distal sizes of each tooth, taking into account its localization. There are also modern mathematical models of calculations for determining the biological age used in the process of comparative and reconstructive identification both in life and after death (analysis of morphological changes of solid tissues of teeth and pulp, in particular, digital orthopantomograms – using standard coefficients at pathological erosion for method by Kvaal et al.), as well as other techniques.

The set of signs of appearance is quite individual and sustainable throughout life, which determines the criteria for identification. In addition, photographs of unknown persons are the most accessible object of comparison. The craniometric identification of a person is carried out on the basis of appearance by comparing a photo of an unknown or suspected person with a photograph of a corpse. The identification of living and dead photographers is carried out both by criminal investigators and by doctors-forensic criminal experts. Currently, computer programs are used to increase objectivity and reduce the terms of research. It is also possible to compare the exterior of the corpse with life-long photography, including the so-called verbal portrait system. In the presence of bone remnants of the skull, the identification of skeletal remains is carried out using the method of photosynthesis – the imposition of comparable images of the face and skull and their direct comparison with photographic equipment. The method of photo-mixing is based on the quantitative study and fixation of the coordinates of the physiognomic and craniometric points according to a certain algorithm of their degree of coincidence.

When computer images are combined, a skull with a special tripod is placed in the perspective of the person's head in the photo, and the degree of coincidence of points and contours is studied. Restoration of the appearance of the deceased can be based on individual features of the skull by the method of graphic portrait reconstruction – taking into account the regularity of the relationship of the structure of the skull and soft tissue of the head. Modern computer technology helps to implement and improve traditional methods, including the above-mentioned. There are also many variants and modifications of these techniques depending on expert data. The establishment of a person with a dental status can be done by studying the features of the structure of the teeth and dentition. Identification signs are most often divided into: a) anatomical signs of teeth; b) abnormalities of teeth and jaws; c) acquired signs.

Anatomical signs of teeth – quantity, generation accessory (milk, permanent), class (cutters, fangs, premolars, molars), sides (left, right). In addition to the anatomical, distinguish odontopsy signs of the teeth: the shape of the surfaces of the crown – vestibular, tongue, mesial, distal, their absolute dimensions and area; the shape and size of the tubercles, the features of the occlusal surface, the number and relief of the chewing surfaces of the crowns, the distance between the teeth, the size, shape and radius of the dental arches; group features of each tooth: the relief of the cutting edge for incisors, the intensity of styles, size, shape, number, shape of the angles, cutting edges, the presence and features of reduced areas of teeth, especially lateral, as well as the change in the structure of enamel.

When conducting identification forensic examinations of individual teeth and examining individual teeth for morphological features, establish the name of each tooth, its origin – belonging to the upper or lower jaw, as well as to the right or left side, group, etc. In this case, use of such dental features: a sign of curvature enamel crowns, a sign of the crown angle and a sign of the root, as well as anatomical features of individual teeth.

Anomalies of the teeth and jaws are divided into anomalies of individual teeth,

tooth row and bite. Anomalies of teeth are rare, they include abnormalities of form, position, structure and number of teeth. Abnormal shapes are often cutters, usually crown and root are changed; Root abnormalities are characterized by a large variety: concave root tooth at an angle, curvature, twisting, splitting, splicing, change in number and size.

Anomalies of the position of the teeth are divided into two groups:

– location of the tooth (first – presence and localization) in the hole, inconsistency of its position. The anomalies of this type include the displacement of teeth and their rotation around the vertical axis; the presence of moving two adjacent teeth by localization, and sometimes there is a rotation around the vertical axis of the upper incisors and fangs, rarely – small root and bottom cutters; location of the teeth outside the well: in the maxillary artery, in areas of solid palate, nasal cavity, at the angle of the jaw, etc.).

Anomalies of the size of the teeth are represented by micro-, macrodent; These are often fangs and cutters; to the anomalies of the individual teeth include the rotation of the tooth around the axis, change its position – tinea, lingual or palatine, tooth displacement in the maxillary artery, etc.

Anomalies of the enamel structure are associated with insufficient gravitation - hypoplasia – a defect in the development of the enamel, which consists in its underdevelopment or complete absence. There are three variants of enamel hypoplasia: systemic, local, focal. When systemic hypoplasia is affected by a group of teeth, the formation of which occurs in the same period. Color change is possible. Under more severe forms of hypoplasia, the underdevelopment of certain areas is characteristic. Possible lack of enamel – this form is the hardest, but it is not common. Local hypoplasia occurs in permanent teeth. Focal hypoplasia – a phenomenon extremely rare. Its main manifestation is the delayed development and erosion of several teeth next to each other, both dairy and permanent. Often hypoplasia is amazed by permanent molars, fangs and incisors. The cell is localized in the middle part of the vestibular surface of the crown, in the region of the cutting edge in the form of a roller. Teeth may have a yellow color and a rough surface. X-

ray images of the affected teeth show a decrease in the height of the roots, the expansion of the root canals, the reduction of layers of solid tissues.

The resulting wedge-shaped defects, erosion and usurized areas occur due to mechanical influences on incisors, fangs, small root teeth and, very rarely, on large root teeth. These defects are wedge-shaped grooves with sharp edges and a smooth surface.

For endemic fluorosis, which is due to high levels of fluorine in drinking water, the characteristic of permanent teeth is characteristic, and you can always make assumptions about the region of residence or birth of a person. Very rarely occurs sporadic form of fluorosis, which can be found in attenuated children, even less often – professional, which is also associated with production, and iatrogenic – long-term use of fluoride drugs.

Anomalies of jaw development – prognathia, progeny, as well as general prognosticism, etc. – occur quite often. Pathological forms of bite can be observed: straight, oblique, open, as well as various combined defects. Physiological prognotia is more common in women. General prognotism is usually seen as a physiological phenomenon. Often, a similar nature of the structure of the jaw is peculiar to the representatives of the Negro race, in some cases it can also occur among representatives of other groups of the population.

Anomalies of the jaws may have «V-shaped» and «saddle-shaped» forms. This kind of abnormality is rare and is observed exclusively on the upper jaw. In some cases, both types of anomalies are combined.

Acquired signs appear throughout life and as a result of various factors (dental diseases, their treatment, injuries, post-traumatic deformations) undergo changes. Diseases of the teeth may be accompanied by changes in enamel, dentin, cement, as well as the appearance of carious cavities, that is, the possible variety of variants of tooth decay.

Acquired human life as an identifiable feature should be considered all forms of caries and its complications, noncarious lesions of the teeth, as well as the results of their treatment and restoration of hard tissues and teeth, seals, tabs, restoration of

crowns, veneers, artificial crowns and pin teeth, various orthopedic structures, dental implants, etc., that is, all the signs and manifestations of odontopathological processes, as well as dental interventions in this regard are taken into account.

Take into account not only the method, the quality of structures or restoration techniques, the materials used, but also other features associated with the odontological and dental status of the living or deceased person, which determines the identity and identity of the above data, that is, the objects of identification research.

Mechanical damage includes not only partial (shovels) and full fractures of crowns, jaws, but also natural abrasion of teeth, the degree of which depends on age, structure of enamel, kind of bite, presence of chronic, including professional intoxication.

The definition of age-related changes in teeth (the method of M. M. Gerasimov, 1955) is based on the establishment of a certain relationship between the structure of soft tissues of the face and the skull. The essence of the method is to compare facial images on life-long photographs and skulls in the same angle and scale, which are combined and superimposed on each other by photographic means or with the help of a computer – the method of photoconduction of life-time photographs and skulls is based on the data of M. M. Gerasimov. The image must be confirmed by the correspondence of the contours of the head of the person, skull bones, recognition points (landmarks), as well as the thickness of soft tissues over certain areas of the skull (according to the data of M. M. Gerasimov).

With full correspondence of the comparable landmarks of photoconductivity, the affinity of the skull to the person depicted in the photograph is determined. In this case, it is only about the probability of identity, since it is not always possible to completely exclude the coincidence of certain recognition points (landmarks) in two different people whose facial features have a certain group similarity.

The method of comparative study of the anterior teeth for the life-time photograph of the face and skull is a study used in the conduct of dental identification examinations using a life-long photograph showing a person with an open oral cavity

and clearly visible front teeth, provided that the presented object of the study (skull, upper or lower jaw), the indicated teeth are preserved. Used after-death pictures of the skull and, accordingly, jaws in the same perspective and scale, in which life-long photographs of the person are performed. Further with the help of special techniques – reparation, overlay, slip or a combination of them, a comparison of images is performed.

Repertory method – allows to detect the coincidence of signs on objects and define them in the form of «circuit-contours». It is used in cases where all or almost all comparable features are determined on objects of research (for example, shape and width of crowns, closing lines – occlusion lines, etc.).

The method of slip (combination) is used in dental identification examinations to compare the width of crowns of teeth and interdental gaps. The fragment of the crown of the tooth image is highlighted on the area of the photo of the examined skull, then superimposed on the image of the teeth from the life-time photograph and moves, as if «slipping», until it coincides all the contours and the width of the crowns of the teeth, interdental spaces and other individual characteristics.

The overlay method is used if the vestibular surfaces of the anterior teeth and the line of their closure are visible on the person's lifetime photograph. In this case, one image is photographed or computerized overlapped by another. When using the method of overlay it is necessary to achieve the coincidence of all comparable features, namely, the shape and width of crowns, cutting edges, interdental gaps, lines of teeth closure and other individual characteristics. This method is used by forensic experts and forensic forensic experts to establish the identity of the teeth that are retained on the skull and visible on life-long photographs.

In addition to the above techniques, a comparative study of viable and posthumous X-ray of the maxillofacial area or other types of visual examination that is used in the presence of life-time roentgenograms belonging to the identified person, as well as vivid X-ray of the maxillofacial area and the preservation of the respective sites on the examined skull is known. In this case, life-time and post-mortem X-rays are compared (the post-mortem X-ray is executed in the same

projection and at the same distance as in vivo), the method involves the exact comparison performed by external contours, the shape and size of the bones.

