

THE MINISTRY OF HEALTH OF UKRAINE
THE HIGHER STATE EDUCATIONAL INSTITUTION OF UKRAINE
"UKRAINIAN MEDICAL STOMATOLOGICAL ACADEMY"

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METHODICAL RECOMMENDATION
for independent work of students during the preparation
to practical lessons and the lessons

Academic discipline	Orthodontics
Module №3	Children's dental prosthetics
The theme of the lesson №8	Changes of maxillo-dental system in endocrine pathology.
Course	V
Faculty	Preparation of foreign students

Poltava 2017

1. Relevance of the topic:

The maxillofacial region is a part of the organism that dynamically changes in the process of development and growth. Changes in the functions of endocrine glands lead to disruption of metabolism, trophic disorders in tissues. The dental manifestations of some endocrine disorders are of great diagnostic importance, as they outpace the manifestations of the general clinical symptoms of the disease. To an orthodontist-dentist, it is very important to take into account the general condition of the orthodontic patient, to know the dental manifestations of hereditary diseases and syndromes. Early detection (together with a pediatrician, a geneticist) is necessary to determine the clinical prognosis and choose an adequate complex of treatment: therapeutic, orthodontic and surgical.

2. Specific objectives:

To explain the features of morphological and functional disorders of the dento-alveolar region associated with the pathology of the endocrine system.

To know a syndromic diseases and their manifestations in the oral cavity.

To explain the tactics of orthodontic treatment of patients with endocrine pathology.

To analyze the results of syndromic diseases differential diagnostics manifested in the oral cavity.

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

Name of previous disciplines	Skills
1. Anatomy	To describe the anatomical and physiological features of the brain and facial sections of the skull structure, jaws, the attachment of mimic and chewing muscles, and the mucous membrane of the oral cavity. To evaluate the development and proportionality of the facial part of the skull, jaws size.
2. Prevention of dental diseases	The timing, order and sequence of permanent teeth eruption.
3. Pediatrics and Internal diseases	To know the features of clinical symptoms manifestations in endocrine diseases of children and adults. Be able to conduct differential diagnosis of various endocrine diseases.

4. Tasks for independent work in preparation for the lesson.

4.1. A list of key terms, parameters, characteristics that a student should learn in preparation for the lesson:

Term	Definition
1. Metabolism.	Metabolism consists of two processes: assimilation (or anabolism) – the synthesis of compounds characteristic of

	the body and dissimulation (or catabolism) – the decomposition of substances and the removal of the products of this decay from the body. The totality of the assimilation (synthesis) processes and dissimulation (decay) forms the basis of life. Distinguish the general (external) metabolism, taking into account the intake of substances and their release, and the intermediate metabolism, which covers the transformation of these substances in the body.
2. Syndrome diseases in orthodontics.	Hereditary syndromes, which are characterized by typical manifestations in the maxillofacial area.

4.2. Theoretical questions to the lesson:

1. The influence of thyroid gland diseases on the development of the dento-alveolar apparatus.
2. The effect of adrenal cortex diseases on the development of the dento-alveolar apparatus.
3. Influence of pancreatic diseases on the development of the dento-alveolar apparatus.
4. Disturbance of metabolism and its effect on the development of the dento-alveolar region.
5. Morphological disorders in the dento-alveolar apparatus associated with the pathology of the endocrine system.
6. Functional disorders in the dento-maxillary apparatus associated with the pathology of the endocrine system.
7. Shereshevsky-Turner syndrome.
8. Cruson Syndrome.
9. The syndrome of Albright.
10. Syndrome of the Staton-Capdepon.
11. The Papiyon-Lefevre syndrome.

4.3. Practical work that are performed in class:

1. To determine the signs of teeth hard tissues violations.
2. To determine signs of periodontal tissue violations.
3. To determine the signs of the oral cavity mucosal disorders.
4. To identify anomalies of teeth, dentition and bite.
5. To draw up a plan for the prevention of dento-alveolar anomalies in endocrine diseases, metabolic diseases.
6. To master the method of curating a patient with endocrine diseases and metabolic diseases.
7. To be able to plan preventive orthodontic measures in patients with diseases of the endocrine system and metabolism.
8. To be able to differentiate syndrome diseases manifested in the oral cavity (Shereshevsky-Turner, Cruson, Albright, Staton-Capdepon, Papiyon-Lefevre).

