BUKHARA STATE MEDICAL INSTITUTE NAMED AFTER ABU ALI IBN SINA

DEPARTMENT OF "PROPEDEUTICS OF CHILDHOOD DISEASES"

Registered in the
Educational section
№_____
_____2021 y

"Approve"
Vice-rector for Educational Affairs,
PhD associate Professor
G. J. Jarilkasinova _____
_____2021 y

WORK PROGRAM ON THE SUBJECT OF "PROPEDEUTICS OF CHILDHOOD DISEASES" FOR STUDENTS OF II COURSES OF BACHELOR OF MEDICINE, (*MBBS*) PROGRAM

Area of expertise: 500000 - Health and social security
Area of education: 510000 – Healthcare
Field of education: 5510200 – Pediatrics

Faculty Of Pediatrics

Semester - 3-4

Labor intensity in hours – 150 hours

Including:

Lectures 18 hours

Clinical practice – 44 hours

Practical classes - 28hours

Independen work- 60 hours

Bukhara – 2021

Compiler:

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Reviewers:

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The work program is based on the curriculum and curriculum in the direction of Pediatrics -5510200, discussed and approved at the meeting of the Department of Pediatrics

Protocol no. _____from "____"_____2021 y.

Head of the Department: , PhD associate Professor Sh. T. Muxamedova____

Extract from the minutes of the meeting of the scientific Council of the faculty "__"___ 2021y

Dean, PhD associate Professor. Achilova D.N_____

The work program is based on the curriculum and curriculum in the direction of Pediatrics -5510200, discussed and approved by the scientific and methodological Council of BSMI

Protocol no. _____from "____"_____2021 y.

Methodist of the Institute: Odilova R. H. _____

WORK PROGRAM ON THE SUBJECT OF "PROPEDEUTICS OF CHILDHOOD DISEASES" FOR STUDENTS OF II COURSES OF BACHELOR OF MEDICINE, (*MBBS*) PROGRAM

The subject includes systematic instructions in growth and development, nutritional needs of a child, immunization schedules and management of common diseases of infancy and childhood, scope of Social Pediatrics and counselling.

OBJECTIVES

The broad goals of the teaching of undergraduate students in Pediatrics are to acquire knowledge and appropriate skills for optimally dealing with major health problems of children and to ensure their optimal growth and development.

Knowledge

At the end of the course, the student shall be able to:

(a) Describe the normal growth and development during fetal life, neonatal period, childhood and
adolescence and outline deviations thereof;

(b) Describe the common pediatrics disorder and emergencies in terms of epidemiology, etiopathogenesis, clinical manifestations, diagnosis, rational therapy and rehabilitation;

(c) State age related requirements of calories, nutrients, fluids, drugs etc. in health and disease;

(d) Describe preventive strategies for common infectious disorders, malnutrition, genetic and metabolic disorders, poisonings, accidents and child abuse;

(e) Outline national programmes relating to child health including immunization programmes;

Skills

At the end of the course, the student shall be able to:

(a) Take a detailed pediatrics history, conduct an appropriate physical examination of children including neonates, make clinical diagnosis, conduct common bedside investigative procedures, interpret common laboratory investigations and plan and institute therapy;

(b) Take anthropometric measurements, resuscitate newborn infants with bag and mask at birth, prepare oral rehydration solution, perform tuberculin test, administer vaccines available under current national programmes, start an intravenous line and provide naso-gastric feeding, observe venesection and intra-osseous infusion if possible.

(c) Conduct diagnostic procedures such as lumbar puncture, bone marrow aspiration, pleural tap and ascitic tap; observe liver and kidney biopsy.

(d) Distinguish between normal newborn babies and those requiring special care and institute early care to all new born babies including care of pre-term and low birth weight babies, provide correct
guidance and counselling in breast-feeding.

(e) Provide ambulatory care to all sick children, identify indications for specialized/inpatient care and ensure timely referral of those who require hospitalization.

Integration

The training in pediatrics should be done in an integrated manner with other disciplines, such as Anatomy, Physiology, Forensic Medicine, Community Medicine, Obstetrics and Physical Medicine, curative and rehabilitative services for care of children both in the community and at hospital as part of a team.

The task of training is the formation of knowledge on:

* Communication with healthy and sick children and their parents;

* Definition of the essence (concept) of the studied diseases by their etiology, pathogenesis, classification, clinical manifestations, complications, prognosis, principles of treatment;

* To plan the examination of patients, medical tactics and treatment.

* Principles of differential diagnosis and final diagnosis;

* Rehabilitation and dispensary observation of sick children.

Requirements for knowledge and practical skills in the course of pediatrics.

The student needs to know:

* Standards of physical and psychomotor development of children of different age groups;

* Etiology, pathogenesis, clinical and differential diagnosis of the most common diseases of childhood;

* Principles of treatment of childhood diseases;

* Anatomical and physiological features of organs and systems in children;

* Principles of feeding children in the first year of life;

* Principles of nutrition of children over 1 year.

The student must be able:

* Collect anamnesis of sick children and their parents;

• Assess the health status of children;

* Make a plan for clinical, laboratory and instrumental examination;

• To substantiate the clinical diagnosis;

* Make a plan of pharmacotherapy of diseases; develop a plan of rehabilitation measures;

• Conduct clinical supervision of the children;

* Calculate nutrition for healthy and sick children;

* Make out the medical history of children in the hospital.

The student must master the following practical skills;

* Somatometric assessment of the physical condition of the child;

* Assessment of the neuropsychic state of a healthy child;

* Collection of medical history;

* Clinical examination of patients by systems;

* Identification of the main clinical, laboratory and instrumental criteria in the studied diseases;

* Preparation of diet for children;

Mandatory minimum requirements for the number of assignments by type of practical classroom training.

I. the Collecting of anamnesis in children and their parents;

II. Examination of the patients;

III. Preparation of diet.

IV. Anthropometric study of children;

V. Interpretation of results of laboratory researches:

1. General analysis of blood, urine, feces;

2. Biochemical parameters of blood;

3. Bacteriological crops of blood, urine, feces, pharynx;

4. Rheumatology test;

VI. Interpretation of the results of instrumental research methods:

5.Radiographs;

6.ECG;

7. Ultrasound examination of kidneys, liver, gallbladder;

8. Endoscopic methods of research;

VII. Calculation of doses of drugs according to the nosological diagnosis and age of sick children.

VIII. A prescription.

IX. Solution of situational problems.

The number of control measures to assess the knowledge of students.

Students ' knowledge is assessed by the current intermediate and final control.

Application of computer and information technologies

To improve the educational process and improve the level of mastering the discipline should be used:

•Training video;

* Computer training programs;

* Training and testing programs;

* Business games and situational challenges;

• Use of e-mail and INTERNET.

MONITORING

In the rating system, the assessment of the quality of students ' knowledge in the discipline is carry out by the following types of control:

Current

Intermediate

Total

Current control is a systematic check of student's knowledge during each practical lesson. In the classroom, the most common form of knowledge assessment is the oral control of a piece of educational material, in addition to small written tasks (answers to questions of the ticket) and the use of a pedagogical test with a small number of test items can be recommended for

certain topics. Each current task is estimated in points, according to the regulations on the rating system of control on the developed criteria. Assessment means the percentage of learning a piece of educational material. At the end of the course all the points of the current control are summed up.

Intermediate control-is designed to check the assimilation of students a certain amount of discipline, including several sections of practical training. Held 1 time per semester after the completion of the main sections and lectures of the discipline. Total for passage of the disciplines planned for the intermediate control 2-fold. Intermediate control is carried out orally, in writing. About carrying out intermediate control students are warned in advance. Interim control is assessed in points according to the regulations on the rating system of control according to the developed criteria. At the end of the course of discipline summed up the points of the current and intermediate control, on the basis of which **t**he question of admission to the final control of the student.

The final control is carried out in the form of oral, written or test control, in the form approved by the training Department of the Institute according to the General schedule. Possible test control in the computer center.Evaluation of the final control is carried out with the issuance of points in the sheet and the rating book of the student.