Often a comparative study involves the use of the application method. The essence of this method is that on one of the comparable photographs (imprint from the lifetime of the X-ray), the pieces of an arbitrary value are cut from the other comparable photo (imprint from the post-mortem radiograph). If the image on any of the comparable imprints from the X-ray differs, that is, identical, the identification using this technique is considered objective. Identification of the person on the features of the structure of the tooth row and individual teeth Establishing a person of an unidentified corpse according to the dental status can be done through the study of both the tooth row as a whole and the teeth separately. Identification studies always take into account individual characteristics, both congenital and acquired. In these studies, anatomical features, anomalies of the development of jaw bones and teeth (type of bite, position, shape and size, structure of teeth, etc.), signs of diseases and injuries of the tooth-jaw system and dental and general medical interventions can be used. When conducting identification forensic examinations of individual teeth, it is first necessary to establish the denomination of the tooth, its affiliation to the upper or lower jaw, as well as to the right or left side. To solve these problems, dental (odontological) signs are used, which include the sign of the crown angle, curvature of the crown enamel and a sign of the root, as well as the anatomical features of the individual teeth.

The method of enlarged panoramic radiography allows to eliminate some of the shortcomings of the intra-rotational shooting. With a minimal radiation load, it allows you to obtain an objective visual inspection of the alveolar process and the tooth row. The principle of this method is to obtain, by means of a special X-ray tube, inserted into the oral cavity, an enlarged identical X-ray diffraction pattern, due to the maximum approach of the source of radiation to the withdrawn object.

The use of digital orthopantomograms also allows us to expand the possibilities of using modern computer techniques (according to E. Ya. Kostenko, M. Yu. Goncharuk-Khomin, 2013).

The analysis of digital orthopantomograms of the dental and maxillofacial apparatus is carried out using constant anthropometric indices, which are expressed in certain proportional relationships, taking into account the absolute and intentional error. The authors distinguish three variants of this method:

- method of contrast contouring of iatrogenic interventions;
- a method of comparing the intensity of images;
- the method of the relevant object mapping.

The particular relevance of this method is to increase the reliability of the expertise and the possibility of its use in investigative actions, even with deliberate attempts to change the dentistry during orthopedic treatment of persons who avoid legal liability or who are under investigation, and, undoubtedly, in identifying victims mass disasters, passport registration of citizens, migration of citizens, etc.

Identification of the person behind traces and imprints of the teeth

To identify a person with dental status, a study of traces and fingerprints can be performed (Fig. 4.1).

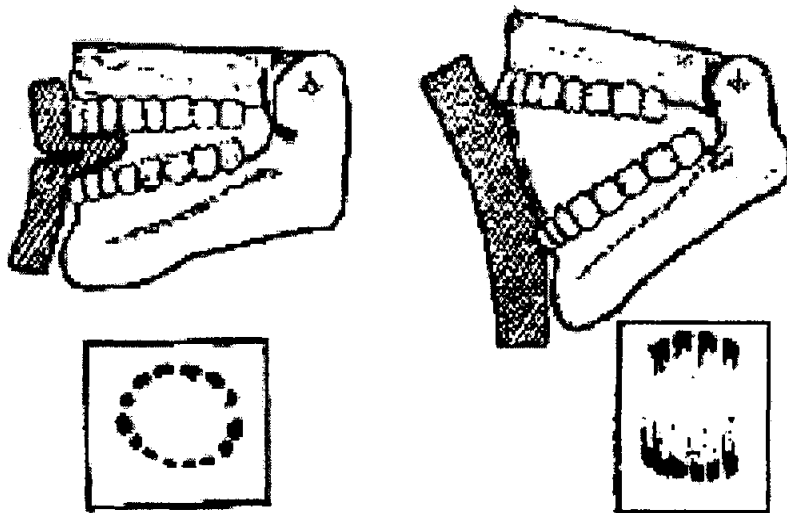


Figure 4.1. Scheme for the formation of static and dynamic traces of teeth (for V. M. Guseyedov, V. V. Volkov, 1975).

Studies are conducted when the object (human skin, various food products, objects, etc.) exhibit clear static or dynamic traces of the effect of the teeth. In this

case, the so-called trasologic method of forensic criminology is used. In such cases, comparative studies are conducted, and the choice of the method is determined by the type of traces. For static traces, methods of reparation, overlays, applications, and for dynamic – a method of slipping are used.

For a comparative study, it is necessary to obtain experimental traces that are performed on models of teeth of an unknown or suspected person, pre-fixing them in an articulator with the installation of the appropriate bite. Models are made of gypsum or plastic materials. The trace of perceptive object for an experimental trace is dental wax and various plastic masses. At the same time their hardness should correspond to the object submitted for examination. Investigated and experimental tracks must be photographed on the same scale and under the same lighting. Signs that may coincide with a comparative study of the structure and features of the tooth-jaw machine on both objects: the width of the crowns of the teeth, the defects of their cutting edges, the yield of teeth from the tooth row, the distance between the teeth, defects in the tooth row, etc., can establish their identity. In addition to studying the dentition, for the purpose of identification can be used drawing of the back of the tongue, which is studied visually, and especially papillae – with the help of optical instruments. Fingerprints of the tongue from the upper and lower jaws are removed using reflective spoons using plastic materials, and then a gypsum (positive) model is made. The method of rupil platinography is characterized by the use of individual features and relief of the solid palate. This method is most often used for significant damage or posthumous changes, and when other identification methods are inappropriate.

To precisely indicate the localization, forms and numbers of the papillae of the tongue (which are clearly individual), the angle of their arrangement, is used by the map-map, according to which the back of the tongue is divided into 10 squares (five on each side), separated by the median line going from the root groove to the middle of the tip of the tongue.

In forensic medicine it is sometimes possible to establish a person by the features of the structure of relief of hard palate. The choice of hard palate as a

research object is due to its resistance to the action of various endo- and exogenous factors. The statistically reliable individuality has lateral folds of the mucous membrane of the solid palate, arranged perpendicular to both sides of the palatal suture and limited to the alveolar edge of the upper jaw.

The study of anatomical features of the side folds of the mucous membrane of the solid palate can be done using the visual method, using a dental mirror and using molds and a plaster model, which allows the use of data on the features of the relief of the solid palate as an additional criterion in forensic examination of person identification. Post-mortem, in particular, rotten changes in the body, do not affect the topographic anatomical features of the main elements of the relief of the rigid palate (within 4 months after death, and sometimes longer).

By the nature of the features of the mucous membrane of the rigid palate and lateral folds conditionally distinguish 5 forms:

1 – linear, it can be straight or winding;

2 – in the form of two divergent lines having a picture in the form of a «hook» or a Roman numeral five;

3 – a line coming from the palatine suture and split into two branches;

4 – a line coming from the palatine seam and at its free end forms a picture in the form of a «ring»;

5 – a line that goes from the palatine seam and is divided into three branches, starting from the middle.

Each of the forms of side folds of the solid mucus may occupy one or more certain levels, both on one side and on the other side of the palatine suture. For forensic medical examination in order to identify a person it is expedient to allocate 5 conditional levels of folds arrangement. Levels have limitations on the right, left and right at the upper edge of the alveolar sprout:

1 level is the projection of a conditional line passing through the interdental spaces of the fangs and the first premolar;

2nd level – projection of the conditional line between centers of crowns of the first premolars;

Level 3 is a projection of the conditional line between the interdental spaces of the first and second premolars;

Level 4 is a projection of the conditional line between centers of crowns of other premolars;

Level 5 is a projection of the conditional line between the interdental spaces of the second premolar and the first molar.

The lateral fold on each level can be even or single, located on both sides, and on the other hand.

Taking into account the presented data, the classification of the main elements of the solid palate is proposed, based on the allocation of 5 anatomical forms of side folds of the mucous of solid palate and a certain level of their location in each individual case. This classification can be represented using the basic anatomical formations of solid palate. The center of this scheme is the palatine suture, the tip of the incisor papilla, the lateral sides (right and left) are represented by the folds of the mucous membrane of the solid palate, which extend perpendicular to the medial (palatal) seam in a certain sequence. The features of the relief structure of the mucous membrane of the solid palate can be described using a mathematical model that characterizes the various anatomical forms of the side folds of the mucous membrane of the solid palate, and the level of their placement. This model is a mathematical formula with letters and numerals consisting of 2 registers (upper and lower), 5 cells in each register and 5 indexes occupying a certain cell.

The registers serve for a differentiated description of the relief of the mucous of the solid palate from the right and left sides (upper case for the right side, lower - for the left side). The cells represent the level of the folds arrangement, and their sequence corresponds to the sequence of folds (1 cell for 1 level, 2 cells for 2 levels, 3 cells for 3 levels, etc.). Indices characterize the form of folds: the index «1» denotes 1 form folds, the index «2» denotes 2 form folds, the index «3» denotes 3 form folds, etc. If the fold at a certain level can not be traced, it is indicated by the index «0».

The mathematical model reflects the strict individuality of the relief of the mucous membrane of the solid palate for each case, it is simple enough for assembly,

does not require special knowledge and can be used together with odontogram. A dentist can bring her to an outpatient card directly at a clinical appointment.

Due to the research of a number of authors, in particular S. I. Gazhva (2000), with the use of a camcorder for shooting macroobjects of the oral cavity with the subsequent computer processing of the results, a set of criteria was determined, which first of all takes into account:

- color of the mucous membrane of the tongue;
- location, size and shape of papillae;
- flexibility options.

These criteria make it possible to determine the age and gender dynamics of the changes in the back of the tongue, to find out the influence of the ethnic differences between the appearance and dentaljaw apparatus and the individual features of the structure of the tongue, as well as to study the manifestations of manifestations on the surface of the mucous membrane of pathological processes that often occur in diseases of the internal organs.

