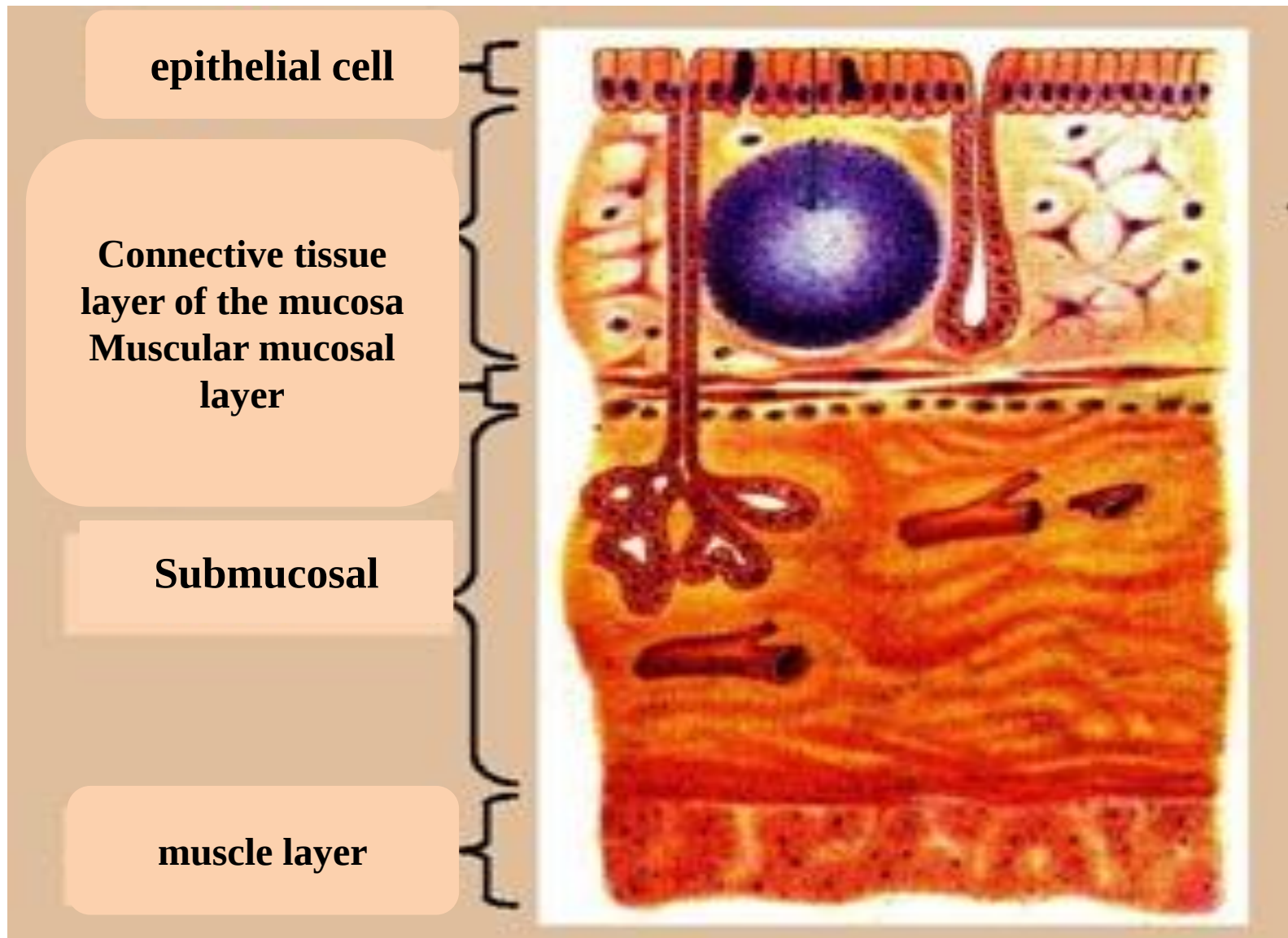


LESSON 29

MICROBIOLOGICAL DIAGNOSIS OF MUCOUS MEMBRANES AND SALIVARY GLANDS INFECTIONS

The structure of the mucous membranes



Protective properties of the mucous membranes of the oral cavity

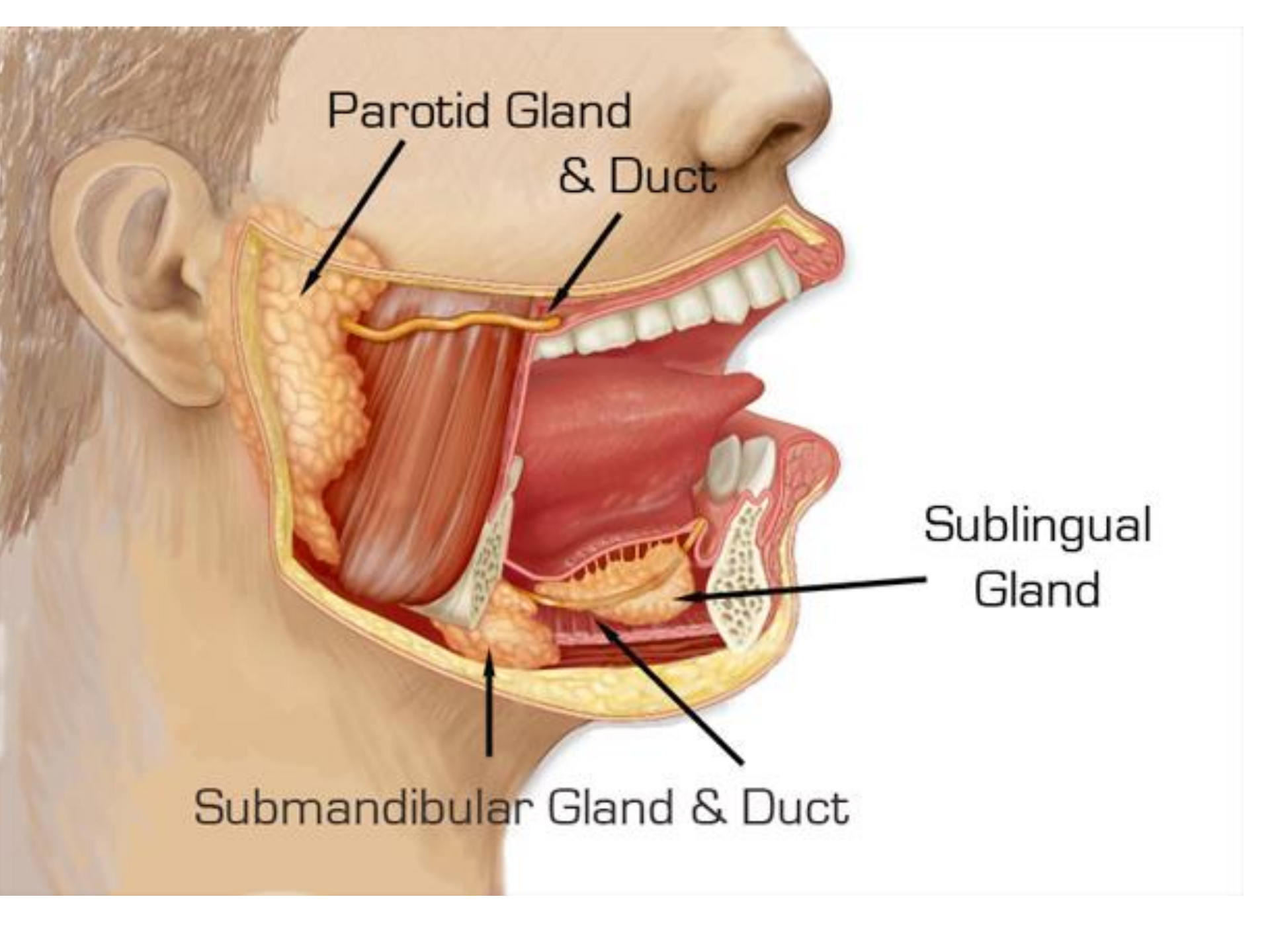
- The mucous membranes of the oral cavity are covered with a large amount of saliva secreted by the parotid and submandibular salivary glands.
- A large number of salivary glands located in the mucous layer help keep the mucous membranes of the oral cavity moist and elastic.
- Saliva has an antiseptic property and protects the oral cavity from infection, neutralizing the acidic environment, destroying bacteria, and helps protect teeth from caries.

Infections of the oral mucosa

- Diseases of the oral mucosa are accompanied by pathomorphological changes - inflammation, dystrophy, tumors Inflammation is one of the most noticeable pathological processes, it is a protective reaction of the body in response to the action of a pathogenic factor.
- Inflammation can be acute or chronic
- The course and result of the inflammatory process depends on the reactivity of the organism, localization and activity of the pathogenic factor.

There are three stages of inflammation

- In acute alternative inflammation, dystrophic and necrotic processes in the cellular elements of the epithelium and connective tissue, edema of vessel walls, mucoid and fibrinoid degeneration, and the fibrous component of the thin connective tissue layer of the mucous membrane (lamina propria mucosa) prevail.
- For exudative inflammation, vasodilation, swelling of the endothelium, edema and infiltration of the walls of blood vessels and perivascular connective tissue by leukocytes are more characteristic.
- In proliferative inflammation, the processes of cell proliferation and transformation predominate, resulting in the formation of mature connective tissue.