Independent work of students (IWS) – reporting form - reports on practical training. Theme defense includes the IWS issues in the intermediate and final controls.

The form of the account – record in the training log.

Assessment of the IWS-an additional point in the practical lesson.

Estimation criteria for all controls

86.0-100% - excellent;

71,0-85,0-good

56,0-70,0-satisfactory

Less than 55.0 points-unsatisfactory.

Interactive methods

The "Rotation» method

The method is based on the distribution of a group into several subgroups. Each subgroup is given a separate task. Within 30 minutes, the group analyzes the 3 tasks, the last 15 minutes the whole group together parses the job. To do this, the audience hang 3 tasks in different boards. Each small group (consists of 2 – 3 students) for 10 minutes writes their answers, then they change the job and write their answers. Each subgroup has its own color marker, which they write their answers. The answers must not be repeated. After the end of the disassemble answers with the entire group. The group with a large number of correct answers is considered the winner

“Round table” method

The task is given on 1 sheet of paper. Each student writes his own version of the answer. After recording each answer, discussed by the whole group, wrong answers are crossed out. This method can be carried out both orally and in writing. This method reveals the readiness of students to the topic and at the end of the assessed knowledge of students

“The decision of the clinical situational tasks” method

The group is divided into several small groups. Each small group is given a clinical task. Within 15 minutes students solve problems. After completing the task is discussed with the whole group together. After analysis of each situation, students ' knowledge is evaluated. Advantages of the method: students achieve a certain goal, prove that they can implement into practice.

"Academic debate» method

The group is divided into 2 teams. each group is given a sheet with the task. In each group roles are distributed: the doctor, the patient. In each group, 1 or 2 students analyze the doctor's advice – positive (lawyers) and negative (prosecutors). After the patient's consultation, the results are evaluated by the" Lawyer "and"Prosecutor". This method requires students to have deep knowledge. In the end, the teacher will say his last word. Thus, the teacher learns the readiness of students for this lesson. The method is based on the assessment of not only students 'knowledge, but also students' readiness for clinical situations.

“Pen on the table” method

In this method, a given job group (for example, explain the mechanism of physiological jaundice in newborns). The student writes a response and puts the pen down on the table and passes the paper to the neighbor. The following, too, writes his answer and passes it to its neighbor. If the student does not know the answer, he passes the paper to the next one, but holds the pen in his hands. Students are not allowed to write one answer 2 times. After all the answers are written, teacher will read and explain all answers .

Positive aspects of this method:

-the teacher sees who is ready for classes;

-untrained student during oral analysis of the lesson adds and strengthens their knowledge;

-this method is time-efficient;

-students check their answers 2 times, orally and in writing.

«Tour» method

Students should be placed in a circle. The question is answered in turn. Everyone is given the floor. Everyone has the right to express his or her opinion

on a given question. The student has the right to pass his turn to the next. Sometimes around the circle embarks on what the subject. The recipient of this item begins to respond. In this method, all are equal. Everyone should see each other.

"Aquarium" method

This method is based on the game "What, where, when". 3 people are selected. They are in the role of "fish in aquarium". The rest in the role of observers. The question is given. If within 1 minute "fish" will not be able to answer, their places will be taken by others.

"Brainstorming» method

Basic rules of the method: Do not express any comments or criticisms, get more ideas, develope and make the combination of different ideas, then express a brief conclusion. Divide the group by the idea of producing and the idea of processing. This method can be used to introduce a new topic, gives the teacher to find out the readiness of the group for the lesson in a short time. The method allows you to optimally solve any situation, to teach opponents to make the right decision. This method is a good preliminary preparation for explaining a new topic.

THE ACADEMIC LOAD FOR STUDENTS OF IV COURSES OF BACHELOR OF MEDICINE, BACHELOR (*MBBS*) PROGRAM ON THE SUBJECT OF "PROPEDEUTICS OF CHILDHOOD DISEASES"

№	**Total hours**	**Lectures**	**Clinical practice**	**Practical classes**	**Independent work**
2 cource	150	18	46	162	60

METHODICAL RECOMMENDATIONS FOR STUDENTS TO PRACTICAL LESSONS IN THE COURSE " PROPEDEUTICS OF CHILDHOOD DISEASES"

Topic: 1. Introduction to Pediatrics. Childhood periods.

Course: II

Specialty: 222 Medicine .

Number of education hours: 2 hours .

Training location: classroom in the children's department

I. Relevance of the topic. One of the characteristic features of the infant organism is the continuous growth, development, improvement of the structure and function of organs and systems. In the process of individual development, the child's body goes through certain stages of development and formation of individual organs and systems of the body. Some stages of the child's development are characterized by different growth rates, maturity and features of the functioning of organs and systems, the specific interaction of the organism with the external environment. Due to this, each period of life has its own specific features. Knowledge of these features allows you to evaluate the harmony of the child's development, to diagnose and properly treat various pathologies of childhood, to carry out specific measures of prevention and rehabilitation.

II. Learning objectives of the lesson:

- Knowing classification periods of childhood, be able to describe the features of each period.
- Know the features and methods of history taking in children of different ages.
- Know the criteria for assessing the general condition of the sick children.
- To be able to collect anamnesis of disease and life of the child and his family.
- To be able to assess the overall condition of the child.

III. The objectives of personality development:

- The student must learn to follow the principles of medical ethics and deontology at the bedside;
- Have the ability to establish psychological contact with the patient and his family;
- To acquire a sense of responsibility for the quality of professional knowledge and professional correct action.

V. The content of the topic

The periods of children's age

A. Intrauterine period (duration 270-280 days):

a) the phase of embryonic development (up to 2 months);
b) the phase of placental development (from the 3rd month before birth).

B. Extrauterineperiod or postnatal (from birth to 17–18 years old):

a) the period of the newborn (from 0 to 3-4 weeks);
b) the breastfeeding period of (from 1 month to 1 year);
c) the period of milk teeth (from 1 to 7 years):
   - pre-preschool period (from 1 to 3 years),
   - pre-school period (from 4 to 6-7 years);
d) the primary school period (the period of adolescence) (from 6-7 to 12 years);
e) theelder school period (puberty period - pubertal) (from 13 to 15-16,17-18 years).

There are the following **critical periods:**

1. Newborn - a period of emergency adaptation.
2. Breastfeeding period- increased growth and development of functions.
3. 3 years - the formation of HNA (higher nervous activity).
4. 6-7 years - maturing mechanisms of school maturity.
5. Adolescence - endocrine rearrangement of the body.

Classification of teratogenic factors:

1. Exogenous:

- infectious (bacterial, viral);
- toxic (salts of heavy metals, household poisons, paints, etc.);
- nutritionally deficient (lack or deficiency in the mother's diet of certain vitamins (folic acid), minerals (Zn, Cu), or insufficient nutrients);
- combined.

2. Endogenous (genetic).

3. The combination of exogenous and endogenousfactors.

Algorithm of practical work of student during examination of patient

№	Task	Instructions to the students	Notes
1.	To collect anamnesis in a sick child.	Algorithm of collection of anamnesis	It is necessary to expose the factors of risk of development of disease
	Complaints	- basic complaints; specification of complaints: localization, time of appearance, reason, what facilitation comes from, amount, quality, concomitant phenomena; general complaints; complaints on the systems;	
	Anamnesis of disease	- beginning of disease: acute, subacute or gradual; date and time; the first and next symptoms; features of development and current of the disease; time and sequence of appearance of separate symptoms, complications, date of address to the doctor; what treatment was conducted, what from the applied medications had appeared effective, which did not influence on the current of the disease or had undesirable action;	
	Anamnesis of life	- obstetric anamnesis; amount of pregnancies in mother, their current, state of health of other children in	

2.	Food anamnesis Allergic anamnesis Epidemiological anamnesis Genetic anamnesis Make a conclusion about the general condition of child	family, health of mother; are features of current of this pregnancy: early and late toxicose, anemia of pregnant, threat of breaking, diseases of mother during pregnancy; terms of taking of pregnant on an account in woman's consultation; intranatal traumas, estimation of newborn on Apgar's score, condition of child after birth: time of beginning of breast-feeding, immunizations, when was discharge from maternity home, subsequent of development of in all age periods, transmitting diseases, children's infectious; basic stages of physical and psychical development; social condition; - characteristic of the first applying to the breast: activity of suction, presence of colostrum; duration of establishment of lactation; feed of child after discharge from a maternity hospital; time of introduction of correcting additions, weaning; mixed or artificial feeding; formulas, observance of their application rules, -allergic diseases in child, his parents, close relatives; presence of unusual reactions on the food, plants, smells, insects, animals and so on. - presence of contact with the infectious patients for the last 3 weeks, epidemiological surroundings in child's establishment which is visited by a child. - study of genealogy at least to the	

		third generation; are cases of death and its reason in close relatives; diseases in family; genealogical tree.	