Setting age for teeth. Determining the age of teeth is one of the essential and important stages in identifying a person. Often, the need for such an examination arises in the study of rotten, skeletal corpses or in the presence of bone remnants. In all periods of human life, information is used on the timing of bite formation: a temporary, variable, constant, accompanied by a whole set of relevant age attributes.

Increased erosion of teeth is divided into horizontal, vertical and mixed, and the degree of erosion – to the physiological and pathological. When determining the age, consider not only the vertical erosion of the enamel and the reduction of the height of the crown, but also the reduction of its width by erasing interdental contacts.

A certain pattern is established in the manifestation of the process of abrasion of teeth depending on age. Studying the degree of physiological stiffening of teeth, M. Gerasimov proposed a 6-point system of visual assessment of the degree of erosion of the cutting edges and chewing surface for different groups of teeth of the upper jaw, which is used in the study of fully skeletal corpses.

Factors of the environment influence the degree of tooth erosion (Z. P. Cherniavskaya) – teeth that are in the open air for 30 months, undergo noticeable changes, namely: erosion areas increase on all teeth without exception, on the enamel there are small cracks, going in the longitudinal and transverse directions; the color of the naked dentin acquires a light brown or dark yellow color. In cases of tooth staying in water at a temperature of 18–19 °C and in the soil the degree of erosion decreases. When burning teeth, if the temperature reaches over 300 °C, the erosion areas are somewhat reduced, and in some cases it is impossible to determine the nature of their changes due to significant deformation and tooth decay (Table 5).

Table 5

**Degree of wear of the teeth of the upper jaw depending on age
(for M.M. Gerasimov, 1955)**

Age	Cutter	Fang	Premolars	First molars	Second molar
10–13	0	0	0	0	0
13–14	0-1	0	0	0	0
14–16	1	0	1	0	0
16–18	1–2	1	1	1	0
18–20	2–3	2	2	2	1
20–25	2–3	2	2	2	2
25–30	3	2	2–3	2–3	2
30–35	3	2–3	2–3	3	2–3
35–40	3	3	3	3–4	3
45–50	3–4	3–4	3–4	4	3–4
50–60	4-5	4	4	5	4–5
60–70	5-6	5	5–6	5–6	6

Note. 0 – there is no erasure; 1 – loss of only enamel; 2 – erosion of humps; 3 – abrasion reaches the dentine; 4 – abrasion reaches the pulp chamber; 5 – abrasion reaches the border of the crown; 6 – complete abrasion of the crown.

SECTION V

**DETERMINATION ALGORITHM OF ANATOMO-
MORPHOFUNCTIONAL STANDARDS OF TOOLS AND
COMPLEX USE OF ODONTOLOGICAL, UNITOGLIFFIC
PARAMETERS IN JUDICIAL DENTISTRY**

The development of modern stomatological diagnostic and therapeutic methods, which undoubtedly expands the possibilities of identification on the dental status, but still remain relevant to the classic methods of odontology.

In particular, studying the features of individual teeth, groups of teeth, occlusive relationships, especially dental erosion, odontopathology, and in-vitro interventions remain equally informative.

There is not always a financial, organizational and methodical opportunity to carry out all identification activities at the current level. New computer programs using vigraphic research methods, molecular genetic forensic examinations, and a number of multi-stage modern methods are undoubtedly objective and evident enough, but not in all cases, the possibility of conducting them.

In addition, although most domestic authors refute the long-standing standards of anatomical and morphological features, considering them somewhat outdated, in foreign literature, the relevance and objectivity of individual criteria is emphasized. An important and controversial issue is the clear definition of scientifically substantiated criteria, that is, not only the determination of group membership, the position of a specific tooth, but also important individual characteristics.

Forensic experts in the identification of corpses of unknown persons are increasingly referring to data from dentists, that is, they use the criteria for assessing the state of the dental-jaw system, which for a long time, even under the influence of various environmental factors retains species and individual characteristics. Proceeding from the above, the algorithm for studying individual anatomical and morphofunctional features of teeth and a comprehensive study of individual

odontological, odontoglyphic parameters and their use in forensic stomatology, in particular, in the identification of corpses of unknown persons, as well as the identification of scorched, dissected, skeletal, rotten corpses, most often and helps to answer the questions of the investigation.

The importance of individual dental status, as the most important criterion in expert practice, remains relevant.

All expert studies can be divided into several stages. First, the study of the odontological characteristics of each group of teeth, then – the establishment of an individual odontoglyphic pattern, especially molars, taking into account the signs of molarization and inclusiveness, as well as the relationship between their odonto-anthropological variants to adjacent classes of teeth. And, finally, the definition of signs of abrasion of teeth with the help of a combined histochemical coloring with the definition of odontoglyphic zones of abrasion of teeth.

From scientific works of scientists-anthropologists it is known that odontologists already in the nineteenth century. carried out measurements of the absolute size of the teeth, even developed a system for a detailed study of the morphology of the teeth. These techniques allowed anthropologists to draw conclusions about the evolution of the tooth-jaw system, gave an idea of the ethnic characteristics, sexual, age and racial characteristics of the material being studied.

The human body is characterized by the presence in one dental arc of teeth, different in size and shape, the so-called heterodontal system. There are several classes (groups, forms) of teeth: a class of chisels, icons, a class of premolars and molars. Teeth belonging to any of the classes have a common structure and function, that is, they are joined together morphologically, histologically, biochemically, and the like. But inside each class there is a sufficient number of features that make it possible to distinguish one tooth from another.

According to the hypothesis of A. Dahlberg (1961), within each class of teeth there is a morphogenetic field. Teeth that are near the mesial boundary of the class are key, stable. The latter are the pole of the morphogenetic field. Teeth that are located in the distal parts of the class are called variables.

That is, here the morphogenetic field weakens and the manifestations of the severity of most features, far from the pole, lose clarity. Variable teeth are to a greater extent subject to reduction processes – reduction and reduction of size, reduction or complete disappearance of some structural elements. The process of reducing the teeth sufficiently increases the variety of their morphological variants. Key teeth, being more stable, conservative, to a lesser extent are subject to reduction, retain stable forms, sizes, have a high degree of differentiation. Each class is characterized by a certain number of reductions – differentiation, for variable teeth, this series has more diverse forms, unlike the key ones.

The morphological field of molarization is characterized by the presence of the number of tubercles and separating furrows with well-defined pits in large and small angular teeth and cucumbers. The morphogenetic field of incision is characterized by well-expressed exostilis, mesiostil, distostil and secretive additional grooves (Ia, IIa, IVa) in the upper incisors and small angular teeth, as well as in the upper large angular teeth with the appearance of exostile and endostile (Carabella's hump), and in the lower large corner teeth with the presence of an endostile (hump Carabelli de Jong). The frequency of these signs, according to A. Zubov, is different in certain races and subject to the laws of population genetics. In a number of papers by P. M. Skrypnikov (2000, 2002) it was proved that during morphogenesis, due to phenotypic determination in the coronet of all types of teeth, the homology of both elevated (humps, stumps, ridges) and lower (pits, furrows, grooves) of anatomical formations due to the presence of morphological fields of molarization and incidence. Taking into account these data he proposed a new classification of odontological signs.

The analysis of the literature allows to distinguish the presence of four populations of mankind according to odontological signs of molarization: the Australo-race (macrodonts), the monogloid race (mesodontia), the europoid and Negroid races (microdots).

Equatorial populations (Australian race) are characterized by well-developed processes of molarization and inclusiveness, which manifest themselves in the form

of macrodentists.

The manifestation of the polarization field on the lower molars is the presence of a «Y-figurine» of the figure with an additional sixth hump (a hump of Carabelli de Jong), a well-developed distal crest of trigon and a coupon, the presence of a five-hill molar second molar, the constant presence of the third molar. At the same time, the upper molars are characterized by the presence of giant rocks Karabelli (postsendoconus), a slight degree of reduction of the crown elements. The morphological feature of the field of incidence of the same race is the presence of 30-40% of cases of spade medial incisors with a triangular shape, the presence of enamel droplets in incisors and a group of large angular teeth.

For the Mongoloid race, the reduction of molarization and the high degree of detection of incidence are characteristic, due to which mesodonticism is determined in the teeth of the upper and lower jaws. At the same time, the characteristic features of the lower molars are the presence of «Y-5» and, rarely, «Y-6 figure», well-developed distal crests of trigon (30%), the absence of a ridge of the coupon, the presence of a «milky» third molar.

Unlike the lower large angular teeth, the upper ones are characterized by the absence of a cartilaginum of Carabelli on the first molar, with a slight reduction of the diacons with a significant reduction of the endoconus. In this case, the amplification of the field of incidence is accompanied by the presence of spatula (more than 70%), otolithic form of the upper incisors, the presence of crushing (the accumulation of teeth), the presence of enamel influxes in molars and incisors.

For the europoid race, a partial reduction of the signs of the field of molarization and a very pronounced reduction of the field of incidence, which, as a consequence, tends to result in microdotypes. In this case for molars of the mandible characterized by the absence of the sixth hump, the formation of «Y-4» drawing with the transition to + 5 «plus» and + 4 «plus» drawing on the first molar, the tendency to the four-hill type of the second molar, the partial absence of the third molar (a tooth of wisdom). For molars of the upper jaw, respectively, is the presence of a hump of Carabelli (postsendoconus), sometimes in other molars it is found a hump of

Carabelli (in the form of postsendoconus). In addition, the weakening of the field of incision is accompanied by a weak manifestation of the spatula of the medial incisors, the presence of diasthenia between the upper central incisors, the hypoplasia of the lateral incisors, the rectangular shape of the upper incisors, the absence of enamel influxes in incisors and molars.

According to A. A. Zubov (1973) and Turner (1981), according to the odontological characteristics, the two countries are divided into two branches, the Mongoloid and European-race races.