Parotid Gland
& Duct

Sublingual
Gland

Submandibular Gland & Duct

Acute infectious lesions of the oral mucosa

- Stomatitis (from the Greek stoma, mouth, + -itis, inflammation] - inflammation of the oral mucosa.
- Stomatitis is the most common lesion of the oral cavity. Serous stomatitis is observed in many acute infections, especially often in measles, scarlet fever, diphtheria, dysentery, typhoid, pneumonia, influenza, septic conditions, etc.
- The clinical picture of acute serous stomatitis is the entire mucous membrane of the oral cavity is bright red and slightly swollen; in severe cases, vesicles, pustules, erosion appear; the gums are edematous and surround the teeth in the form of a roller, the interdental papillae of the gums are hypertrophied and bleed easily

Classification of stomatitis depending on the etiology

- **bacterial** - caused by various kinds of bacteria (streptococcal, syphilitic, tuberculosis, etc.);
- **viral** - occurs against the background of herpetic, enterovirus infections, influenza, measles;
- **fungal** - caused by the development of a fungal infection;
- **radiation** - the result of irradiation (affects tissues during radiation sickness);
- **chemical** - acquired as a result of burns of the mucous membranes with aggressive chemicals (hydrogen peroxide, other alkalis or acids);
- **medication** - an allergic reaction of the mucosa to taking some medications.

Causes of stomatitis

- Stomatitis occurs as a reaction of the immune system to foreign agents: bacteria, viruses, fungi or chemical molecules. At the same time, the body begins to actively produce a large number of lymphocytes, which provoke the formation of ulcers on the oral mucosa.
- The pathological process develops under the influence of external or internal factors.

External factors

- Violation of hygiene standards, the use of unwashed vegetables and fruits.
- Wearing poor-quality dentures - they can rub the mucous membrane, causing irritation.
- Excessive oral hygiene - the frequent use of toothpastes and rinses with sodium lauryl sulfate, which dries out the lining of the oral cavity.
- Mechanical and chemical injuries of the mucosa - eating too hard, sour, hot food.
- Smoking

Internal factors

- Hormonal imbalance, which is often observed in women during pregnancy and adolescents.
- Diseases of internal organs - anemia, problems with the gastrointestinal tract, cardiovascular system.
- Stress, nervous strain.
- Taking certain medications that reduce saliva production.
- Poor nutrition, lack of vitamins C, E, group B, as well as zinc, iron and other important trace elements in the body.

Depending on the form of stomatitis in the oral cavity is divided into:

- catarrhal;
- ulcerative stomatitis (ulcerative necrotic Vincent);
- aphthous;
- gangrenous.

Bacterial stomatitis

- They are caused by various bacteria, in most cases - species that permanently live in the oral cavity. Exogenous introduction of pathogens is also possible.
- The mucous membrane of the oral cavity is resistant to the action of microorganisms, the violation of its integrity (usually after microtrauma) predisposes to the development of an infectious process

Oral infections stomatitis

Catarrhal stomatitis -
superficial
inflammation of the
oral mucosa

- ❖ Staphylococcus
- ❖ Neisseriaceae
- ❖ Haemophilus
- ❖ Corynebacterium

Ulcerative necrotic
stomatitis - mainly
anaerobes

- ❖ Fusobacterium
- ❖ Bacteroides
- ❖ Veillonella
- ❖ Peptostreptococcus
- ❖ T.vinsentii
- ❖ Actinomyces

Acute stomatitis: gonococcal Gingivo
stomatitis Vincent

Catarrhal stomatitis

- Stomatitis caused by staphylococci and streptococci constitute the main group of lesions. Stomatitis can be superficial and short-term, or severe
- In childhood, impetuous stomatitis is observed.
- The disease is characterized by the appearance of superficial erosions on the mucous membrane of the lips, cheeks, gums, hard palate and tongue, often merging together.
- Erosions are covered with a yellowish-gray coating, when it is scraped off, bleeding occurs.
- The lesions do not extend to the tonsils and pharynx. The gums, especially on the free edge, often ulcerate. Initially, streptococci are isolated from the lesions, and at a later date, staphylococci.

Streptococcus pyogenes can also cause erysipelas of the oral mucosa. Lesions can be a continuation of inflammation on the skin of the face or begin with small cracks and abrasions on the mucous membranes of the mouth and nose. Often, the entrance gate can be carious teeth and purulent inflammation of the gum pockets.

Sometimes erysipelas develops after surgical and orthopedic interventions in the oral cavity. Serous-hemorrhagic inflammation with severe edema develops on the oral mucosa.

Leukocyte infiltration develops in the deep layers of the mucous membrane. The mucous membrane acquires a dark crimson color. In severe cases, blisters and areas of necrosis appear on it.