Assessment of the general condition of the patient is carried out according to the criteria:

- position in a bed (active, passive, forced)
- consciousness (clear, sombre, sopor, stupor, coma)
- reaction to the environment
- data of objective examination of all organs and systems of the child's body
- data of additional methods of examination

The general condition can be:

- *Satisfactory*
- *Moderate*
- *Heavy*
- *Very heavy*

VI . Plan and organizational structure of the class

N	Elements of practical training	Time (minutes)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10
3.	Demonstration of technique of collection anamnesis and clinical examination in children by the teacher.	20
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age sick children.	25
5.	Filling down the protocols of examination of the sick child.	10
6.	Final control of knowledge, solving of clinical cases.	10
7.	The tasks for independent preparation of students for the next class.	2
TOTAL		80

VII . The materials of methodical provision of classes

VII .1. Materials for self-control for the preparatory stage of the class:

Test tasks (examples):

1. What is the normal duration of the pre-natal stage of the baby's development?
   A. 240-250 days from fertilization
   B. 250-260 days from fertilization
   C. 260-270 days from fertilization
   D. 270-280 days from fertilization
   E. 280-290 days from fertilization
2. What is the normal duration of embryonic development phases of the child?
   A. up to 2 weeks from fertilization
   B. up to 1 month from fertilization
   C. up to 1.5 months from fertilization
   D. 2-3 months from fertilization
   E. up to 3-4 months from fertilization
3. What periods of childhood combine into one - perinatal?
   A. germinal, embryonic, fetal
   B. embryonic, non-fetal, early fetal
   C. non-fetal, early and late fetal
   D. early and late fetal, intranatal
   E. late fetal, intranatal, early neonatal
4. What is the normal duration of the placental development phase?
   A. 10-40 weeks
   B. 8-38 weeks
   C. 12-42 weeks
   D. 13-40 weeks
   E. 15-35 weeks
5. What pathologies are characterized by embryopathie?
   A. dysplasia
   B. hypoplasia
   C. flaws
   D. sclerosing
   E. inflammation

6. A newborn baby was discharged from the hospital 3 days ago. Who has a history of a child's life and illness?

A. at parents
B. from relatives or a child caregiver
C. from the medical staff of the pediatric clinic
D. studying the documents of the newborn
E. all of the above

7. The first 3-4 months of the baby showed resistance to certain infections (measles, diphtheria, chicken pox). Why is this happening?

A. due to active cellular immunity
B. due to active humoral immunity
C. due to passive humoral immunity
D. due to passive cellular immunity
E. at the expense of all of the above

8. Police brought a child without parents and documents to the hospital. What signs the doctor should most accurately assess the child's age?

A. by body weight
B. height
C. by the number of teeth
D. by number of words in the dictionary
E. motor skills

9. For the first time, a pediatrician collects a history of a healthy newborn baby. Which type of anamnesis should not be collected?

A. history of life
B. medical history
C. food history
D. genetic history
E. epidemiological history

10. The sequence of history collection:

A. complaints, Anamnesis of life, Anamnesis of disease
B. Anamnesis of life, Anamnesis of disease, complaints
C. complaints, Anamnesis of disease, Anamnesis of life
D. Anamnesis of disease, complaints, Anamnesis of life
E. Anamnesis of life, complaints, Anamnesis of disease

Answers:

1	D	3	E	5	C	7	C	9	B
2	D	4	D	6	E	8	C	10	C

VII .2. Materials for methodological support for the main stage of class:

1. List of practical tasks:

–Master the skills of collecting anamnesis of a child's illness and life;

–Master the technique of assessing the general condition of the child.

2. Professional algorithm for mastering skills.

№	Task	Instructions	Notes
1.	To master the technique of collecting anamnesis	Perform the following sequences: 1. Collection of medical history. 2. History of life.	To pay attention to hereditary and allergic history, factors that contributed to the occurrence of the disease.
2.	To master the method of assessment of the general condition of the child	Assess the position of the baby's bed, his / her consciousness, and the response to the environment	The child should be examined taking into account his / her age characteristics

VII .3. Materials of control for the final stage of the class:

Situational tasks (examples) :

Task 1 . Child 5 years. The mother complains of frequent wet cough, disturbed during the day, frequent breathing, poor appetite. Medical history: Acute, 3 days ago. Have disease's links with an outside walk. He treated the baby at home: put mustards on his chest, ate a decoction of herb mother-in- law, but the child's condition worsened, coughing increased, frequent breathing appeared. The mother turned to the pediatrician. 3 of the anamnesis of life it is known that the infant from one month of age is transferred to breastfeeding (first in a dilution of 1: 1, then 2: 1, with 2 months - whole milk); every 2-3 months has ill with colds, suffered measles, scarlet fever, chicken pox, enterocolitis.

1. Determine the infant's age.
2. Pathology of which organs do you suspect?
3. Highlight the factors that have had an impact on your child's health.

Task 2. In a child 2 years of age Down disease, congenital heart disease. The parents are healthy, the mother is 39 years old, the father is 43.

Pregnancy is the first, with the threat of interruption, toxicose I and II half. The baby was born by caesarean section.

1. Define the period of childhood.
2. Identify factors that have had an impact on your child's health.
3. During which period of prenatal life did the heart defect take place?
4. Adverse factors of what nature most likely led to the formation of heart defects?

Task 3. During a primary patronage for a 7-day-old child, a district pediatrician determined the presence of a “wolf-jaw”. From the anamnesis it is known that the mother worked in a harmful production, suffered an acute viral infection a week before delivery.

1. Define the period of childhood.
2. Identify the factors that influenced the formation of the named defect.
3. In what period of prenatal life did the birth defects of jaw development occur?

Task 4. A girl of 14 years complains of periodic heart pain, mainly during excitement, tendency to fainting, vegetative disorders. During clinical and instrumental examination, no signs of cardiovascular damage were detected. From the anamnesis it is established that these complaints have appeared in the last few months. During the summer, the child's height increased dramatically.

1. Define the period of childhood. 2. What are the functional disorders of the cardiovascular system of this nature? 3. What contributed to the manifestation of child complaints?

Task 5. A child of 7 years has cerebral paralysis and has major motor-static disorders. In the perinatal period, there was an intracranial birth trauma, which resulted in treatment in the neurological department.

1. Define the period of childhood. 2. In what period did the pathology that the child suffered develop? 3. What is caused by the lag in psychomotor development of the child

Answers:

Task 1.

1. Period of milk teeth (preschool). 2. Pathology of respiratory organs. 3. Outside cold-walk from a month old switched to feeding cow's

milk, are often ill colds diseases suffered measles, scarlet fever, chicken pox, enterocolitis.

Task 2.

1. Preschool. 2. Mother's age, the formation of chromosomal disease, pathological course of pregnancy and childbirth. 3. In the embryonic period. 4. Factors of endogenous, genetic nature.

Task 3

1. Neonatal period. 2. Harmful working conditions of mother. 3. Pre-natal stage, stage of embryonic development

Task 4.

1. Senior school age. 2. "Youth's heart". 3. Pubertal “growth jump”.

Task 5.