In the Mongoloid race, according to Turner (1993), distinguish the main branch (sundontos), which is characterized by the presence of a spade incisor. This sign is observed from the Mongols, Chinese, Japanese and other peoples. The additional branch (synodontite) is more common in Thai, Malachite, American Indians and is characterized by the presence of a «colic» third molar.

The European race is divided into northern (Aryan) and southern (Semitic) branches. The Nordic branch meets Scandinavians, Germans and other peoples and is characterized by a well-developed hump of Carabelli, the first upper molar. Southern europoid branch is typical for the inhabitants of the Mediterranean and is characterized by pronounced microdontinism due to hypoplasia or lateral angiasis of the upper incision.

In addition to population reduction there is also age-erasing chewing surface of teeth of different degrees, which is especially pronounced in molars, cucumbers and incisors.

According to the opinion of L. M. Lomiashvili and L. G. Ayupova (2005), groups of large root teeth have important and varied functions. These are quite stable, fundamental forms of crowns with a high degree of differentiation of surfaces, which are in close contact with each other, as well as with teeth-antagonists, and enter into a certain relationship, forming a solid block for food processing (molaris – from Latin means «mill»).

Each tooth has its own purpose and carries only its functional load. The first

large root tooth is key, stable, has a stable shape, rarer than others, to be reduced. Each next tooth of the class of molars (the second major root tooth, the third major root tooth) is variable, which is often accompanied by a change in the shape of the crown, a decrease in its size, a change in the number of tubers, or even a complete absence of the tooth (third molar root – a wisdom tooth).

The configuration of crowns of variable teeth often changes. There are types of crowns of the second molar, which are almost the same as the first molar, have a corresponding, somewhat cubic shape.

The location and correspondence of their humps between them are similar to the structure of the key tooth – the first molar.

But the shape of the crown can be modified and acquire the form of a diamond, with the mesiodistal parameter of the crown significantly exceeds its vestibule-lingual size.

The location of the humps on the surface of the crowns, respectively, changes, the anterior palatal hump occupies a large area, displacing the anterior palpitations, and located first-hand grooves shift to the cheek side.

If the process of reduction – the differentiation in the area of the upper molars is significantly expressed, then the shape of the crown may vary significantly, but the mesiodistal parameter prevails over the vestibulolingualny.

The location of the humps is also changing along the crown surface: the first order of the H-shaped vortex is transformed into an X-shaped one.

The degree of differentiation of the main humps is greatly increased, with additional formations appearing, which give the surface of the tooth various chimeric patterns, the furrows appear.

The variability of the forms of the upper molars also manifests itself in diminishing the size of the distal palatine or in its complete absence (Fig. 5.1).

According to anthropological studies of A. Zubov and N. I. Khaldeyev (1989), even in the last century, the human dental morphology did not remain unchanged, changes in the reduction nature continued.

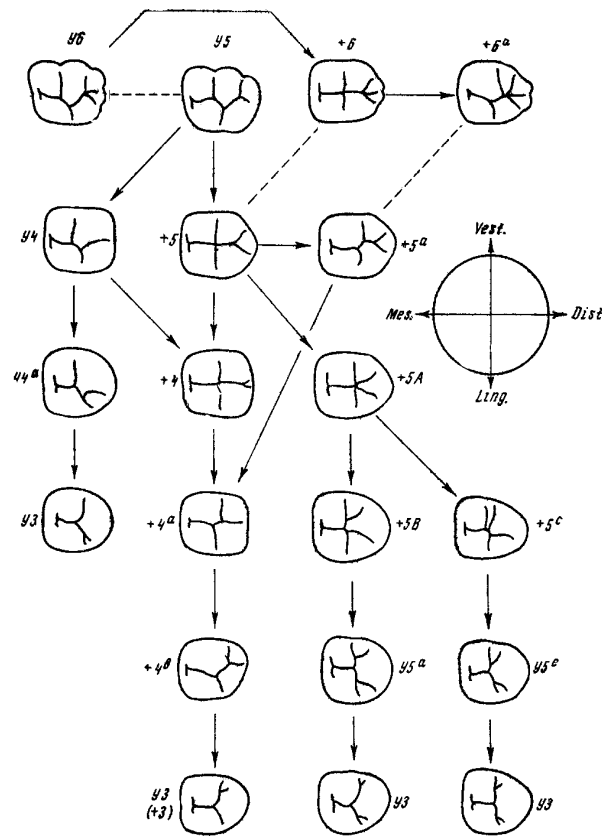


Figure 5.1. The structure of the occlusive surface of the lower molars, depending on the number and position of the tubers, and possible variants of odontoglyphic pattern (according to A. Zubov, 1973).

The researches of P. M. Skrypnikov (2003) found that the reduction process is characterized by an increase in the relative thickness of the enamel layer, a deepening of the thickness of the tissues of the protruding elements, a decrease in their number, that is, by simplification, due to the external change of the relief. Therefore, the reduction is not due to the loss of genetically planned elements, but due to their preservation under a thick layer of enamel. This is what brings new patterns into the structure of chewing terrain. Consequently, the more archaic structure of the structure, reflected in the inner layer, changes in the direction of elimination of «extra» crests and humps, reduction and dismemberment of the crests grooves. These relief changes are somewhat related to the system of major furrows and small grooves. Typically, under the ridges often formed a continuous section of the furrow,

masked under a thick layer of enamel, and its general direction on the inner and outer surfaces of the enamel practically coincides.

Characteristic for a person reduction of the elements of the outer enamel of the masticatory surface refers, therefore, mainly to elevated enamel structures, and not to the system of furrows, but sometimes the relative increase in the thickness of the enamel layer of teeth in a person not only smooths the relief, hiding crests, additional tubercles, cranial enamel influx (tsingulum), but it can also form sulcus, absent or short, having a discontinuous motion on the inner surface of the tooth crown enamel.

Thus, the outer surface of crowns of large and small angular teeth is a unique formation that arose as a result of a rather pronounced specialization in a special evolutionary direction.

Morphological studies confirm that the development of reduction processes that have arisen in the tooth and jaw machine, according to modern data, is determined by three components:

- food features;
- peculiarities and character of changes in ontogenesis;
- the prevalence of caries.

These factors of influence contribute to the simplification of shape, size, and other morphological features of teeth.

Odontoglyphic analysis has greatly contributed to the creation of accurate representation of the unity of models of the structure of the chewing surface of the teeth and its parts. There is an extremely convincing scientific evidence of the existence of standard repetitive patterns, in which, despite the apparent differences (due to the unequal position of the elements and different degrees of reduction), it is always possible to identify and accurately identify well-known details that create a single structure of the structure. This is due to the presence of a single morphogenetic mechanism of differentiation of output odontometers, namely the mechanism of the three-part distribution of each growing element at a certain stage of increasing its size. Simplification of the topography of the crowns of the tooth from the class to the

class (along the lines of the «big angular tooth – the ile») occurs mainly due to the loss or reduction of distal or lingual elements, therefore the general system of drawing of the furrow teeth naturally aspires to a universal monographer circuit.

Odontological indices of certain classes of teeth, including incisors and molars, are determined by the peculiarities of the individual odontoglyphic crown pattern, odontometric parameters of their individual anatomical parts, as well as the relation of various anthropological variants to adjacent classes of teeth. Consequently, according to the form, size, and pattern of the chewing surface, one can determine the race's ethnic identity according to the analysis of the occlusive surface of the tooth (humps, styles). Deep areas (fossa, fissures, grooves) have an individual character of the pattern, which leads anthropologists to the idea of the parallel existence between dermatoglyphics and odontoglyphics. Taking into account the above, it is clear that it is expedient to use the data of individual odontoglyphic status when filling the dental clinical documentation for odontograms, since for conducting of forensic examination all the signs are valuable criteria. Method of determination of abrasion of teeth with the help of combined histochemical coloring. In forensic science, as well as in its separate field – forensic stomatology – enough methods of age determination according to indicators of tooth erosion are described. In the techniques described above, we use the indexes of tooth erosion, which are practically used in identifying a person for age by using a special scale and scoring in points. Each described method involves the comprehensive consideration of various factors. Erasing the hard tissues of the tooth is one of the characteristic features of adult teeth. The degree of erosion of teeth is due not only to the nature of food, the peculiarities of its culinary processing and invulative changes. It is proportional to the person's age (that is, the time during which the tooth operates), but varies among representatives of different cultures.

Forensic physicians B.G. Smith and J. K. Knight (1984) offered an index evaluation of the degree of abrasion of hard tooth tissues, from facial erosion (small polished surfaces) to complete loss of the crown of the tooth, leaving only the smooth

surface of the root at the level of the gums. This index score takes into account different types of teeth. Estimates «0» – corresponds to an intact tooth. Within the framework of one assessment, different types of erosion are connected by horizontal lines, depicting the level of variation of types of abrasion. Types of erosion and their score assessment are only a morphological classification that does not show the quantitative loss of solid tissues. Taking into account the increase in life expectancy and despite the relatively high level of preventive measures in the western countries (the reduction of not only the prevalence of caries and tooth loss, but also the actual eradication of teeth, even in the elderly), scientists M. A. Donachie and A. W. Walls (1995). It was suggested to give an index to the degree of abrasion (Tooth Wear Index), which takes into account not only the erosion of the occlusal surface, but also the presence of defects in the vestibular and caudal regions (Table 6), for the elaboration of the degree of erasure in elderly patients.