- Another common disease caused by streptococci is jamming. The disease begins with the appearance in the corner of the mouth of a small streptococcal pustule, which quickly transforms into erosion with fragments of the epidermis along the edges.
- In the absence of treatment and non-compliance with the basic rules of hygiene, as well as due to stretching of the skin when opening the mouth and minor injuries, a crack forms in the center of erosion, passing to the mucous membrane of the cheek. The crack bleeds easily and becomes covered with a bloody or purulent crust.
- Increased salivation and untidy oral maintenance contribute to the constant irritation of streptococcal erosion, which can lead to streptococcal impetigo on the skin of the face.

Ulcerative necrotic stomatitis Vincent

This is an advanced form of catarrhal stomatitis, in which most of the oral mucosa is affected by ulcerative and erosive foci, redness, swelling and bleeding of the gums, a slight increase in temperature up to 37.5° , pain in the gums. It is caused by the complex effect of spirochetes and fusobacteria.

Ulcerative necrotic stomatitis has three varieties: acute, subacute, chronic.

According to the degree of severity, mild, moderate and severe forms are distinguished.

Stomatitis occurs in three phases: initial, active and resolution stage. At the very beginning, the patient complains of a slight malaise. Then you can diagnose the onset of gingivitis: it is characterized by bleeding gums and the development of hyperemia. The mucous membrane of the mouth is covered with sores, first covered with a yellowish, and then a gray-green coating. Necrotic tissues adhere so tightly to the surface that they begin to bleed when you try to remove them.

If timely treatment is not available, the disease spreads to the bone tissue and osteomyelitis occurs.

Reasons for the development of ulcerative necrotic stomatitis

- ✓ The disease most often occurs against the background of a decrease in the overall resistance of the body, which manifests itself against the background of stress, after surgery or severe prolonged infectious diseases.
- ✓ Failure to comply with the basic rules of hygiene also leads to the development of the disease, because pathogenic microflora develops well in dental deposits. The impetus for the beginning of the development of infection can be microtraumas resulting from scratching the oral mucosa with the edges of destroyed fragile teeth.
- ✓ Incorrectly installed dentures, ribbed elements of orthodontic or orthopedic structures also provoke injury to the mucous membrane. The eruption of the eighth tooth (impacted lower or upper "eight") also causes the development of Vincent's stomatitis.

Gangrenous stomatitis

- Gangrenous stomatitis is a severe lesion of all jaw tissues, accompanied by their rapid necrotic and gangrenous decay. In this case, the inflammatory process of the damaged area can be almost completely absent.
- The main difference between gangrenous stomatitis and ulcerative stomatitis is that the latter affects only soft tissues and mucous membranes, while the former gradually destroys bones, periosteum, muscles, and skin.
- A striking distinguishing feature of this type of stomatitis from others is the terrible smell of rot coming from a sick person.
- Such stomatitis is inherent in people with a very low level of immunity, in particular with immunodeficiency syndromes. The low resistance of the body as a result of hypovitaminosis, exhaustion, serious infectious and gastrointestinal diseases creates favorable conditions for the development of gangrenous lesions of the oral cavity.

STOMATITIS- CAUSES & TYPES

- Nutritional deficiency stomatitis
- Aphthous stomatitis
- Angular stomatitis
- Denture-related stomatitis
- Allergic contact stomatitis
- Migratory stomatitis
- Herpetic gingivostomatitis

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Gonococcal stomatitis

Called *Neisseria gonorrhoeae*, is transmitted by contact-sexual and contact-household routes, as well as when a child passes through the birth canal. The disease is manifested by hyperemia, swelling of the oral mucosa, small erosions with a viscous mucopurulent secret. On the lips with gonorrhea there may be ulcerative lesions, the gums are swollen and inflamed. Tongue, buccal mucosa may be hyperemic and with expressions. It is also possible to damage the salivary glands and pharynx.



Ulcerative necrotic stomatitis (Vincent's disease)

- Acute, sometimes recurrent, gingival lesions with ulceration, necrosis of the gingival margin and destruction of the gingival papillae.
- The main pathogens are the association of *Fusobacterium plautii* and *Treponema vincentii*. Often the development of the disease is preceded by inflammation caused by staphylococci and streptococci. The process progresses rapidly, which is facilitated by the release of a large amount of collagenase by fusobacteria, which destroys the collagen of the connective tissue, and the anaerobic conditions that are created in necrotic tissues.
- Often, lesions of the tonsils and larynx are observed with the development of a condition known as Simanovsky-Vincent-Plaut's angina. Conditions often occur with violations of the body's resistance (immunodeficiencies, stress, hypovitaminosis, etc.).