The content of the topic:

Diabetes. The disease, caused by absolute or relative insulin deficiency and characterized by a violation of carbohydrate metabolism with an increase in the amount of glucose in the blood and urine, as well as other metabolic disorders. In the oral cavity, changes are observed, the degree of manifestation of which depends on the severity and prescription of diabetes.

The most characteristic changes in the oral cavity in diabetes mellitus.

Change	Cause	Manifestation
Xerostomia (dryness).	Dehydration.	The mucous membrane of the oral cavity is dry or slightly moistened, cloudy, significant plaque, hyperemic.
Catarrhal stomatitis, glossitis.	Infection, reduction of barrier function, poor hygiene.	Hemorrhages, erosion.
Fungal stomatitis.	Dysbacteriosis, a decrease in enzymes in saliva (lysozyme).	Cracks appear in the corners of the mouth with white-gray crusts.
Paresthesia.	Dryness, defeat of the nervous system.	Itching, reduction of taste to sweet, salty, sour.
Trophic disorders.	Metabolic disease.	Trophic ulcers.

Hypothyroidism – the condition caused by a long, persistent deficiency of thyroid hormones, the opposite of thyrotoxicosis. The extreme degree of manifestation of clinical symptoms of hypothyroidism in adults – myxedema, in children – cretinism.

Hyperthyroidism – the syndrome caused by hyperfunction of the thyroid gland, manifested by an increase in the content of hormones: triiodothyronine (T3), thyroxine (T4). Hyperthyroidism, depending on the level of occurrence of the disorder is distinguished: primary – thyroid gland, secondary – pituitary, tertiary – hypothalamus.

Hypoparathyroidism – pathology, which combines a number of conditions characterized by a decrease in some or all of the effects of parathyroid hormone, which is accompanied by hypocalcemia.

Avitaminosis – disease, which is the result of a prolonged malnutrition, in which there are no vitamins.

Rickets – the disease of infants and young children, occurring with a violation of bone formation and lack of their mineralization, due mainly to the deficit of calcium and its active forms during the most intensive growth of the body. The earliest characteristic changes are revealed by radiography in the end sections of long bones. Demineralization of the diaphysis was also proved. If convalescence does not occur, clinical symptoms appear.

Acromegaly – disease associated with impaired function of the anterior lobe of the pituitary (adenohypophysis); Is accompanied by an increase (enlargement

and thickening) of the hands, feet, skull, especially its facial part, etc. Acromegaly occurs usually after the growth of the body; Develops gradually, lasts for many years. It is caused by the production of an excessive amount of growth hormone.

Myxedema develops with insufficient thyroid function. With this disease, the lips and nose are thickened, swollen upper eyelids, anemia, edema and dryness of the mucous membrane of the oral cavity are observed, the tongue, lips, and gums increase. Due to swelling of the larynx mucous membrane, the voice is deaf.

Illness of Itsenko-Cushing. Neuroendocrine disease, characterized by increased production of adrenal cortex hormones, which is caused by excessive secretion of adrenocorticotrophic hormone (ACTH) by cells of hyperplastic or tumor tissue of the pituitary (in 90% of the micro-adenoma). At the base of the disease is the violation of the main types of metabolism. The disease develops as a result of hyperproduction of glucocorticosteroids, due to:

- 1) a primary abnormality in the adrenal cortex;
- 2) hyperproduction and ACTH adenohypophysis;
- 3) violations of the pituitary gland.

The mucous membrane of the oral cavity is edematous, there are prints of teeth in the tongue and cheeks, and there are trophic ulcers, erosion, and candidiasis. In such patients, the dentist should conduct treatment in contact with the endocrinologist, because only local symptomatic treatment of the oral cavity will be ineffective.