Table 6

Criteria for assessing the degree of abrasion based on the occlusion of the occlusal surface and the presence of defects in the vestibular and cervical areas

Surface Mark	Axillary, tongue and occlusal surfaces	Cutters	Cervical area
0	No loss of enamel	No loss of enamel	There is no change in the contour of the surface
1	Loss of enamel	Loss of enamel	Minimal change in the contour of the surface
2	Loss of enamel with buccal dentine less than 1/3 of the surface	Loss of enamel with buckling of dentin	Defect depth less than 1 mm
3	Loss of enamel with buccal dentin more than 1/3 of the surface	Loss of enamel and dentin, but without the appearance of pulp or sclerized dentin	Defect depth of 1-2 mm
4	Complete loss of enamel, exposure to pulp or sclerized dentin	Exposure to pulp or sclerotized dentin	Defect depth of more than 2 mm, exposure to pulp or exposure to scleroderma dentin

Systematics of age-related rubbing of teeth by M. Gerasimov (1955), allows to determine the age, but provided that the subject is teeth or missing only 2-4 teeth and their antagonists exist, or teeth have not yet been cut. Other methods, including the most widely used diagnostic method for determining age for Takey (1981, 1984), which determine the degree of stiffness and tooth position, are more extended and detailed, while using it, all surfaces and areas of teeth are also taken into account. Quite often, visual and optical methods for diagnosis of degree of tooth erosion for the determination of age are not sufficiently objective, as there may be difficulties at the stages of the method.

First of all, without the use of a special color it is impossible to clearly identify the area, and even more so the area of abrasion of the hard tissues of the tooth. This is also due to the features of relief teeth (Figure 5.2).

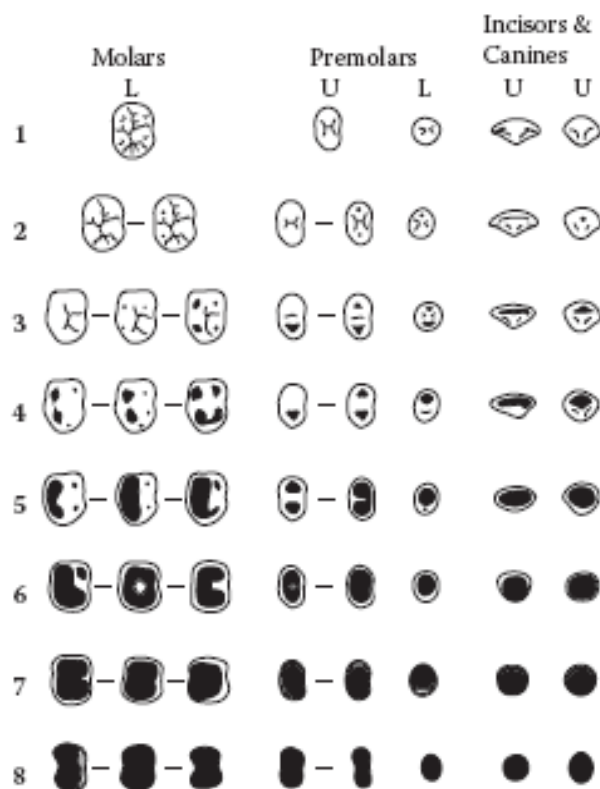


Figure 5.2. Scheme of the degree of wound closure surface and distribution of defects on the vestibular and caudal regions in different groups of teeth (according to M. A. Donachie and A. W. Walls, 1995).

Therefore, the proposed method for determining the area of abrasion of solid fabrics using a combination of histochemical coloring (PAS + altsian blue) helps in solving the set of expert tasks. When using this method, the coloration of hard tooth tissues (in particular, enamel and dentin) clearly shows the areas of abrasion and their differentiation, because the enamel is colored blue and dentin – in pinkish-red. Therefore, the erosion zones, or «platforms» of the occlusive surface, are well contoured and delimited. Thanks to the use of this histochemical color, it is possible to visually identify the areas of abrasion on any surface. In the future, it is advisable to study the surface of the teeth in an epimicroscopic light in more detail (Fig. 5.3).

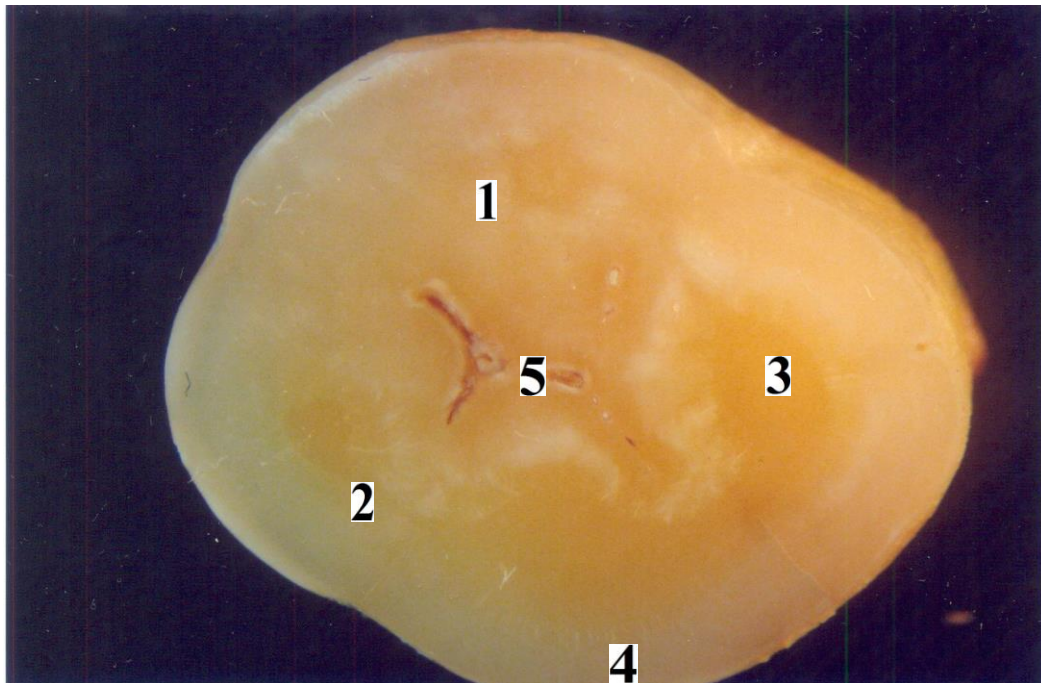


Figure 5. 3. Occlusion surface of the second molar of the lower jaw.
Native image. Ass.: Loup x 20: 1 – eoconus; 2 – epiconus; 3 – diaconus;
4 – endoconus; 5 – central (α -fovea).

As an example in Fig. 5.3, a second molar of the mandible is depicted, in which a zone is visualized on the occlusive surface macroscopically, preferably in the central portion of the crown with some displacements in the distal side of the intensively saturated color, that is, the abrasion zone. This area of the chewing

surface of the molar is located predominantly in the diagonal of the endoconus (i.e., in the distal parts of the crown), and in the form of a trapezium, the area in the epiconus region is determined. But their macroscopic appearance is difficult to determine.

Sometimes it is also possible to determine the area in % morphometric method using planimetric lines by G. G. Avtandilov (1981).

In Figure 5.4, the areas of blue with a blue hue – rubbed enamel are visualized, and near the red zone – the adjacent areas of the dentine that is rubbed.



Figure 5. 4. Occlusion surface of the second molar of the lower jaw. Coloring PAS and Alcian blue. Zb.: Loup x 20: 1 – eoconus; 2 – epiconus; 3 – diaconus; 4 – endoconus; 5 – central (α – oves).

The use of the histochemical coloring of SHIK and altian blue gives the possibility to distinguish odonto-glyphic erosion zones on each adjacent tooth on the adjacent surface, that is to identify the so-called «zone of rubbish» and determine its area using morphometric measurements (patent number UA 93687 U, bul. 19, dated 10.10.2014, authors: Gasyuk P. A., Chernyak V. V., Pisarenko O. A.,

Nikiforov A. G., Vorobets A. B. «Method of determining the signs of abrasion of teeth with the help of a combined histochemical color»).

As can be seen from Figure 5.4, the «horseshoe» zone of the red color is well contoured; the dentine is worn, which is well pronounced and has a considerable thickness on the tubers; along with a red zone, a «crown-like» blue strip is defined – the remains of a worn enamel.

Expansion of the areas of abrasion of enamel is observed along the periphery of the tubercles and clearly manifested in the projection of the central fossa. On the medial surface of the crown, the area of the ruined enamel and dentin eoconus is also visualized, in blue-blue (enamel) and red (dentin), which is in the form of a trapezium, respectively.

It should be noted that with further study of longitudinal and transverse teeth, it is possible to establish the distribution of abrasion zones, that is, not only the area but also the thickness of the lost solids of each surface, which significantly increases the accuracy and objectivity of expert research.

CONCLUSIONS

During the period of the development and formation of dentistry as a science, the role of the dentist constantly increases, from the profiled diagnostician to the expert, since the diseases of the maxillofacial area are an important problem in modern dentistry and are accompanied by pronounced morphofunctional disorders of the dento-jaw system and are characterized by polyethyologic and cascade metabolic disorders.

The prevalence of dental pathology in different countries of the world is quite high. Polymorphic clinical manifestations of dental pathology are associated with different composition of the microflora of the cavity of the mouth, features of innervation and blood supply. Significant role is played by factors that affect the antimicrobial response and the new metabolic status of the organism.

The problem of early diagnosis, objectification of the diagnostic process of dental patients and the development of effective prevention and treatment measures aimed at achieving positive long-term results, is one of the leading places among the priority directions of the development of modern dentistry. It is known that the development of dental pathology is facilitated by a variety of exogenous and endogenous factors and triggers, but the relative role of these factors is insufficiently studied. The results of epidemiological and clinical studies of recent years show the relationship between the pathology of the cardiovascular system and persistent bacterial infections or the clinical states of the maxillofacial area.

In addition, today's views and concepts do not explain the existing differences in the identification of risk factors for the development and progression of most dental pathology, their course, ambiguous results of treatment under the same conditions. It is well-known in the clinic that the difference in the rate of progression of generalized periodontitis in patients who received treatment under standard conventional schemes suggests the biological heterogeneity of this disease, in particular, and the dental pathology in general, and its possible complex causes.