Bacterial lesions of the oral mucosa

chronic:

- tuberculosis
- tuberculous lupus
- leprosy
- syphilis
- actinomycosis

Tuberculosis

Tuberculosis of the oral mucosa and gingiva is caused by mycobacteria of the human type, and is usually secondary, less often primary tuberculosis of the oral mucosa develops in the form of a primary tuberculosis complex. Mycobacterium tuberculosis can enter the oral mucosa both endogenously and exogenously.

The clinical form of the disease depends on a number of factors, primarily on the general course of the tuberculosis process and the immunological state of the body. A certain role is played by the nature of nutrition, neuro-endocrine disorders, etc. Of the forms of secondary tuberculosis with damage to the oral mucosa, lupus erythematosus, scrofuloderma and milium ulcerative tuberculosis can be observed.

Primary tuberculosis of the lips and oral mucosa

Primary tuberculosis, or primary tuberculous complex, or primary tuberculous chancre, on the lips and oral mucosa is rare, mainly in children. It occurs as a result of exogenous infection, which occurs more often by airborne droplets, less often by alimentary.

After an incubation period (8-30 days), a painful ulceration up to 1-1.5 cm in size with undermined uneven edges with a dirty gray bottom occurs at the site of the entrance gate. The bottom and edges of the ulcer are slightly indurated, but on the lips the induration can be significant. After 2-4 weeks, the submandibular lymph nodes increase and thicken. At first they are mobile, and then they are soldered to each other and to the skin, after a while these nodes suppurate and open.

Tuberculosis chancre is distinguished from **lip cancer** and hard chancre by its rather rapid development, the young age of patients, softening of the lymph nodes, and the presence of *Mycobacterium tuberculosis* in the discharge of the ulcer.

Tuberculous lupus

- It is the most frequent, persistent, relapse-prone, chronically current tuberculosis disease of the mucous membrane of the mouth and lips.
- The favorite localization of lupus erythematosus is the face, which is affected in about 75% of patients, and very often the red border of the upper lip is involved in the process, to which the process usually passes from the nose. However, there may be an isolated lesion of the red border of the upper lip.
- The primary element in lupus erythematosus is a tubercle (lupoma). Lupoma is a limited, initially flat, pinhead-sized or slightly larger, red or yellowish-red soft, painless formation, prone to peripheral growth and fusion with neighboring elements. As a result of the fusion of the loop, lesions are formed that have different sizes and outlines.

Tuberculous lupus

Lupus foci on the red border of the lips and especially on the mucous membrane of the mouth ulcerate. The edges of the ulcers formed in this case are corroded, irregularly shaped. The bottom of the ulcer is covered either with a dirty gray coating or with papillomatous growing granulations, sometimes they resemble bright juicy raspberries. On the red border of the lips on the surface of the ulcer, crusts often form, sometimes very thick.

In places of ulceration, rough, disfiguring scars may form. Ulcerative lupus process, although rare, leads to significant destruction fabrics.



Tuberculous lupus

- The oral mucosa is a common localization of lupus erythematosus, and lesions of the oral mucosa may be combined with skin lesions or precede them.
- According to a number of authors, the frequency of lesions of the mucous membrane of lupus erythematosus varies from 18 to 35%. The most common localization of the lupus process in the mouth is the gums, hard and soft palate, while the tongue is rarely affected.

Syphilis

- The mucous membrane of the oral cavity and the red border of the lips are the localization of syphilitic eruptions in all stages of the disease, including primary syphilis.
- With extra-sexual infections, the localization of the chancre on the lips and oral mucosa is most common.
- Hard chancre can occur on any part of the red border of the lips or oral mucosa, but most often it is localized on the lips, tongue, tonsils.

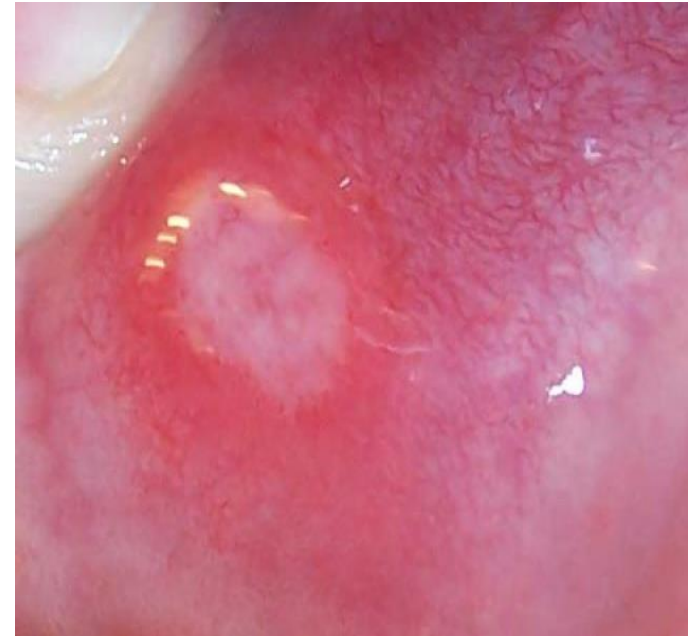
Chancre

The development of a hard chancre on the lip or oral mucosa, as in other places, begins with the appearance of limited redness, at the base of which, within 2-3 days, a seal occurs due to inflammatory infiltrate.