Addison's disease – a rare endocrine disease, as a result of which the adrenal glands lose the ability to produce enough hormones, especially cortisol. This pathological condition was first described by British therapist Thomas Addison in his 1855 publication. Addison's disease is caused by the cessation or reduction of the hormones production in the adrenal cortex. The most characteristic sign is skin pigmentation and mucous membrane of the oral cavity. In the oral cavity, strips or a circle of blue, grayish-black color appear due to the deposition of melanin. Treatment of manifestations of endocrine system diseases in the oral cavity is carried out together with endocrinologists. The sanitation of the oral cavity and symptomatic therapy are shown depending on the clinical manifestations. For diagnosis of hereditary diseases, inspection of the face is very important. Pay attention to such signs: a cut of the eye slits (Mongoloid or antimongoloid); Presence of ptosis, epicanthus, exophthalmos, strabismus, color sclera, presence of eyelashes and their size; Features of the nose bridge (wide, with a sinking) and superciliary arches (protruding or overhanging); The presence of the filtrum and red border of the upper lip anomalies, hypo- or hypertelorism, the size of the nose-frontal angle, the pigmentation of the facial skin and mucous membrane of the oral cavity; Shape and location of the auricle, the shape of the skull, the timing of the fontanelles closure; The relationship of the jaws (progenic, prognathic); Height of different parts of the face (shortening, elongation); Between the occlusal ratio (medial, distal, open, deep or cross bite), as well as the presence of face asymmetry, the growth of the patient, the proportionality of the build, the presence of deformations of the entire skeleton, and the position and number of fingers.

Cruson Syndrome (craniofacial dysostosis). Described by A. Cruzon in 1912. The cause of the development of the disease is a violation of intrauterine development at the 6th-7th weeks. The main manifestations of the disease are premature synostosis of the cranial sutures, hypertelorism (reduction of the distance between any paired organs, most often between the inner edges of the eye cavities), exophthalmos, nystagmus, external strabismus, hook-shaped flat nose, short upper lip, upper jaw hypoplasia and relative lowering of the lower jaw Jaws or prognosis, broad forehead, shallow orbits. The syndrome is characterized by deformation of the skull and its base, as well as the face. Hypoplasia of the middle part of the face is observed in the vertical, sagittal and transversal directions. There is a possible deformation of the skull of two types: oxy- or brachycephaly. Cranial sutures, mostly coronal and lambdoid, are closed prematurely, but not always. Premature craniosynostosis is possible at birth, but most often it begins on the 1st year of life and ends in 2-3 years. Sometimes synostosis develops at the age of 10 years. Premature sinostosis of cranial sutures causes an increase in intracranial pressure.

Dental symptoms are as follows: in the oral cavity the mesial occlusion with the reverse overlapping of teeth of different degree and different size of the sagittal gap prevails, as well as its combination with open and cross bite; Anomalous form of some teeth (mainly macrodontium), sometimes hypodontia and curvature of the teeth roots; Anomalies of the teeth (mostly crowding); Deformation of the dental and alveolar arches, especially on the upper jaw with a predominantly uneven narrowing of the latter. In patients, anomalies of the inner and middle ear, deterioration of visual acuity are observed.

Treatment of patients is phased and complex. Orthodontic treatment is most effective at an early age. In the older age, maxillofacial surgery is indicated to correct inter-maxillary relationships and deformities of the bones of the facial skeleton.

Roben syndrome (congenital micrognathia with glossoptosis). The leading symptom is hypoplasia and deformity of the lower jaw. In addition, there are violations of the muscular tone of the tongue, pharynx and larynx, accompanied by newborn glossoptosis (downward and backward deviation of the tongue) and shortness of breath, development of hypoxia. In 50% of patients, cleft palate is detected. Cervical articulations are bent, but the shape of the joints and coronal processes is not changed. The best results of treatment up to 6 months of age are provided by the use of a monoblock activator, which fixes the lower jaw in a position extended to 5 mm and separates the tips of the gingival ridges (up to 4 mm). At the front end of the activator, a hole is made along the line of closure of the lips for the passage of a stream of air and food. The newborn is put in a special plaster bed face down. The lower jaw must hang down. During feeding, the baby is held vertically, the head is tilted. Orthodontic treatment is carried out in a complex, step-by-step manner, both before and after surgical interventions. Rational complex treatment makes it possible to effectively conduct both clinical and social rehabilitation of such children.