Therefore, special efforts are being made that allow us to thoroughly objectify the diagnosis and create a clear algorithm with the use of additional survey methods. This direction of methodological developments is also appropriate in that the variants of the immune response to various infectious antigens, which, according to literature, are one of the most important causes and mechanisms of the development of pathological processes of the maxillofacial area, tend to be genetically determined nature. It is the immune response of different strength, due to genetic factors, which determines the state of immune homeostasis, and, consequently, the dynamic ratio of elements in the system of «health-disease». Recent large-scale pathomorphological studies suggest that one of the places in the atherogenesis is inflammatory factor. High levels of cholesterol in the blood plasma are an important risk factor for atherosclerosis, which allows you to consider it as a process associated with the accumulation of fats in the vascular wall.

However, a number of studies suggest that atherosclerosis is not only a violation of cholesterol metabolism. According to modern views, atherosclerosis can be regarded as a series of cellular and molecular disorders that arise consistently, which in aggregate can be described as inflammatory diseases. Our previous works show the importance in developing the pathology pathology of the periodontal tissue initially inflammatory, and then inflammatory and dystrophic, of such classical factors as cardiovascular diseases, diabetes mellitus, smoking, age, sex, heredity. However, in about half of the cases, one of the most striking clinical manifestations of atherosclerosis, stenocardia, occurs for the first time against the background of the absence of most of the listed modifying risk factors. The fact today is that in many countries of the world, forensic dentists carry out dental identification, age, sex determination depending on involitional changes of the organs of the oral cavity, odontological status, analyzing the cellular composition of soft tissues, traces and prescription of injuries of the teeth and jaw – facial area.

REFERENCES

1. Авдеев М. И. Судебно-медицинская экспертиза трупа / М. И. Авдеев – М.: Медицина, 1976 – 440 с.
2. Автандилов Г. Г. Методика расчета сложности морфометрических систем при морфометрических исследованиях / Г. Г. Автандилов, С. Г. Суханов. – М.: Медицина, 1982 – 80 с.
3. Айала Ф. Современная генетика / Ф. Айала, Дж. Кайгер. – М.: Книга по требованию, 2012. – 294 с.
4. Алтухов Н. В. Анатомии зубов / Н. В. Алтухов – М.: Маросейка, 1913 – 120 с.
5. Анисимова И. В. Онкологическая настороженность в практике врача-стоматолога / И. В. Анисимова // Институт Стоматологии. – 2010. – № 4. – С. 52 – 53.
6. Артюшкевич А. С. Клиническая периодонтология / А. С. Артюшкевич, Е. К. Трофимова, С. В. Латышева. – Минск, 2002. – 303 с.
7. Атлас микроскопического и ультрамикроскопического строения клеток, тканей и органов / В. Г. Елисеев, Ю. П. Афанасьев, Е. Ф. Котовский, А. Н. Яцковский. – М.: Медицина, 2004. – 145 с.
8. Афанасьев И. Ю. Гистология, эмбриология, цитология / И. Ю. Афанасьев, Н. А. Юрина. – [6-е издание]. – Спб.: Специальная литература, 2012. – 545 с.
9. Бабанин А. А. Судебно-медицинская оценка повреждений челюстно-лицевой области / А. А. Бабанин, И. Ф. Соколова, О. В. Беловицкий. – Симферополь, 2002. – 100 с.
10. Беловский Ю. Ю. Анализ гемограмм: теория и практика / Ю. Ю. Беловский, В. И. Глобин, С. А. Шустова. – М.: Медицина, 1999. – 84 с.

11. Богуславский А. П. Судебно-медицинская экспертиза трупов неизвестных лиц / Богуславский А. П. – К.: Здоровья, 1964. – 143 с.
12. Быков В. Л. Гистология и эмбриональное развитие полости рта человека: учебное пособие / В. Л. Быков. – М.:ГЭОТАР-Медиа, 2014. – 624 с.
13. Використання одонтогліфічних ознак різних груп зубів для клінічної та судової стоматології / В. В. Черняк, П. А. Гасюк, О. А. Писаренко, А. Г. Нікіфоров // Клінічна стоматологія. – 2014. – № 2 (67), ч.1. – С. 27–30.
14. Гасюк А. П. Атлас одонтогліфіки людини / А. П. Гасюк, П. М. Скрипников. – Полтава, 2001. – 87 с.
15. Гасюк Н. В. Аспекти діагностики запальних захворювань тканин пародонта / Н. В. Гасюк, М. О. Чоловський // Світ медицини та біології. – 2009. – № 4. – С. 69 – 72.
16. Гасюк Н. В. Гематологічна абетка стоматолога / Н. В. Гасюк, О. В. Клітинська, Ф. Р. Криничко. – Тернопіль, 2017. – 32 с.
17. Гасюк Н. В. Морфофункціональна організація ясен в нормі та при запаленні: автореф. дис. на здобуття наук. ступеня канд. мед. наук: спец. 14.03.09 «Гістологія, цитологія, ембріологія» / Н. В. Гасюк. – Сімферополь, 2009. – 19 [12] с.
18. Гасюк Н. В. Морфофункціональна характеристика клітинного складу епітеліального компоненту ясен хворих на цукровий діабет II типу / Н. В. Гасюк // Молодий вчений. – 2014. – № 8 (11). – С. 109 – 111.
19. Гасюк Н. В. Оптимізація методів діагностики червоного плескатоного лишая на стоматологічному прийомі / Н. В. Гасюк // Вісник наукових досліджень. – 2014. – № 3 (76). – С. 58 – 61.
20. Гасюк Н. В. Характеристика поліморфних варіантів ядерного фактора транскрипції NF-κB1 як предикторів розвитку генералізованого пародонтиту / Н. В. Гасюк, Г. А. Єрошенко // Галицький лікарський вісник. – 2015. – № 3. – С. 66 – 69.

21. Гасюк Н. В. Цитологічні і цитогенетичні особливості слизової оболонки порожнини рота людини в нормі та при запальному процесі: автореф. дис. на здобуття наук. ступеня доктора мед. наук: спец. 14.03.09 «Гістологія, цитологія, ембріологія» / Н. В. Гасюк. – Київ, 2015. – 38 [26] с.
22. Гасюк П. А. Антропологічні варіанти ікол, їх мікротвердість та особливості біомінералізації: дис. на здобуття наук. ступеня кандидата мед. наук: спец. 14.03.01. «Нормальна анатомія» / П. А. Гасюк. – Полтава, 2006. – 177 с.
23. Гематологічні показники в практиці лікаря стоматолога: [методичні рекомендації] / Ступак О. П., Левицький А. П., Скрипнікова Т. П., Гасюк Н.В. – Одеса, 2014. – 29 с.
24. Гемонов В. В. Развитие и строение органов ротовой полости и зубов / Гемонов В. В., Лаврова Э. Н., Фалин Л. И. – М.: ГОУ ВУНМЦ МЗ РФ, 2002. – 87 с.
25. Генетика человека с основами медицинской генетики / Хандорина Е., Терехова И., Жилина С. [и др.]. – М.: ГЭОТАР-Медиа, 2011. – 232 с.
26. Гизатулина Э. Р. Структурные и биохимические особенности слизистой оболочки десны: дис. на соискание научн. степени кандидата мед. наук: спец. 14.03.09. «Гистология, цитология, эмбриология» / Э. Р. Гизатулина. – Уфа, 2006. – С. 87 – 100.
27. Горбунова И. Л. Клиническая анатомия зубов / И. Л. Горбунова – М.: Медкнига, 2006 – 175 с.
28. Григорян А. С. Ключевые звенья патогенеза заболеваний пародонта в свете данных цитоморфометрического метода исследования / А. С. Григорян, А. И. Грудянов // Стоматология. – 2001. – № 1. – 34 с.
29. Грудянов А. И. Методы диагностики воспалительных заболеваний пародонта / А. И. Грудянов, О. А. Зорина. – М.: МИА, 2009. – 109 с.
30. Гунин А. Г. Гистология в таблицах и схемах / А. Г. Гунин – М.: Медицина, 2005. – 67 с.

31. Данилевський М. Ф. Захворювання слизової оболонки порожнини рота / М. Ф. Данилевський. – Київ, 2008. – 320 с.
32. Дмитриева Л. А. Современные аспекты клинической пародонтологии / Л. А. Дмитриева – М.: МЕДпресс, 2001. – 128 с.
33. Дмитриенко С. В. Анатомия зубов человека / С. В. Дмитриенко, А. И. Краюшкин, М. Р. Сапин – М.: Медицинская книга; Н. Новгород, 2000. – 196 с.
34. Долгов В. В. Клиническая лабораторная диагностика / В. В. Долгов, В. В. Меньшиков. – М.: Медицина, 2012. – 392 с.
35. Жданова М. Л. Роль изменения цвета зубов при проведении идентификации личности / М. Л. Жданова, Л. М. Лукиных, Г. А. Пашинян // Нижегородский медицинский журнал: ежеквартальный научно-практический журнал. – 2008. – № 2. – С. 72 – 75.
36. Зайратьянс О. В. Патологическая анатомия: атлас / О. В. Зайратьянс. – М.: ГЭОТАР-Медиа, 2014. – 960 с.
37. Зв'язок поліморфізмів генів TLR2 та TLR4 зі схильністю до окремих урогенітальних інфекцій / О. В. Измайлова, О. А. Шликова, І. П. Кайдашев [та ін.] // Проблеми екології і медицини. – 2011. – Т. 45, № 4. – С. 29 – 35.
38. Звягин В. Н. Медико-антропологическая идентификация личности в судебной медицине / В. Н. Звягин // Судебно-стоматологическая экспертиза. – 2001. – С. 33 – 34.
39. Зубов А. А. К выделению новой области в системе антропологии (принципы этнической одонтологии) / А. А. Зубов // Советская этнография. – 1966. – № 1. – С. 57.
40. Зубов А. А. О расово-диагностическом значении некоторых одонтологических признаков / А. А. Зубов // Советская этнография. – 1968. – № 3. – С. 16 – 20.
41. Зубов А. А. Одонтоглифика / А. А. Зубов // Расогенитические процессы в этнической истории. – М.: Наука, 1974 – С. 56 – 60.