Then the seal gradually increases and usually reaches 1-2 cm in diameter. In the central part of the lesion, necrosis occurs and erosion of a meat-red color is formed, less often an ulcer with an infiltrate at the base. Sometimes erosions are covered with a grayish-white coating.

When the chancre is located on the lips, significant swelling is sometimes formed, as a result of which the lip sags, and the chancre lasts longer than in other places.

More often, one hard chancre develops, less often - two or more. If a secondary infection joins, then erosion can deepen, and an ulcer with a dirty gray necrotic coating is formed.



Chancre

- In the corners of the mouth and in the region of transitional folds, a hard chancre takes the form of a crack with oval outlines.
- When a hard chancre is located in the corner of the mouth, it can clinically resemble seizures. On the tongue, a hard chancre is usually solitary, occurs more often in the middle third. In addition to erosive and ulcerative forms, a slit-like form may occur.
- When a hard chancre is located on the back of the tongue, due to a significant infiltrate at the base, the chancre usually protrudes sharply above the surrounding tissue, and there is meat-red erosion on its surface. Note the absence of inflammation around the chancre and its painlessness.

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Actinomycosis

- With the development of actinomycosis of the oral mucosa, the main is the endogenous route of introduction of the pathogen. Banal inflammatory processes and trauma of the mucous membrane are of certain importance in the occurrence of the disease. Actinomycetes constantly live in the oral cavity. They are located on the mucous membrane, make up the stroma of tartar, and are part of dental plaque.
- Actinomycetes are found in carious cavities of teeth, in pathological gingival pockets, on the tonsils, in the ducts of the salivary glands.
- However, the presence of actinomycetes on the mucous membrane is still not enough for the development of the disease. The decisive factor in the development of actinomycosis is the reactivity of the organism.

Actinomycosis

- Actinomycosis of the oral mucosa can be **primary and secondary**.
- The development of **primary actinomycosis** is most often the result of an injury to the mucous membrane by the sharp ends of cereals, blades of grass, fish bones, as well as the sharp edges of teeth, etc. Chronic inflammation resulting from injury contributes to the development of actinomycosis.
- With **secondary actinomycosis** of the mucous membrane, the process from nearby tissues - submucosal tissue, subcutaneous tissue, periosteum and jaw bones - extends to the mucous membrane and causes its damage.
- More often, actinomycosis occurs on the mucous membrane of the lower lip and cheek, sublingual region, lower and lateral surfaces of the tongue.

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Actinomycosis

- Primary actinomycosis of the oral mucosa is characterized by slightly pronounced pain sensations. It begins with the appearance of a superficially located inflammatory infiltrate. When the process is localized on the lower lip or cheek, the infiltrate is round in shape, soldered to the underlying submucosal tissue.
- When the focus is located in the sublingual region, on the lower and lateral surfaces of the tongue, the infiltrate is more superficial. The mucous membrane in the affected area has a red or stagnant red color. Often the mucous membrane becomes dry, dull, sometimes whitish in color. Gradually there is a softening of the infiltrate and its delimitation. During this period of the disease, minor pain sensations appear.
- When the lesions are located on the lip or cheek, abscess formation occurs. Upon opening of such a focus, a cavity is formed, after emptying which the process regresses and gradually, during the treatment, all inflammatory phenomena disappear.

Candidal stomatitis

- The disease occurs more often in infants, but it also occurs in adults, especially in debilitated people suffering from diabetes mellitus, blood diseases, hypovitaminosis, long-term receiving corticosteroids, cytostatics, antibiotics. and etc.



Candidal stomatitis

- The disease is characterized by the appearance of initially point, easily removable raids on the mucous membrane of the palate, cheeks, gums, tongue. Spot raids usually merge with each other due to peripheral growth. Under the plaque, a smooth, slightly edematous, hyperemic surface is exposed. With a long existence of the process, coarse whitish-gray films are formed, which are tightly soldered to the underlying mucous membrane. When removing such films, a bright erosive bleeding surface is exposed.
- White plaque in candidal stomatitis consists of desquamated epithelial cells, fibrin, food debris, bacteria, yeast mycelium.
- The process can spread to the mucous membrane of the larynx, pharynx and esophagus. In a number of patients, isolated candidiasis of the tongue (candidal glossitis) is observed, the occurrence of which is facilitated by the presence of a scrotal (folded) tongue.
- *Candida albicans* reproduces well in its deep folds, and the clinical picture of candidal glossitis does not differ from that in other parts of the oral mucosa.
- However, the so-called pseudoleukoplakic, or hyperplastic, form of the lesion occurs more often on the tongue with the formation of a thick layer of tightly seated plaque. Patients complain of burning sensation in the oral cavity, dryness, and in the presence of erosions, soreness.