1. Junior school age. 2. Intranatal period. 3. The main disease - CNS lesions of traumatic nature.

VII .4. Materials of methodical support of students' self-preparation:

Orienteering card for independent work of students with educational literature

Educational tasks	Instructions for the task
To study the classification of periods of childhood;	List and specify their age range
To study the stages of prenatal development	- Specify t and describe each. - Know the "critical" periods of prenatal development; - Name the teratogenic factors that affect pregnancy;
To study periods of the pre-natal stage of development	To know the basic physiological features: –neonatal period, –period of infancy, –period of milk teeth, –junior and senior school age.
To study the sequence of history of disease and life	Consistently anamnesis of illness and life in children and their parents
To study the criteria for assessing the general condition of sick children	Assess the general condition of the sick child

VIII . Literature

Basic:

Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012.

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev – Vinnytsia: Nova Knyha, 2018

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013.

Nelson textbook of pediatrics.—18th ed./ edited by Robert M. Kliegman. Part II. Growth, development and behavior // www.mdconsult.com

Topic: 2. Monitoring the physical development of healthy children. WHO recommendations. Features of the clinical examination of the child. Lagging in physical development

Course: II

Specialty: Medicine .

Number of education hours: 2 hours .

Training location: classroom in the children's department

I. Relevance of the topic:

Neonatal period -is the most important and critical period of life. In the adaptation of the child to conditions extrauterine life involves all major functional systems. The transition process of restructuring their operations is the essence of the neonatal period. Knowledge of these features allows the doctor to correctly interpret the processes that occur in the neonatal period. One way to reduce child mortality is to prevent preterm birth and improve the care of preterm infants. This requires coordinated work of doctors of various specialties: therapists, obstetricians, gynecologists, pediatricians.

II. Learning objectives of the lesson:

- Know the term "newborn baby", "full-term newborns," "preterm infants."
- Know the signs of maturity newborns.
- Know the signs of classification and prematurity.
- Know the basic causes of transient states.
- Know the methods of inspection of the newborn and features.
- Know the rules of care for newborns.
- To be able to assess the condition of a newborn baby.
- To be able to assess the maturity of a newborn baby.
- To be able to diagnose transient states neonatal period.
- Be able to conduct primary toilet newborn baby.

III. The objectives of personality development:

- The student must learn to follow the principles of medical ethics and deontology at the bedside;
- Master the ability to establish psychological contact with the patient and his family;
- To acquire a sense of responsibility for the quality of professional knowledge and professional correct action.

V. The content of the topic

The concept of "newborn baby", maturity of the newborn and prematurity.

The neonatal period is the period of adaptation to the new conditions of life, which begins with the cutting of the umbilical cord and lasts 28 days.
Depending on the prenatal age, newborns are divided into:

- mature newborn;
- premature;
- postmature.

The child's condition after birth is evaluated by an obstetrician on the Apgar Score.

Clinical assessment of the condition of the newborn on the Apgar Scoreat 1, 5 and 30 minutes after birth

Skin color	**Cyanotic or pale**	**Body pink, extremities blue**	**Pink**

Attributes / points	0	1	2
Heart rate	Absent	Less then 100	More than 100
Respiration	Absent	Slow, irregular	More than 20
Muscle tone	Atony	Hypotonia	Normal
Reflexes	Absent	Hyporeflexia observed	well expressed

Classification of prematurity by gestational age and body weight at birth

Degree of prematurity	I	II	III	IV
Gestational age (weeks)	37-35	34-32	31-29	Less than 29
Body weight (g)	2500-2001	2000-1501	1500-1000	Less than 1000

External manifestations of prematurity include:

- skin is wrinkled, dark red;
- almost complete absence of subcutaneous tissue;
- soft ears;
- a lot of fluffy hair, especially on the face, limbs, back;
- low navel location;
- hypoplasia of the genital organs - in girls, the labia minor are not covered by the labia major, in boys - the testicles are not descended into the scrotum;
- be left cranial sutures, open small and lateral fontanelles.

The maturity of the newborn is the readiness of the organs and systems of the newborn to a new extrauterine existence for him. A newborn is considered functionally mature if its functional systems satisfactorily support the vital activity of the organism in the extrauterine environment.

Functional signs of maturity:

- sufficient spontaneous motor activity;
- physiological hypertonus of the flexor;
- pronounced innate unconditioned reflexes;
- active sucking;
- shout;
- the ability to maintain a constant body temperature under certain environmental conditions;

- adequate functioning of all organs and systems.

Morphological signs of immaturity:

- skin is wrinkled, dark red;
- almost complete absence of subcutaneous tissue;
- soft ears;
- a lot of fluffy hair, especially on the face, limbs, back;
- low navel location;
- labia minor are not covered by large (in girls) and testicles not descended into the scrotum (in boys);
- cleft cranial sutures;
- open small and lateral fontanelles;
- nail plate does not cover the nail bed.

Transitional conditions of newborns (physiological) are the states of adaptation (adaptation) of the newborn to the external environment.

The main transitional conditions include:

- simple erythema;
- toxic erythema;
- physiological jaundice;
- transitional violations of thermal balance;
- transitional loss of initial body mass;
- transitional features of function of kidneys;
- hormonal crisis;
- physiological dyspepsia;
- transitional hyperventilation and features of the early neonatal respiratory act;
- features of neonatal hemodynamics;
- transitional features of metabolism (catabolic orientation of metabolism, metabolic acidosis, hypoglycemia, activated lipolysis, hypomagnesemia, hypocalcemia);
- transitional features of hemostasis and hematopoiesis.

Care for a healthy newborn child is carried out according to the order of the Ministry of Health of Ukraine No. 152 of April 4, 2005).

Patronage of newborns.

In our country, during the first days (in exceptional situations - within the first 3 days after discharge, the district pediatrician and nurse are obliged to visit the mother with the child from the maternity hospital, which is the primary patronage of the newborn. After 7-10 days the doctor examines the child the second time, the nurse is on a weekly basis. If a newborn from a "risk group",

the pediatrician is obliged to visit him within a month at least 4 times, the nurse is at least 8 times.

The main issues that need to be clarified during patronage, in addition to the condition of the newborn, include:

a) living conditions of a child's room (air temperature - 20 - 22ºC, wet room cleaning - twice a day, airing - 4 times a day, heat from a battery, direct sunlight, drafts) should not get into a children's bed placed in a lighted place;feeding rules;

b) umbilical wound treatment;

c) monitoring the body weight of the newborn;

d) issues of general child care (rules for dressing, bathing, separate storage of the child’s laundry, his washing, ironing on both sides);

e) walks in the fresh air (at a temperature not lower than - 5ºC, the first time the day after discharge from the maternity hospital, the duration starts from 15–20 minutes twice a day to 5–10 hours a day);

f) preventing the child from contacting the sick.

VI. plan and organizational structure classes

number	**Elements of practical classes**	**Time (minutes)**
1.	Announcement of the topic of the class with an emphasis on its relevance. Checking the attendees.	3 min.
2.	Input test knowledge control.	10 min.
3.	Demonstration by a teacher of a newborn baby examination; discussion of the results of the survey.	20 min.
4.	Independent work of students: collecting anamnesis in mothers of newborns, identifying signs of prematurity, postmaturity, presence of transitory conditions, conducting anthropometry in children.	25 min.
5.	Filling down the protocols of examination of the sick child.	10 min.
6.	The final control of knowledge: the solution of clinical situational tasks.	10 min.
7.	The tasks for independent preparation of students for the next class.	2 min.
	TOTAL	**80 min.**

VII. The materials of methodical provision of classes

VII.1. Materials for self-control for the preparatory stage of the class:

Test tasks (examples):

1. The oral automatism reflexes include:
   A. Moro reflex
   B. Babkin reflex (hand-mouth)
   C. reflex Kernig
   D. Orbiculopalpebral
   E. Babinsky's reflex
2. The anatomic attributes of a prematurity:
   A. long extremities
   B. short trunk
   C. badly expressing of lanugo
   D. long neck
   E. low locating of a umbilical ring
3. Determine the gestational age of the child, whose vellus hair (lanugo) located in the area of the shoulder girdle on the blades:
   A. 28 weeks
   B. 30 weeks
   C. 34 weeks
   D. 36 weeks
   E. 38-40 weeks
4. Transitional conditions of the neonatal period include:
   A. hypotension
   B. regurgitation
   C. hypothermia
   D. hyporeflexia
   E. hypertension
5. The terms of the maximal expressiveness of transitional conditions of newborn:
   A. the first hours after birth
   B. first week of life
   C. second week of life