Albright's syndrome (pseudohypoparathyroidism, Albright's ancestral osteodystrophy, polyosseous fibrous dysplasia) is characterized by replacement of normal bone tissue with fibrotic stroma. Through the similarity of the histological structure, the diagnosis is established on the basis of clinical and radiological signs. Fibrous dysplasia is a non-tumorous process in the bones with certain clinical and morphological features. There are two forms of fibrous dysplasia: polyosal (rarely found), mono-osal is the most common. The severe form of polyosseous fibrous dysplasia with characteristic skin pigmentation (in the form of coffee-and-milk spots) in combination with various endocrine disorders (Cushing's syndrome, hyperthyroidism, hyperparathyroidism, diabetes mellitus, premature puberty) is called Albright syndrome, which is common in girls. In the case of a mono-asymalous shape, asymmetry of the face is observed due to the increase in bone tissue, the color of the skin over the neoplasm is unchanged. Palpation of the affected jaw is painless, the tumor is dense, its surface may be tuberos, the mucous membrane over it is not changed. In the later stages of the lesion, pain appears. In OPTG in focal form, fibrous dysplasia is represented by characteristic areas of enlightenment of bone tissue of round or oval shape with a rim of sclerosis around the periphery, uneven thinning of the cortical layer of bone, its continuity is not disturbed. Periodic layering is absent. The diffuse shape is characterized by the absence of clear boundaries with a healthy bone. A well-marked transition of pathologically altered bone tissue to a healthy one through a section of a large-bony bone. Sites of enlightenment can be multiple, separated by dense bony membranes, which gives the bone the appearance of honeycombs. Orthodontic treatment provides for the normalization of inter-maxillary and inter-occlusal relationships.

The Shereshevsky-Turner syndrome is caused by the anomalies of sex chromosomes in female patients, namely, the absence of one X chromosome in the karyotype. A sign of the disease in newborns is lymphatic edema of the dorsal surfaces of the feet, legs, hands and neck. The disease manifests itself as primary amenorrhoea, sexual infantilism, the formation of skin folds on the lateral surfaces of the neck (neck of the "sphinx"), valgus position of the elbows, low height. Such patients have a short neck, low hair growth on the nape, they have pigment nevi, an enlargement of the thyroid gland, hypoplasia and deformation of the nails, a leukocytic thorax, a brachiocephalic skull, an epicanthus (skin fold in the corners of the eyelids), ptosis of the eyelids and astigmatism, heart defects, stenosis of the pulmonary artery, anomalies of limb development (shortening of IV and V fingers). In addition, the following symptoms are characteristic: a not very pronounced antimonogloidal incision of the eyes, a low position of the auricles, a retrogenia, a high sky, early eruption of the permanent teeth and their shortening, petrification of the root pulp, mainly in premolars and bifurcation of their roots, mainly on the mandible, chronic catarrhal gingivitis with the formation of abnormal dento-gingival pockets, distal occlusion, microdentia, dentition of teeth, narrowing of dental arches.

Syndrome of the Staton-Capdepon (hereditary violation of amelo- and dentinogenesis, hereditary black tooth, dysplasia of Capdepon) – manifests itself in the defeat of both temporary and permanent teeth. Teeth have a characteristic color, which experts estimate differently: gray-blue, purple, brown-violet, pearl. Sometimes the milk teeth erupt in white, but eventually change their color. Permanent teeth are always changed. After the eruption, enamel and dentin begin to quickly erode right down to the level of the gums without opening the pulp chamber. Naked dentin gradually darkens (from light to dark brown color). Its surface is smooth, shiny, painless when sensed. Teeth are very rarely affected by tooth decay. Apical pathological processes (focal rarefaction, gingival fistulas, radicular cysts, osteomyelitis) occur more often, even in the absence of carious lesions. Denticles and obliteration of the root canals are found in the pulp of the teeth. The tactics of treatment should be differentiated. With a slight loss of tissue, a course of remineralizing therapy of tooth tissues is recommended with the use of exotic and endogenous agents. The group of chewing teeth is covered with metal crowns without increasing the bite. With a significant loss of hard tissues are treated with removable dentures.