Fungal diseases of the oral mucosa

Acute pseudomembranous candidiasis occurs in preterm infants and weakened newborns, called C. albicans, C. tropicalis

Acute atrophic candidiasis - accompanied by xerostomia (dry mouth, burning, redness of the mucous

Chronic hyperplastic candidiasis develops against the background of VID (expressed as seizures, palatinitis, cheilitis, glossitis, pareitis)

Chronic atrophic candidiasis (dryness, redness, swelling of the mucosa, itching, seizures, cracks on the tips of the lips) can develop when wearing removable dentures



Candidal stomatitis

Viral diseases of the oral mucosa

- Stomatitis with influenza
- Herpetic stomatitis
- Chicken pox
- Infectious mononucleosis
- Measles
- Vesicular stomatitis
- HIV infection (candidiasis, HIV gingivitis, Vincent necrotizing ulcerative gingivitis, HIV periodontitis, Kaposi's sarcoma, actinomycosis, mycobacteriosis, staphylococcal osteomyelitis, etc.)

Viral stomatitis

- The main causative agent is HSV type 1; less often - HSV type 2 and varicella-zoster. Viral stomatitis is more often observed in people with immunodeficiency states. Usually, rashes form in areas where the skin passes into the mucous membrane, for example, on the red border of the lips and near it. At the same time, rashes can appear on the mucous membrane of the oral cavity, more often on the mucous membrane of the lips and cheeks, less often on the pharynx and tonsils.
- Vesicles transform into pustules, forming erosions. The course of the disease can be complicated by periodontal disease, caries, and the presence of removable dentures. Herpetic lesions resemble herpangina, manifested by vesicular rashes on the back of the pharynx, dysphagia and anorexia (causative agents are group A Coxsackie viruses). In the dynamics of the disease, the vesicles burst with the formation of aphthae with a whitish bottom. The disease is self-limiting after 7-10 days.

Herpetic stomatitis



Рис. 6

Stomatitis



????

- Types of stomatitis in adults
- Herpetic stomatitis
- 90% of adult patients are carriers of the herpes virus, but it is activated only when the immune system is weakened (with a cold, hypothermia, nervous exhaustion).
- The disease is accompanied by signs of general intoxication of the body, as well as the formation of small bubbles on the oral mucosa.
- Aphthous stomatitis
- This is a severe form of the disease, when deep painful round aphthae form in the mouth. These are yellow or gray plaques with a red border, their size can reach 10 mm. As a rule, staphylococci and other pathogenic microorganisms in the oral cavity become the cause of the disease, which begin an attack against the background of reduced immunity.