D. the first month of life

E. the first day of life

6. What does not belong to transitive conditions of the neonatal period?

A. changes of skin
B. changes of thermal balance
C. sexual crisis
D. hyperbilirubinemia
E. hyperlipidemia

7. What does not belong to the assessment of the newborn Apgar?

A. color

B. hard beating

C. breath

D. physical development

E. muscle tone

8. What skin color should be in the newborn when assessing it on the Apgar score of 1 point?

A. pink
B. pale or cyanotic
C. pink with cyanotic limbs
D. cyanotic
E. pale

9. What does not belong to the primary toilet newborn?

A. sucking the contents of upper respiratory tract

B. umbilical cord ligation

C. preventionof ophtalmia

D. drying the child by sterile napkin

E. care about the umbilical wound

10. Enter dates intrapartum period:

A. 8 to 28 days

B. from birth to 28 days of life

C. with the onset of labor before birth

D. from 28 to 40 week fetal development

E. from birth to 7 days of life

Standards of answers:

1	B	3	E	5	B	7	D	9	E
2	E	4	C	6	E	8	C	10	C

VII.2. Materials for methodological support for the main stage of class:

1. The list of practical tasks:

– master the technique anthropometric measurements in newborns;

– master the methods of inspection of the newborn.

2. Professional algorithm on mastering skills.

Number	**Task**	**Directions**	**Remarks**
1.	To capture the methods of anthropometric measurements in newborns	Measure weight and body length, circumference of the head and chest newborn baby	Follow the rules of anthropometric measurements in newborns
2.	To capture the methods of inspection of newborn	Perform the next sequence: History taking life An objective examination of the newborn child: – evaluation of the general condition of the child; – assessment of skin (color development vellus hair, nail growth) – subcutaneous tissue (stage of development - the size fold); – maturity of the nervous system (severity newborn reflexes, character cry); – skeletal and muscular systems (size and	Particular attention is paid to this obstetric history (emissions, stillbirth, their causes), pregnancy, delivery, assessment of the child after birth, current adaptation period). In conducting clinical examination of the child must strictly observe the rules of examination of the newborn (adequate ambient

		development of large and small fontanel density of ears, skull bones, the degree of muscle tone); – the degree of development of genitals, – location cord rings and so on. 3. Make a conclusion about the state of a newborn baby.	temperature, daylight).

VII.3. Materials Control for the final phase of occupation:

Situational tasks (examples):

Task 1. The baby was born weighing 2400h, birth length - 50 cm., Gestational age - 39 weeks.

Which group of babies, mature or premature, does it belong to?

Task 2. A newborn baby with a gestational age of 39 weeks, with a body weight of 2600g, a body length of 48 cm, during the examination revealed sluggish sucking, drowsiness, lethargy, a low cry, reduced motor activity. Which group of children - mature or premature, immature - does the child belong to?

Task 3. A full-term newborn baby on the 3rd day of life had an excitement, a loud cry, the increases of body temperature up to 39.4^0C. What physiological condition should a neonatolog first of all think about?

Task 4.

In a full-term newborn boy on the 4th day of life, an increase in the mammary glands appeared, on the 6th day of life, palpation of them gives off droplets of milky-white liquid. The general condition is not broken.

1. Name this condition of the newborn baby.
2. In which newborns (full-term or preterm), this condition is more common.

Task 5.

A newborn baby on the 4th day of life appeared polymorphic erythematous spots, in the center of which there are whitish bubbles, localized by groups on the chest, buttocks, around the joints. The general condition is not broken.

1. What is the name of this rash in a newborn?
2. Where should there be no rash elements?
3. What could be the reason for this condition?
4. What should be done with a newborn in this state?

Standards of answers:

Task 1.

Full-term baby.

Task 2.

Term immature child.

Task 3.

Transient heat balance change - physiological hyperthermia.

Task 4.

1.Hormonal crisis - breast engorgement. 2. In term infants.

Problem 5.

1.Transitional changes of skin– toxic erythema. 2. On the palms and feet. 3. Allergic condition. 4. The usual hygienic regime of the newborn. Items do not need to be processed.

VII.4. Materials methodological support self-students:

Preliminary card for students' independent work with educational literature

Educational tasks	Directions to the task
Examine the concept of "newborn", "full-term newborns," "preterm infants."	Define the concept.
Explore donoshenosti signs, prematurity, perekoshenosti	Specify the basic anatomical, morphological and functional characteristics. Determine the degree of prematurity.
To study the signs of full-term, prematurity, endurance	Know the morphological and functional characteristics of maturity and immaturity of newborn baby
Examine the physical parameters of the newborn child;	Specify weight, height, head circumference and chest newborns.
To study the transient states of the newborn child: - leather; - respiratory system; - cardiovascular system; - gastrointestinal tract; - blood system;	Describe each state: – Know the time of appearance and disappearance of transient conditions; – Know the basic clinical

- urinary system; - transient weight loss; - transient violation of thermal balance; - sexual crisis.	manifestations of transient states.
To study the features of care for a newborn baby in the hospital and at home	To conduct: – toilet skin, umbilical residue, mucous membranes, oral cavity, nose, eyes, ears.
To study the method of examination of a newborn child	Collect perinatal history. Evaluate the general condition of a newborn baby. Determine the maturity newborn detect physiological state and transient neonatal period.

VIII. literature

VIII . Literature

Basic:

Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012.

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev – Vinnytsia: Nova Knyha, 2018

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013.

Nelson textbook of pediatrics.—18th ed./ edited by Robert M. Kliegman. Part II. Growth, development and behavior // www.mdconsult.com

Topic 3 : Physical development of children, semiotics of disorders. Protein-energy deficiency, paratrophy, obesity, gigantism, nanism. The concept of biological acceleration.

Course: II course

Specialty: Medicine

Number of education hours: 2 hours .

Training location: classroom in the children's department

I.Relevance of the topic. The physical development of a child is the most objective criterion for assessing his or her health. This is due to the fact that the indicators of physical development are closely interrelated with many factors that affect the health of children and is the result of the interaction of genetic factors and environmental factors (hygiene, nutrition, physical education, daily routine, etc.). In addition, physical development is a very sensitive indicator, which can be easily changed under the influence of various adverse factors, especially environmental conditions. Therefore, the assessment of the level of physical development of the child is an integral element of monitoring the state of his health and occupies an important place in the practice of a pediatrician.

II.Learning objectives of the lesson:

- To know peculiarities of physical development of children;
- To know the technique of anthropometric measurements;
- To be able to perform anthropometric measurements in children of different age groups;
- To be able to estimate physical development of child.

III.The objectives of personality development:

- The student must learn to adhere to the principles of medical ethics and deontology at the patient's bedside;
- To master the ability to establish psychological contact with the patient and his family;
- To master the sense of responsibility for the quality of professional knowledge and the correctness of professional actions.

V. The content of the topic

Physical development – is a dynamic process of growth (increase in length, body weight, individual parts of the body) and biological maturation of the child in a particular period.

Physical development is understood as the totality of morphological and functional features of an organism, characterizing the growth, weight, shape of a child’s body, its structural and morphological properties.

Methods for assessing the physical development of children.

Anthropometry is carried out at every medical examination of the child. To do this, the nurse carried out measurements of the length and weight of the body, the circumference of the head and chest of the child.

Evaluation is carried out by comparing the individual indicators of the child with the standard. The following methods are used:

- The method of empirical calculations,
- The method of anthropometric standards.

Assessment of physical development by empirical method

Mass of body

For definition of mass of body of a fetus with 25 for 41 weeks use the following calculations: mass of body of a fetus in 30 weeks of pregnancy = 1300 g, each next week it is necessary to add 200 g, and on each missing week substract 100 g.