Papiyon-Lefevre Syndrome (palmar-plantar hyperkeratosis and periodontolysis, early periodontitis) – includes the innate hyperkeratosis of the palm and foot, progressive destruction of the alveolar bone around the milk and permanent teeth. The first symptoms of the disease – erythema and thickening of the skin of the palms and feet in newborns. Later the disease progresses. Subsequently, the lateral surfaces of the palms and feet, parts of Achilles tendons, elbows and knee joints are affected. Deep cracks, defects of nails form. There is thinning of hair, hyperhidrosis. The first dental signs appear in 2-3 years. Milky teeth erupt in the usual time and without any special features. First, the mobility of the incisors with gum flushes and the release of pus is observed, and in the future the mobility of all the milk teeth. Gingival abscesses can form, vertical alveolar bone destruction and teeth mobility progress. Up to 4-6 years, children lose all their milk teeth, after which the inflammation in the periodontium stops, the gums become smooth and shiny. After eruption of permanent teeth, the disease recurs again and after 1-2 years the teeth become mobile. Up to 13-15 years, patients lose all permanent teeth. Treatment of patients should be comprehensive. Prescribe symptomatic local therapy and immunocorrection (thymus drugs). Orthodontic and orthopedic treatment consists of dental prosthetics, mostly removable structures, especially in childhood.

Materials for self-control:

A. Tasks for self-control (tables, diagrams, drawings, graphs):

1. To draw a structured logical scheme of the activity in the album.

B. Tasks for self-control:

1. The diseases of the endocrine system include:
hypothyroidism

rickets
rubella
hypovitaminosis
measles

2. The diseases of the endocrine system include:
diabetes mellitus
scarlet fever
rubella
hypervitaminosis
avitaminosis

3. The diseases of the endocrine system include:
hyperthyroidism
measles
rubella
rickets
avitaminosis

4. The metabolic disorders include:
deficiency
scarlet fever
addison's disease
measles
diabetes

5. The metabolic disorders include:
rickets
hyperthyroidism
rubella
hypothyroidism
Addison's disease

6. The metabolic disorders include:
hypervitaminosis
diabetes mellitus
diffuse toxic goiter
measles
congenital adrenogenitalny syndrome

7. The childhood infectious diseases are:
scarlet fever
Addison's disease
rickets

hypervitaminosis
scurvy

8. The childhood infectious diseases are:

rubella
rickets
diabetes mellitus
hyperthyroidism
avitaminosis

9. The childhood infectious diseases are:

measles
diffuse toxic goiter
rickets
addison's disease
congenital adrenoguenitalny syndrome

10. The endocrine diseases include:

congenital adrenoguenitalny syndrome
scarlet fever
rickets
avitaminosis
scurvy

11. The metabolic disorders include:

scurvy
addison's disease
measles
scarlet fever
hypothyroidism

12. The diseases of the endocrine system include:

Addison's disease
rubella
rickets
scurvy
scarlet fever

13. With diffuse toxic goiter observed:

early mineralization of crowns in permanent teeth
incompetents of dental age to chronological
multiple caries of deciduous teeth
late eruption of deciduous teeth
development of giant teeth

14. The backlog of bone age from chronological is observed with:

- hypothyroidism
- hypoglycemia
- agranulocytosis
- hyperthyroidism
- diabetes

15. Accelerate the timing of permanent teeth germs development with:

- gigantism
- agranulocytosis
- hyperthyroidism
- diabetes
- sickle cell anemia

16. With cerebro-pituitary dwarfism observed:

- microstomia
- impacted teeth
- delayed eruption of teeth
- violations of the microhardness of the dentin
- macrostoma