Types of stomatitis



Zayed



Salivary gland lesions

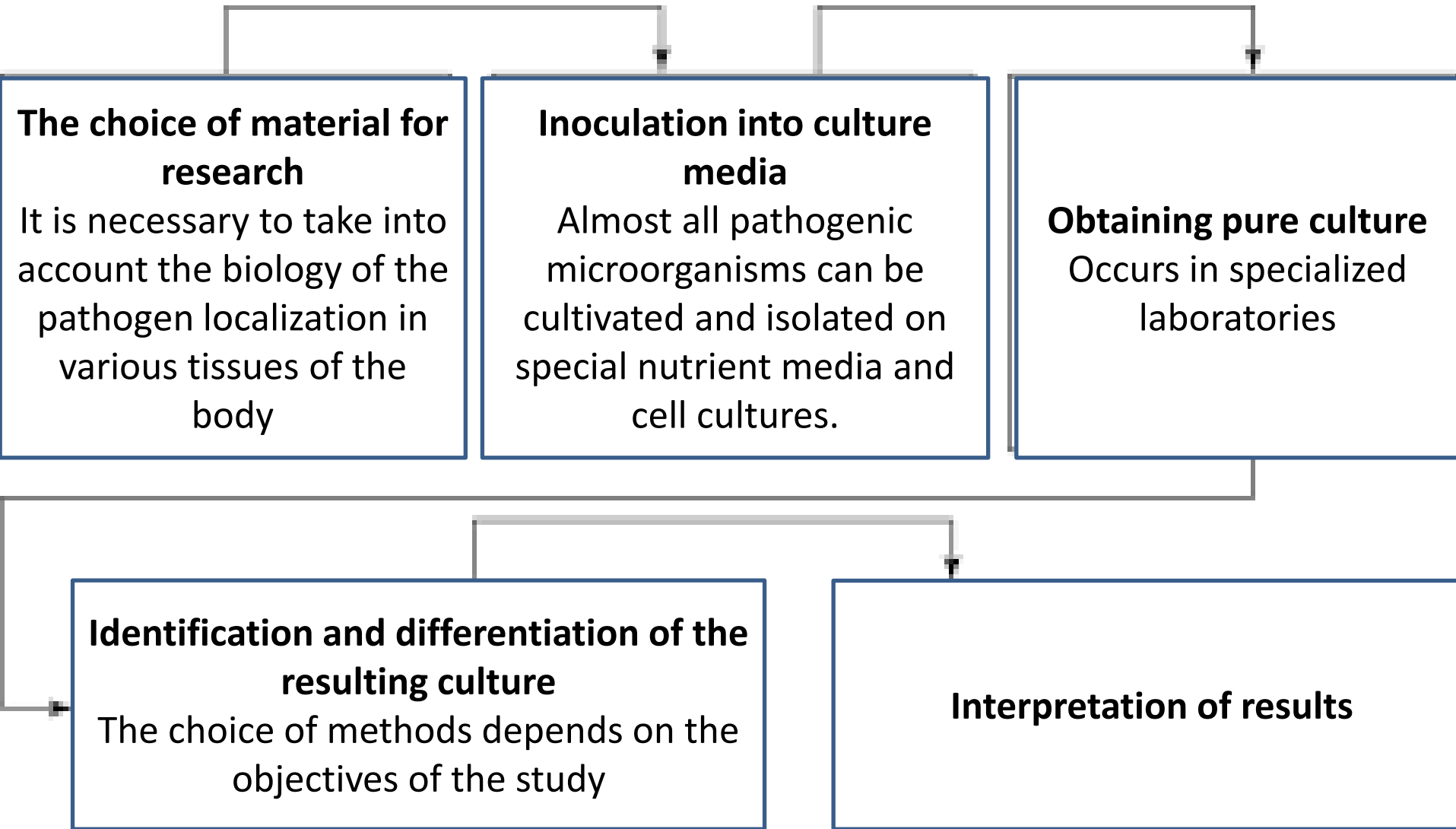
- Malformations
- Sialoadenitis
- Sialolithiasis
- Autoimmune lesions of the salivary glands
- Cysts of the salivary glands
- Tumor-like lesions of the salivary glands
- Tumors of the salivary glands
- Primary, secondary (more often)
- Intraductal, lymphogenous, hematogenous
- Parotid (mumps), submandibular, sublingual (rare)
- Viral, bacterial, fungal

Diagnostic methods

Include :

- OAK
- Biopsy of lesions
- Bacteriological studies
- Immunological studies
- Biochemical blood tests
- Virological research
- Histological cytological studies

Study scheme



Taking pathological material

- To determine the causes of diseases of the oral mucosa, bacterioscopic and bacteriological studies are carried out.
- To take the material using special sterile test tubes
- Taking the material is carried out in compliance with the necessary measures
- Biopsy of lesions



Interpretation of results

- Single cells found in the preparation, even at the stage of budding, have no diagnostic value and are regarded as carriers.
- The detection of a large number of elements of the fungus, multiple budding, the presence of mycelium or pseudomycelium indicates the parasitism of the fungus
- In typical cases, the diagnosis of lupus erythematosus is not difficult. Differential diagnosis of lupus lesions on the oral mucosa and lips should be carried out with tubercular syphilis, leprosy.
- Unfortunately, tuberculous mycobacteria cannot be detected microscopically in the discharge from ulcers.

Interpretation of results

- The diagnosis of acute **herpetic stomatitis** is established on the basis of the clinical picture and the epidemiology of the disease.
- It is recommended to perform a cytological examination of the material from herpetic erosions, which is stained according to Romanovsky-Giemsa, in order to detect the so-called giant multinucleated cells that are characteristic of herpes.
- The method of immunofluorescence allows you to get the result within 2.5-3 hours from the moment of disease of the material.
- The diagnosis of **Vincent's angina** is made on the basis of the clinical picture and the detection of fusospirochetal symbiosis. Differential diagnosis of Vincent's angina must be carried out with diphtheria. It should be remembered that diphtheria and fusospirochetosis can exist simultaneously in the same lesions.
- Only in the absence of diphtheria bacilli can the diagnosis of mixed infection be excluded.
- Histological examination reveals two affected areas: in the center - necrosis with a large number of spindle-shaped bacilli, along the periphery - a pronounced inflammatory reaction with a large number of Vincent's spirochetes.

Determination of the sensitivity of microorganisms to antibiotics

Determination of the sensitivity of microorganisms to antibiotics is based on the determination of the minimum concentration of the drug

- ✓ Disc diffusion method
- ✓ Serial dilution method



Disc diffusion method