By the moment of a birth the mass of a body achieves 3000 – 4000 g. Average mass of body in boys – 3200-3600 g, in girls – 3100-3400 g.

Within the first 3-4 days of life in newborns decrease of initial mass of body (so-called physiological body mass loss) is observed. The maximal decreasing of mass is marked for 3 day of life of the child and achievers 6-8 % from initial body mass

Increasing of body mass during the first year of life

During the first month of life the child gains 600 g, during the second and the third 800, during the fourth – 750 and then each next month on 50 g less, than during previous.

Within the first semester of life the average monthly increase of body mass is 800 g, and during the second semester – 400. In 4.5 months the body mass is doubled. Mass of body in 6 months is 8000 - 8200 g

Empirical formulas of calculation of body mass in first year:

а) The body mass in the first semester (till 6 months) is: $m=m_0+800n$,

m is present mass, m_0 is initial mass, n – age of the child (months);

б) The body mass in the second half-year (from 6 till 12 months) is:

$m =m_0 + (800\times6) + 400 (n - 6)$, where$m_0$ – initial mass, n – age of the child (months);

In one year the body mass achieves 10 kg, i.e. the initial body mass triples.

Increase of body mass after 1 year

On the second year of life the child gains 3 – 3.5 kg, and since the third year of life the annual increase of mass is 2 kg.

Following formula can be use up to 10-years: m=10 + 2n, where n – age of child (years).

Other method of calculation is possible: mass of 5 years old child is 19 kg, on each missing year up to 5 it is necessary to subtract 2 kg, and on each subsequent - to add 3 kg.

From 12 to 16 years the mass of body is: 5n – 20, where n is age in years.

Body Length

Increase of body length during the first year of life

The body length in newborn is 50-52 cm, and in boys on 2 cm more, than in girls. Within the first 3 months of life length increases on 3 cm monthly, in the second quarter – on 2,5 cm, in the third – on 2 cm and in the fourth quarter (10-12 months) – on 1-1,5 cm monthly. Thus, for the first year of life the length of the child increases on 25-27 cm and by the end of year it is 75-77 cm, on 50% more than initial length.

Increase of length in children after 1 year

The length doubles in 4 years (100 cm), triples (150 cm) in 11 years.

The length of the 4 year-old child is 100 cm

а) till 4 years old the length can be calculate by the formula: L = 100-8(4 - n), where n is age of the child (years);

б) after 4 years old: L = 100+6 (n - 4), where n is the age of child (years)

Head Circumference

In newborn the circumference of a head is 34-36 cm.

During the first 3 months the HC increases on 2 cm monthly, in 4-6 months – on 1 cm monthly, and during the second half-year – on 0.5 cm monthly.

The HC of the 6-month child is 43 cm. On each missing month subtract 1.5 cm. On each next month add 0.5 cm.

1 year old child has the HC 46-47 cm, 5 years old child – 50 cm.

Chest (Torax) circumference

At a birth the TC is on 2 cm less, than the HC and it is 32-34 cm. Further the TC increases more intensively, than HC and in 4 months so-called decussating present, i.e. circumferences of a head and of a chest are equal. It is possible to apply the following empirical formulas to calculate the size of a chest:

а) TC in 6 months = 45 cm. on each missing month subtract 2 cm, and each next month add 0.5 cm;

б) For children from 1 to 10 years: 63 cm – 1.5(10 - n), and for children after 10 years 63 + 3(n – 10), where n is age of the child (years).

Anthropometric indexes

Mass-length (weight-height) parameter is calculated only in newborn: (mass of body at birth (g) / length of body at birth (cm)). In norm this parameter is 60-70

Index of trophism: (present mass / ideal mass) x100 %. In norm it is 100±10 %

Body mass index (BMI)=body mass (kg)/body length(m)^2

Estimation of anthropometric parameters with the tables

Stuart Scale consists of 3, 10, 25, 50, 75, 90, 97 percentile corridors. Numbers of percentile means that parameter is lower than at 3, 10, 25, 75, 90 or 97 percent of healthy children.

- The region *of average* parameters is 25-75 percentile
- *above the average* parameters is 75-90, *below the average* is 10-25 percentiles
- *High* parameters is 90-97, *low* – 3-10 percentiles
- *Very high* parameters –higher than 97 percentile, *very low* –lower than 3 percentile.

There are following numbers of percentile corridors:

Below 3 p - №1, 3-10 p - №2, 10-25 p - №3, 25-50 p - №4, 50-75 p - №5, 75-90 p - №6, 90-97 p - №7, higher than 97 p - №8.

The region of 1, 2, 3 corridors shows slow physical development - microsome, region of 6, 7, 8 corridors is the region of accelerated physical development - macrosome, region of 4 and 5 corridors is the region of normal rate of physical development – mesosome.

If a difference between № of corridors of parameters of mass, length and torax circumference is 1 or 0, development is harmonic. If the difference is 2 and more, it is disharmonic development.

VI. The plan and organizational structure of the class

№	The elements of practical class	Time (minutes)
1.	Announcement of the topic of the class with an emphasis on its relevance. Checking the attendees.	3 min.
2.	Input test knowledge control.	10 min.
3.	Demonstration of the technique of measuring the basic parameters of the child's body (mass, height, head circumference, chest, thigh, legs, shoulder). Explaining the main criteria and methods for assessing the physical development of children of all ages.	20 min.
4.	Independent work of students: working out of practical skills of measuring the basic parameters of the body of	25 min.

	children of different ages; assessment of the physical development of the child based on the data obtained.	
5.	Filling in the reports for assessing the physical development of the child.	10 min.
6.	The final control of knowledge: the solution of clinical situational tasks.	10 min.
7.	Task for self-preparation for the next class.	2 min.
	Total	**80 min.**

VII. The materials of methodical provision of classes

VII.1. Materials for self-control for the preparatory stage of the class:

Tests

1. How much does a child grow during the first year of life?
   A. 20 cm.
   B. 15 cm.
   C. 25 cm
   D. 30 cm
   E. 35cm
2. What is the average monthly weight gain of the child in the second half of life?
   A. 400g.
   B. 500g
   C. 600g
   D. 700g
   E. 800g
3. The size of the head relative to the length of the trunk is:
   A. 10 %
   B. 15%
   C. 20%
   D. 25%
   E. 30%
4. What is the average size of the perimeter of the chest in 10 years?
   A. 48cm
   B. 53cm
   C. 60cm
   D. 50cm
   E. 63cm
5. What anthropometric index characterizes the development of the chest?
   A. Broca
   B. Tour
   C. Erisman
   D. Chulicky
   E. Ketle

6. Specify the terms of the second period of "stretching" girls?
   A. 5-8 years
   B. 11-15 years
   C. 10-12 years
   D. 13-15 years
   E. 1-4 years
7. Specify the "rounding" period”
   A. 5-8 years
   B. 11-15 years
   C. 10-12 years
   D. 13-15 years
   E. 8-10 years
8. To assess the physical development of children using methods other than:
   A sociological
   B. somatoscopy
   C. anthropometric standards
   D. physiometrics
   E. indicative calculations
9. Which of the methods of assessing the physical development of children is the most accurate?
   A. somatoscope
   B. indicative calculations
   C. anthropometric standards
   D. physiometrics
   E. social calculations
10. What is the central range of anthropometric values below the average?
   A. 75-90
   B. 10-3
   C. 25-3
   10-50
   E. 90-50

Standards of answers:

1	C	**6**	C
2	A	**7**	E
3	D	**8**	A
4	E	**9**	C
5	C	**10**	E

VII. 2.Materials for methodological support for the main stage of class:

1. List of practical tasks:

- To master the methods of anthropometric measurements of children;
- To master the methods of evaluation of physical development.