17. Prevention of dentoalveolar anomalies in cretinism does not include the use of:

- corticosteroids
- iodized salt
- calcium
- vitamin A
- vitamin D

18. Congenital hypothyroidism delayed eruption of temporary teeth:

- for 1-2 years
- for 4-5 years
- for 6-7 years
- for 3-5 years
- for 3-4 years

19. For congenital hypothyroidism is determined by the delay of the permanent teeth' roots formation:

- for 2-3 years
- for 4-5 years
- for 6-7 years
- for 1-2 years
- for 3-4 years

20. Most common lesion of hard tissues in the early hypofunction of the parathyroid glands is:

- enamel hypoplasia
- caries
- wedge-shaped defect
- hyperplasia of enamel
- no enamel

21. Increase the size of the lower jaw branches and deformation of occlusion occurs when:

- acromegaly
- gigantism
- agranulocytosis
- hyperthyroidism
- diabetes

22. Rachitic lower jaw has the form:

- trapezoid
- triangle
- semi-circle
- semi-ellipse
- parabola

23. Specific prevention of rickets in healthy children may begin:

- from the 2nd month of life
- the 1st week of life
- from the 1st month of life
- the 2nd week of life
- the 1st year of life

24. Specific prevention of rickets to preterm infants can begin:

- the 2nd week of life
- the 1st week of life
- with 2-month of life
- from the 1st month of life
- the 5th week of life

25. Disease by Itsenko-Kushinga in the jaw bones causes:

- osteoporosis
- the majority of them
- desquamation
- osteonecrosis
- osteomyelitis

26. Hypoparathyroidism in children often causes:

- tetany and spasmodophilia
- ataxia and hemophilia
- spasmodalgia and hemostasis
- dyskinesia and mononucleosis
- atony and myxedema

27. Lack of steroid hormone of the adrenal cortex cortisone causes the development of the jaw bones:

- osteoporosis
- osteonecrosis
- osteomalacia
- osteosarcoma
- osteomyelitis

28. Early onset of diabetes in the oral cavity appears:

- dryness, burning of the mucous membranes
- hypersensitivity of mucous membranes, increased salivation
- multiple caries, necrosis of the hyperplastic of the tongue papillae
- recession of the gums and multiple cankers
- disease of periodontal tissues and early loss of milk teeth

29. Growth hormone is:

- secreted by the anterior lobe of the pituitary gland, controls the growth of the skeleton
- allocated the middle lobe of the pituitary gland affects the eruption of teeth
- allocated posterior lobes of the pituitary gland, affects the order of the teething
- secreted by the hypothalamus, influences the degree of mineralization of the teeth
- secreted by the adrenal glands affects the proliferation of osteoblasts

30. Under the influence of an excessive amount of estrogen (female sex hormone) the child is:

- premature cessation of bone growth and delayed of teeth eruption
- accelerated development of the skeleton and dental system
- reducing the amount of calcium and phosphorus in the blood
- osteoporosis and delay of eruption of temporary teeth
- development of periodontal tissues and early loss of milk teeth

31. Lack of the vasopressin hormone secretion (diabetes insipidus) leads to:

- dryness in the mouth and constant feeling of thirst
- multiple tooth decay, necrosis of the tongue hyperplastic papillae

hypersensitivity of mucous membranes, excessive salivation
diseases of periodontal tissues, early loss of milk teeth
incompetents of dental age to chronological

32. Hypoparathyroidism (lack of parathyroid hormone) in the mouth causes:
paresthesia of the mucous membranes and odontalgia
violations of the microhardness of dentin and enamel
periodontal diseases, early loss of teeth
accelerated development of the skeleton and dental system
termination of bone growth and delayed eruption of teeth

33. With gigantism permanent teeth are:
not amended
increasing
delaying
lengthening
shortening

34. Cushing's disease of pituitary origin results in the development:
obesity and osteoporosis
alopecia and brittle nails
cachexia and osteonecrosis of bones
hypercementosis of roots and rudiments of teeth
osteomalacia and tetany

35. When the adrenal cortex and the thyroid gland functioning beginning?
at the 8-12 week of fetal development
at the 18-22 week fetal development
at the 5-7 weeks of intrauterine development
by the end of the 5th month of fetal development
at the 6th month of fetal development

Literature

Main:

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