42. Зубов А. А. Одونتология в современной антропологии / А. А. Зубов, Н. И. Халдеева. – М.: Наука, 1989 – 231 с.
43. Зубов А. А. Эволюция и географическая изменчивость физического типа человека / А. А. Зубов – М.: Наука, 1999 – 98 с.
44. Зубов А. А. Этническая одонтология / Зубов А. А. – М.: Наука, 1973. – 158 с.
45. Использование особенностей строения слизистой оболочки твердого неба у жителей Республики Армения для идентификации личности / М. С. Бишарян, П. О. Ромодановский, Е. Х. Баринев [и др.] // Здоровье. – 2012. – № 4. – С. 14 – 24.
46. Кайдашев І. П. Взаємозв'язок запально-дистрофічних та локальних імунологічних змін слизової оболонки ясен і хворих на хронічний генералізований пародонтит відповідно ступенів тяжкості / І. П. Кайдашев, В. І. Шинкевич // Український стоматологічний альманах. – 2004. – № 4. – 14 с.
47. Карпищенко А. И. Медицинские лабораторные технологии / А. И. Карпищенко. – М.: ГЭОТАР-Медиа, 2012. – 396 с.
48. Кишкун А. И. Клиническая лабораторная диагностика / А. И. Кишкун. – М.: ГЭОТАР-Медиа, 2010. – 396 с.
49. Клименко М. О. Замісний вплив екзогенних гістаміну, серотоніну і гепарину на лейкоцитарну реакцію при запаленні / М. О. Клименко, С. В. Татарко // Фізіологія. – 2001. – № 4. – С. 19 – 24.
50. Клінічна імунологія та алергологія: підручник / [Г. М. Дранік, О. С. Прилуцький, Ю. І. Бажора та ін.]; за ред. проф. Г. М. Драніка. – К.: Здоров'я, 2006. – 888 с.
51. Козинец Г. И. Анализ крови и мочи / Г. И. Козинец. – М.: МИА, 1998. – 186 с.
52. Козинец Г. И. Интерпретация анализов крови и мочи и их клиническое значение / Г. И. Козинец. – М.: МИА, 1998. – 186 с.

53. Комп'ютерна ідентифікація осіб за стоматологічним статусом: методичні рекомендації / Є. Я. Костенко, В. Д. Мішалов, В. І. Біда Ю. Ю. Переста – Київ, 2012. – 28 с.
54. Костенко Є. Я. Експериментальне обґрунтування методу визначення тотожності рентгенівського співставлення за допомогою контрастного контурування стоматологічних втручань / Є. Я. Костенко, В. Д. Мішалов, В. І. Біда // Таврический медико-биологический вестник. – 2012. – Т. 15, вип. 15, № 4 (60). – С. 187 – 191.
55. Костенко Є. Я. Клініко-експериментальне обґрунтування судово-медичної класифікації стоматологічного статусу / Є. Я. Костенко // Вісник проблем біології і медицини. – 2013. – № 4 (1). – С. 361 – 364.
56. Костенко Є. Я. Оцінка можливості дентальної ідентифікації осіб за програмою DVI-інтерполу / Є. Я. Костенко, Ю. В. Цоцко // Буковинський медичний вісник. – 2013. – Т. 17, № 3 (67), ч.1. – С. 80 – 83.
57. Костенко Є. Я. Роль стоматології в судово-медичній експертизі / Є. Я. Костенко // Мат. міжн. наук.-практ. конф. «Актуальні питання стоматологічного сьогодення». – 2010. – С. 136 – 137.
58. Костенко Є. Я. Скануючі методики комп'ютерної ідентифікації особи за цифровими ортопантомограмами: методичні рекомендації / Є. Я. Костенко, В. І. Біда, В. Д. Мішалов. – Київ, 2012. – 17 с.
59. Курляндский В. Ю. Аспекты судебно-медицинской экспертизы в ортопедической стоматологии / В. Ю. Курляндский, Б. С. Сладковский. – М., 2001. – 80 с.
60. Ломиашвили Л. М. Вариабельность форм моляров зубочелюстного аппарата человека / Л. М. Ломиашвили, Д. В. Погодаев // Институт стоматологии. – 2004. – № 4. – С. 74 – 77.
61. Ломиашвили Л. М. Микрорельеф поверхностей коронок зубов и его значение в эстетической стоматологии / Л. М. Ломиашвили // Маэстро стоматологии. – 2002. – № 2. – С. 48 – 55.

62. Ломиашвили Л. М. Художественное моделирование и реставрация зубов / Л. Г. Ломиашвили, Л. Г. Аюпова. – М., 2005. – С. 277 – 285.
63. Луценко М. Т. Цитофизиология: [практическое руководство] / М. Т. Луценко. – Новосибирск – Благовещенск, 2011. – 216 с.
64. Луцик Б. Д. Клінічна лабораторна діагностика: навчальний посібник для медичинських ВНЗ IV рівня акредитації / Б. Д. Луцик. – М.: Медицина, 2011. – 296 с.
65. Луцкая И. К. Болезни пародонта / И. К. Луцкая. – М.: Медицинская литература, 2010. – 256 с.
66. Максименко П. Т. Затруднения и ошибки в диагностике заболеваний слизистой оболочки полости рта, губ, языка / П. Т. Максименко, А. П. Шейко. – Полтава: Полтавский литератор, 2012. – 120 с.
67. Мащенко И. С. Болезни пародонта / И. С. Мащенко. – Днепропетровск: Коло, 2003. – 134 с.
68. Милованов А. П. Внутриутробное развитие человека / А. П. Милованов, С. В. Савельев. – М.: Медицина, 2006. – 134 с.
69. Михайличенко Б. В. Судова стоматологія / Б. В. Михайличенко – К., 2004. – 351 с.
70. Мішалов В. Д. Експертна оцінка стоматологічного статусу при ідентифікації особи / В. Д. Мішалов // Збірник наукових праць співробітників НМАПО ім. П. Л. Шупика. – 2013. – № 22 (3). – С. 395 – 400.
71. Москаленко В. Ф. Судова медицина: 1 книга / В. Ф. Москаленко, Б. В. Михайличенко. – М.: ВСВ «Медицина», 2012. – С. 127 – 164.
72. Мурзова Т. В. Особенности строения слизистой оболочки десны и языка с целью выявления расово-этнических особенностей: дис. на соискание ученой степени канд. мед. наук: спец: 14.03.01 «Нормальная анатомия» / Т. В. Мурзова. – Нижний Новгород, 2002. – 142 [67] с.
73. Мюллер Ханс-Петер. Пародонтологія / Ханс-Петер Мюллер; пер. з нім.

- А. І. Яремко. – Львів: Галл Дент, 2004. – 88 с.
74. Науменко В. Г. Гистологический и цитологический методы исследования в судебной медицине / Науменко В. Г., Митяева Н. А. – М.: Медицина, 1980. – 304 с.
75. Недосеко В. Б. Алгоритм об исследовании больных с заболеваниями слизистой оболочки полости рта / В. Б. Недосеко, И. В. Анисимова // Институт стоматологии. – 2003. – Т. 2, № 19. – С. 32 – 34.
76. Нигматов Р. Н. Морфологическое изучение слизистой полости рта у больных с заболеваниями внутренних органов / Р. Н. Нигматов, Н. Р. Юлдашева // Вісник стоматології. – 2008. – № 1. – 35 с.
77. Пальцев М. А. Атлас по патологической анатомии / Пальцев М. А., Помарев А. Б., Берестова А. В. – М.: Медицина, 2003. – 422 с.
78. Пашина Г. А. Значение аномалий зубов при идентификации личности / Г. А. Пашина, И. Ю. Лебедеко, А. И. Манин // Судебно-медицинская экспертиза. – 2004. – № 2. – С. 19 – 20.
79. Пашина Г. А. Идентификация личности по комплексному исследованию особенностей строения зубов и зубных рядов / Г. А. Пашина // Судебно-медицинская экспертиза: научно-практический журнал. – 2005. – Т. 48, № 5. – С. 26 – 29.
80. Пашина Г. А. Комплексное исследование слизистой оболочки языка с целью идентификации личности / Г. А. Пашина, С. И. Гажва. – М.: Медицина, 2001. – С. 12 – 14.
81. Пашина Г. А. Сравнительная характеристика ангулометрических параметров отдельных зубов и зубных рядов применительно к задачам идентификации личности / Г. А. Пашина // Судебно-медицинская экспертиза: научно-практический журнал. – 2006. – Т. 49, № 6. – С. 16 – 19.
82. Пашина Г. А. Судебная медицина / Г. А. Пашина, Г. М. Харина. – М.: ГЭОТАР-МЕД, 2001. – С. 209 – 215.