2. Professional algorithm for mastering skills and abilities.

№	Tasks	Instructions	Notes
1.	To master the methods of anthropometric measurements of children	To measure body weight, height, head circumference, chest, Shin, shoulder, hip	To know the rules and techniques for measuring the weight and height of the child, depending on age.
2.	To master the methods of evaluation of physical development	To assess the physical development of the child by: – approximate calculations; – centile standards; – standard deviation; – using graphs of physical development	To assessment of physical development should be carried out taking into account the age and sex of the child

VII.3. Materials of control for the final stage of the class:

Situational tasks

Task 1.

The child was born with a body weight of 3000 g. Now she is 7 months old.

1. What weight should a child have according to empirical calculations?
2. The length of the child's body at birth 52 cm. Which will most likely be this figure in 5 months.
3. Calculate the likely size of the head and chest circumferences in the child at 4 months, if at birth they were 36 and 34 cm, respectively.

Task 2.

In the policlinic at the reception at the pediatrician is a mother with a girl of 5 years. In assessing physical development, the doctor discovered excessive deposition of subcutaneous fat and an increase in the girl's body weight by 21%. What should be called a violation of the physical development of the child, which was discovered by the district pediatrician? What is the degree of these violations?

Task 3.

In the policlinic at the reception, the pediatrician examines a boy aged 2 months. It is known that the child was born with a body weight of 3000g and body length of 50 cm. The child is on artificial feeding from birth. Now his weight is 3700g, length is 55cm. Subcutaneous fatty tissue is underdeveloped, pathological symptoms from other organs are absent. What kind of physical development disorder occurs? What is its degree?

Task 4.

A girl of 10 months has a body weight of 12100g, body length - 72cm. It is known that at birth the weight of the body was 3200 g, length 50 cm. The baby is on artificial feeding from birth. Psychomotor development of the child corresponds to his age. Does your child have physical development disorder? Which one? What is its degree?

Task 5.

A girl of 1.5 years old has a body weight of 13800g, a body length of 88cm. A pediatrician, assessing the rate of physical development according to normograms, found that the child's length is above 2 standard deviations (SD), the weight is above 2 SD. BMI above 2 SD, the ratio of weight to length is above 2 SD.

What is the conclusion about the trophy and length of the girl?

Standards of answers:

Task 1.

1. m=3000+600+800+800+750+700+650+600=7900 (g)
2. l= 52+3x3+2x2,5=66 (cm)
3. Head circumference=36+4x1,5=42 (cm); Chest circumference=34+4x2=42 (cm).

Task 2.

Obesity syndrome.Obesity I degree.

Task 3.

Hypotrophy syndrome.Hypotrophy I degree.

Task 4.

Yes. Parathrophy syndrome.Paratrophy II degree.

Task 5.

Growth is normal, overweight.

VII.4. Materials of methodical provision of self-preparation of students:

Indicative map for independent work of students with educational literature

Educational task	**Instructions for the assignment**
To study the concept of physical development	To define the concept. To characterize the factors influencing physical development
To study the concept of acceleration of child	To define the concept. What are the main hypotheses and

development	mechanisms of acceleration? List the main clinical manifestations of acceleration in childhood.
To study the periods of "stretching" and "rounding" in childhood	To enumerate and to specify their age range, their dependence from sex, stay.
To study methods of evaluation of physical development of children	Know how to assess the physical development of the child by: – approximate calculations; – centile standards; – standard deviation; – using graphs of physical development (nomograms)
To study the rules and techniques of anthropometric measurements	To know the technique of measurement: – body weight and height of children depending on age (up to 3 years and older). – head, chest, Shin, shoulder, hip circumferences.

VIII . Literature

Basic:

Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012.

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev – Vinnytsia: Nova Knyha, 2018

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013.

Nelson textbook of pediatrics.—18th ed./ edited by Robert M. Kliegman. Part II. Growth, development and behavior // www.mdconsult.com

Topic 4: Neonatal examination (EPC) Neonatal reflexes

Course: II course
Specialty: Medicine
Number of education hours: 2 hours .
Training location: classroom in the children's department

I. Relevance of the topic. The physical development of a child is the most objective criterion for assessing his or her health. This is due to the fact that the indicators of physical development are closely interrelated with many factors that affect the health of children and is the result of the interaction of genetic factors and environmental factors (hygiene, nutrition, physical education, daily routine, etc.). In addition, physical development is a very sensitive indicator, which can be easily changed under the influence of various adverse factors, especially environmental conditions. Therefore, the assessment of the level of physical development of the child is an integral element of monitoring the state of his health and occupies an important place in the practice of a pediatrician.

II.Learning objectives of the lesson:

- To know the causes of violations of physical development of children;
- To know the semiotics of physical development disorders in children;
- To be able to identify syndromes of physical development disorders in the examined children.

III.The objectives of personality development:

- The student must learn to adhere to the principles of medical ethics and deontology at the patient's bedside;
- To master the ability to establish psychological contact with the patient and his family;
- To master the sense of responsibility for the quality of professional knowledge and the correctness of professional actions.

V. The content of the topic

Syndromes of physical development disorders

Disorders of physical development (dystrophy) - chronic nutritional disorders with metabolic disorders, in which there are various degrees of deviation of anthropometric indicators from the standard values. Deviations of

indicators from the norm can be in the direction of increase, decrease or disproportionate.

Dystrophies are:

- with a predominance of body weight over length (paratrophy, obesity);
- with proportional excess weight and body length;
- with a predominant decrease in body weight with an increased or normal length (hypotrophy);
- with proportional deficit of mass and length of the body (hypostatura).

Hypotrophy is a chronic eating disorder in which there is a decrease in mass with retarded development and impaired metabolism and functions of several organs and systems.

Causes of abnormalities in body weight in children:

- alimentary,
- constitutional,
- somatogenic,
- endocrine-cerebral, etc.

Characteristics of hypotrophy of different degrees

Degrees of ypotrophy	**Deficiency of mass of body**	**Deficiency of body length**	**Index Chulitskaya**	**Proportions of body**
I	10-20 %	Absent	10-15	Fine
II	21-30 %	2-4 cm	0-10	Violated
III	Morethan 30 %	7-10 cm	Negative	Significantly violated

Paratrophy (up to 1 year) is a chronic eating disorder in which an increase in the child's body weight is observed without delay in development.

According to the levels of weight gain, paratrophia is subdivided into:

- paratrophiaI degree - mass excess 11-20%;
- paratrophiaII degree - weight excess of 21-30%;
- paratrophiaIII degree - the excess mass is more than 31%.

Obesity (after 1 year) - excessive deposition of body fat, weight gain with impaired metabolism and the functions of several organs and systems.

According to the levels of weight gain, obesity is divided into:

- obesity I degree - an excess mass of 15-25%;
- obesity II degree - excess weight of 26-50%;
- obesity III degree - an excess mass of 51-100%;
- obesity IV degree - excess weight of more than 100%.

Violation of body length - the discrepancy between the length of the child's body and his age norms:

- growth retardation (deceleration);
- overgrowth;
- acceleration (early advancement of development).

Causes ofviolation of body length

- endocrine disorders and brain damage (dysfunction of the hypothalamus);
- hereditary diseases (achondroplasia, dysostosis, Shereshevsky-Turner and Russell-Silver syndromes);
- chronic diseases of various organs and systems of the child's body;
- nutritional and metabolic disorders;
- hereditary constitutional;
- chronic exogenous intoxication;
- malnutrition;
- social conditions.

Gigantism - excess production of growth hormone in diseases of the pituitary gland. As a rule, parallel - hypofunction of the genital glands (Klinefelter syndrome).

Deviation in head circumference: decrease (microcephaly) or increase (hydrocephalus).

The main causes of deviations in head circumference are a violation of intrauterine development of the brain, trauma and hypoxia of the brain during childbirth, injuries, and infectious diseases of a brain tumor in children after birth.

Deviation in the circumference of the chest can be in the direction of reduction and increase. The causes of these disorders are abnormalities of the chest and lungs, diseases of the respiratory system, the degree of physical training and muscle development, constitutional features, etc.