83. Пирс Э. Гистохимия / Э. Пирс. – М.: Изд. иностр. литер., 1962. – 960 с.
84. Погорелов В. М. Лабораторно-клиническая диагностика анемий / В. М. Погорелов, Г. И. Козинец, Л. Г. Ковалева. – М.: МИА, 2004. – 244 с.
85. Помойницький В. Г. Патогенетичне обґрунтування алгоритму ранньої діагностики гінгівіту / В. Г. Помойницький, О. Д. Салюк // Вісник стоматології. – 2005. – № 2. – 50 с.
86. Салюк О. Д. Рання цитологічна діагностика гінгівіту: автореф. дис. на здобуття наук. ступеня. канд. мед. наук: спец. 14.01.22 «Стоматологія» / О. Д. Салюк. – Київ, 2004. – 20 [12] с.
87. Седнева О. А. Изменения анатомо-морфологических элементов дорсальной поверхности языка в постмортальном периоде при мумификации / О. А. Седнева. – М.: Медицина, 2005. – 123 с.
88. Сіренко О. А. Одонтогліфіка малих кутніх зубів верхньої, нижньої щелеп людини нормі та при карієсі: дис. на здобуття наук. ступеня кандидата мед. наук: спец. 14.03.02 «Нормальна анатомія» / О. А. Сіренко. – Полтава, 2004. – 171 с.
89. Скрипников П. М. Морфогенез рисунка коронки различных классов зубов / П. М. Скрипников // Український медичний альманах. – 2002. – Т. 2, № 2. – С. 65 – 68.
90. Скрипников П. М. Стоматологический статус близнецов, его особенности / П. М. Скрипников // Вісник проблем біології і медицини. – 2002. – № 2. – С. 23 – 25.
91. Скрипников П. М. Структурная организация коронки моляров человека по данным толстых шлифов / П. М. Скрипников // Вісник проблем біології і медицини. – 1997. – № 4. – С. 117 – 120.
92. Струков А. И. Патологическая анатомия: учебник [6-е издание] / А. И. Струков, В. В. Серов. – М.: ГЭОТАР-Медиа, 2015. – 880 с.
93. Судово-медична експертиза об'єктів біологічного походження за локусами ядерної ДНК з використанням полімеразно-ланцюгової реакції /

- Б. В. Михайличенко, В. Д. Мішалов, А. М. Біляков, В. В. Войченко – К., 2013. – 82 с.
94. Сучасні можливості судово-медичної ідентифікації особи за стоматологічним статусом: стан і перспективи / Б. В. Михайличенко, А. А. Бабанін, В. Д. Мішалов, О. В. Дунаєв // Інтегративна Антропологія. – 2014. – № 1 (23). – С. 56 – 60.
95. Талипова Ю. Ш. Влияние некоторых методов эндодонтического лечения зубов у детей в период сменного прикуса на проведение судебно-стоматологической экспертизы / Ю. Ш. Талипова. – М.: ВСВ «Медицина», 2005. – С. 127 – 164.
96. Ткаченко Т. Б. Комплексная оценка состояния слизистой оболочки полости рта и губ с помощью неинвазивных методик / Т. Б. Ткаченко // Медицинские науки. – 2008. – № 5. – С. 29 – 33.
97. Улумбеков Э. Г. Гистология: введение в патологию / Э. Г. Улумбеков, Ю. А. Чельшев. – М.: ГЭОТАР, 2002. – 168 с.
98. Цепов Л. М. Заболевания слизистой оболочки полости рта / Л. М. Цепов, Е. Л. Цепова, А. Л. Цепов. – М.: МЕДпресс-информ, 2012. – 224 с.
99. Цынка Т. О. Диагностика заболеваний по анализам крови и мочи / Т. О. Цынка. – Ростов-на-Дону: Феникс, 2002. – 343 с.
100. Чемяков Р. Д. Внутрипопуляционная изменчивость размеров и формы зубных дуг у человека / Р. Д. Чемяков. – М.: Медицина, 2005. – 143 с.
101. Чемяков Р. Д. Исследование этно-территориальных, половых и внутривидовых особенностей морфологии зубных дуг человека с целью идентификации личности: дис. на соискание ученой степени канд. мед. наук / Р. Д. Чемяков. – М.: Медицина, 1999. – 500 с.
102. Чемяков Р. Д. Одонтоглифика европейской выборки для судебно-медицинской экспертизы идентификации личности / Р. Д. Чемяков. – М.: Медицина, 2008. – 43 с.
103. Чемяков Р. Д. Половой диморфизм размеров зубных дуг человека

- (внутригрупповые и межгрупповые вариации) / Р. Д. Чемяков. – М.: Медицина, 2005. – 98 с.
104. Черняк В. В. Алгоритм визначення анатомо-морфофункціональних ознак зубів та комплексне використання одонтологічних, одонтогліфічних параметрів в судовій стоматології / В. В. Черняк // Матер. міжнародної науково-практичної конференції «Сучасні досягнення судово-медичної науки та експертизи», 2015. – С. 78 – 79.
105. Черняк В. В. Использование данных одонтологического статуса при проведении судебно-медицинских экспертиз: электронное учебное пособие / В. В. Черняк, Е. А. Писаренко, ПА. Гасюк. – Полтава, 2015. – 121 с.
106. Черняк В. В. Методика визначення індивідуального одонтогліфічного статусу / В. В. Черняк, П. А. Гасюк, А. Г. Нікіфоров // Буковинський медичний вісник. – 2013. – № 3 (67), ч.1. – С. 181 – 182.
107. Черняк В. В. Одонтогліфічні зони стертості великих кутніх зубів / В. В. Черняк // Клінічна стоматологія. – 2014. – № 3. – С. 13 – 16.
108. Черняк В. В. Одонтологічна характеристика великих кутніх зубів в нормі та при фісурно-ямковому карієсі: дис. на здобуття наук. ступеня кандидата мед. наук: спец. 14.03.01. «Нормальна анатомія» / В. В. Черняк. – Полтава, 2008. – 163 с.
109. Черняк В. В. Особливості судово-медичної експертизи за індивідуальним одонтологічним статусом: навчальний посібник / В. В. Черняк, О. А. Сіренко, П. А. Гасюк. — Полтава, 2011. – 114 с.
110. Шлопов В. Г. Патологічна анатомія: підручник / В.Г. Шлопов. – Вінниця: Нова Книга, 2004. – 768 с.
111. Юшканцева С. И. Гистология, цитология и эмбриология / С. И. Юшканцева, В. Л. Быков. – СПб.: Наука, 2006. – 132 с.
112. Abelev G. I. Control of differentiation in progression of epithelial tumors / G. I. Abelev, N. L. Lazarevich // Adv. Cancer Res. – 2006. – № 95. – P. 110 – 113.

113. A comparative light-microscopic, electron-microscopic and chemical study of human vaginal and buccal epithelium / I. O. Thompson, P. Van der Bijl, C. W. Van der Wyk [et al.] // Arch. Oral Biol. – 2001. – Vol. 46. – № 12. – P. 1091 – 1098.
114. Accarini R. Periodontal disease as a potential risk factor for acute coronary syndromes / R. Accarini // Arq. Bras. Cardiol. – 2006. – T. 87, № 5. – P. 592 – 596.
115. Berketa J. W. Forensic odontology involvement in disaster victim identification / Berketa J. W., James H., Lake A. W. // Forensic science, medicine, and pathology. – 2012. – T. 8, № 2. – P. 148 – 156.
116. Dahlberg A. A. Relationship of tooth size to cusp number and groove conformation of occlusal surface patterns of lower molar teeth / A. A. Dahlberg // J. Dent. Res. – 1961. – Vol. 40, № 1. – P. 234 – 238.
117. Detection of oral bacteria in cardiovascular specimens / K. Nakano, H. Nemoto, R. Nomura [et al.] // Oral. Microbiol. Immunol. – 2009. – № 24 (1). – P. 64 – 68.
118. Gia-Khanh N. Essentials of biopsy cytology / N. Gia-Khanh, S. K. Tilde, S. Igaku // New York. Tokyo. – 2006. – P. 184 – 199.
119. Gregory W. The dentition of Dreopitecus and the origin of Man / W. Gregory, M. Hellman // Antropol. Papers Amer. Mus. Nat. Hist. – 1926 – Vol. 28, part I. – P. 346 – 348
120. Hershkovitz P. Basis crown patterns and cusp homologies of mammalian / P. Hershkovitz // J. Oral Maxillofac Surg. – 1990. – Vol. 19. – P. 275 – 278.
121. Hrdlicka A. Shovel-shaped teeth / A. Hrdlicka // Amer. J. Phys. Anthropol. – 1920. – № 3. – P. 486.
122. Hrdlicka A. Variation in dimensions of lower molars in man and anthropoid apes / A. Hrdlicka // Amer. J. Phys. Anthropol. – 1923. – Vol. 6, № 4. – P. 222 – 238.
123. Human leukocyte antigen polymorphism in chronic and aggressive

- periodontitis among Caucasians: a meta-analysis / J. M. Stein, H. K. Machulla, R. Smeets [et al.] // *J. Clin. Periodontol.* – 2008. – Vol. 35, № 3. – P. 183 – 192.
124. Hunter W. S. Toos size and approximal decay in human teeth / W.S. Hunter // *Arch. Oral Biol.* – 1967. – Vol. 12, № 2. – P. 15 – 16.
125. Keiser C. Person Identification by Means of the Teeth. Bristol / C. Keiser, S. Nielsen // John Wright and Sons Ltd. – 1980. – 325 p.
126. Kostenko Ye. Forensic dentistry: from age determination to identification / Ye. Kostenko, N. Bobrov // *Folia Societatis Medicinae Legalis Slovaca.* – 2012. – Vol. 2, № 1. – P. 45 – 49.
127. Pretty I. A. Adherence of forensic odontologists to the ABFO bite mark guidelines for suspect evidence collection / I. A. Pretty, D. Sweet // *J. Forensic Sci.* – 2001. – Vol. 46 (5). – P. 1152 – 1158.
128. Schwartz J.L. Oral cytology assessment by flow cytometry of DNA adducts, aneuploidy, proliferation and apoptosis shows differences between smokers and non-smokers / J. L. Schwartz // *Oral Oncol.* – 2003. – № 39 (8). – P. 842 – 854.
129. Sethi P. Oral exfoliative cytology of smokers at discrete clinical stages using AgNOR staining / P. Sethi, P.M. Shah // *Mutat. Res.* – 2004. – № 11. – P. 15 – 21.
130. Thiery J. P. Complex networks orchestrate epithelial-mesenchymal transitions / J. P. Thiery, J. P. Sleeman // *Nat. Rev. Mol. Cell. Biol.* – 2006. – № 7 (2). – P. 131 – 142.
131. Van Dyke T. E. Inflammation and factors that may regulate inflammatory response / T. E. Van Dyke, K.S. Kornman // *J. Periodontol.* – 2008. – Vol. 79, № 8. – P. 1503 – 1507.

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