VI. The plan and organizational structure of the class

№	The elements of practical class	Time (minutes)
1.	Announcement of the topic of the class with an emphasis on its relevance. Checking the attendees.	3 min.
2.	Input test knowledge control.	10 min.
3.	Demonstration of the technique of measuring the basic parameters of the child's body (mass, height, head circumference, chest, thigh, legs, shoulder). Explaining the main criteria and methods for assessing the physical development of children of all ages.	20 min.
4.	Independent work of students: working out of practical skills of measuring the basic parameters of the body of	25 min.

	children of different ages; assessment of the physical development of the child based on the data obtained.	
5.	Filling in the reports for assessing the physical development of the child and the justification of disorders of physical development.	10 min.
6.	The final control of knowledge: the solution of clinical situational tasks.	10 min.
7.	Task for self-preparation for the next class.	2 min.
	Total	**80 min.**

VII. The materials of methodical provision of classes

VII.1. Materials for self-control for the preparatory stage of the class:

Tests

1. In case of hypotrophy of I degree, there is a deficiency of body weight (in %)
   A. 5-10
   B. 10-20
   C. 20-25
   D. 20-30
   E. more than 30
2. On which day of life is the maximum physiological loss of body weight in an infant?
   A. 1-2
   B. 3-4
   C. 5-6
   D. 7-8
   E. 9-10
3. Hypostatures for children of the first year are considered age retard in:
   A. body length
   B. body mass
   C. body length and mass
   D. body weight relative to body length
   E. chest perimeter
4. What is the level of weight gain observed in obesity II degree?
   A. 10-20 %
   B. 15-25 %
   C. 21-30 %
   D. 26-50 %
   E. 30-50 %
5. What is the level of weight gain observed in parathrophy of I degree??
   A. 21-30 %
   B. 10-20 %
   C. 15-25 %
   D. 7-15 %

E. 26-50 %

6. Excess body weight in a child with paratrophy II degree is:
   A. 1-10 %
   B. 21-30 %
   C. 11-20 %
   D. 11-30 %
   E. 15-25 %

7. What degree of hypotrophy needs to be determined with a body mass deficiency from 21 % to 30 %?
   A. II
   B. I
   C. III
   D. V
   E. IV

8. How many times does the head height increase during the childhood period?
   A. in 3
   B. in2
   C. in 5
   D. does not increase
   E. in 4

9. How many times does the surface of a child's body increase after 1 year?
   A. in 2
   B. in 4
   C. in 3
   D. in 5
   E. does not increase

10. What processes in the development of children prevail in modern times?
   A. harmonious physical development
   B. accelerated development
   C. physical retardation
   D. disharmonious development

Standards of answers:

1	B	**6**	B
2	B	**7**	A
3	C	**8**	B
4	D	**9**	C
5	B	**10**	C

VII. Materials of methodical provision of the main stage of the class:

1. List of practical tasks:

- to measure the anthropometric indicators of the child;
- to assess the figures obtained by the empirical formulas, Sigma and centile tables, nomograms.

– to make conclusion about physical development of child.

2. Professional algorithm for mastering skills and abilities.

№	Tasks	Instructions	Notes
1.	To measure the anthropometric indicators of the child	Measure body weight, height, head circumference, chest, Shin, shoulder, hip	Know the rules and techniques for measuring the weight and height of the child, depending on age.
2.	Evaluate the obtained indicators	To assess the physical development of the child by: – approximate calculations; – centile standards; – standard deviation; – using graphs of physical development	Assessment of physical development should be carried out taking into account the age and sex of the child
3.	Make a conclusion about the physical development of the child	To define the syndrome of defeat	To assess the identified changes in the physical development of the child, taking into account age characteristics.

VII.3. Materials of control for the final stage of the class:

Situation tasks

Task 1.

At consultation in a district doctor – pediatrician there is a mother with 5-years old girl. Girl has increasing of mass of body on 21% over the norm.

What kind of violation of physical development takeplace?

What is degree of this violation?

Task 2.

At the polyclinic district doctor - pediatrician conducts the examination of 2 months boy. It is known that a child was born with mass 3000 g, length 50 cm. Child receives artificial feeding. Now weight makes 3700 g, length 55 cm. Development of hypodermic fat is not enough; pathological symptoms from the side of other organs are absent.

What syndrome of violation of physical development take place?

What is degree of this violation?

Task 3.

10 months old girl has mass of body 12100 g and length of body - 72cm. It is known that initial weight was 3200g, length 50 cm. From the moment of birth she was on artificial feeding. Psychical development of child corresponds to the age.

What does violation of physical development take place?

Which, if yes?

What is degree of this violation?

Task 4.

A girl of 1.5 years old has a body weight of 13800g, a body length of 88cm. The pediatrician, having assessed the indicator of physical development according to normograms, found that the child's height is above 2 standard deviations (SD), the weight is above 2 SD. BMI is above 2 CD, the ratio of mass to length is above 2 SD.

What is the conclusion about trophism and growth of the girl?

Task5.

In the policlinic at the reception, the pediatrician examined the boy of 3 months and spent anthropometry. According to the graphs of indicators of physical development, the doctor found that the height of the child is lower - 1 standard deviation (SD), weight is lower - 2 SD, BMI is lower - 2 SD, the ratio with height below - 2 SD. What is the conclusion about the trophy of the child?

Standards of answers:

Task 1

1. Syndrome of obesity
2. Obesity of I degree

Task 2

1. Syndrome of hypotrophy
2. I degree

Task 3

1. Yes
2. Syndrome of paratrophy
3. II degree

Task 4

Growth is normal, overweight.

Task 5

Child is exhausted

VII.4. Materials of methodical provision of self-preparation of students:
Indicative map for independent work of students with educational literature

Educational task	Instructions for the assignment
To study the semiotics of physical development disorders	To know the causes and clinical symptoms of violations of body weight, growth, deviations in the circumference of the head and chest in children of different age groups.
To study the concept of physical education of children	To name and describe the means of physical education of children.

VIII. Literature

Basic:

Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012.

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev – Vinnytsia: Nova Knyha, 2018

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013.

Nelson textbook of pediatrics.—18th ed./ edited by Robert M. Kliegman. Part II. Growth, development and behavior // www.mdconsult.com

Topic: 5 Nervous mental development of children, statics, motor skills, speech

Course: II course

Specialty: Medicine
Number of training hours: 2 hours
Place of classes: classroom in the children's department

I. Relevance of the topic. Psychomotor development of the child is one of the indicators of his health. The overall level of psychomotor development reflects the state of the child's Central nervous system. The ability to assess the psychomotor development of a child is a necessary part of the work of a pediatrician. Under the influence of various factors, there is a delay in the mental development of children. Timely detection of abnormalities in the development and behavior of the child is important because it allows the early stages of the necessary correction.

II.Learning objectives of the lesson:

- To know the main criteria and indicators of psychomotor development of children of different ages.
- To know the features of psychomotor development of children of all ages.
- To be able to assess the psycho-motor development of children of different ages.
- To reveal the disorders of the psychomotor development of children.

III.The objectives of personality development:

- The student must learn to adhere to the principles of medical ethics and deontology at the patient's bedside;
- To master the ability to establish psychological contact with the patient and his family;
- To master the sense of responsibility for the quality of professional knowledge and the correctness of professional actions.

V. The content of the topic

Criteria of an assessment of psychological development are:

- movements;
- statics;
- conditioned-reflexes (first signaling system);
- speech (second signaling system);
- higher nervous activity.

Movements are purposeful manipulate activity of the child. For healthy newborn in a quiet state are characteristic so-called physiological muscular hypertension and on a background of it an embrional posture. Muscular hypertension is symmetrically expressed in all positions: on abdomen, on a back, in positions on the side. Arms are bent in all joints. Hands are bent in a fist; the big dactyls are bringing to a palm. Legs also are bent in all joints and slightly removed in thighs, in soles the back flexion prevails. Even during sleep the muscles are not relaxed. Physiological muscle hypertension disappears by 3-4 months.

Further parameters of movements at the healthy child educe in the following order:

1) first of all movements of eyes becomes coordinated (on 2-3 week) when the child fixes the view on a bright subject;
2) turning of a head after a toy specifies development of cervical muscles;
3) directed movements of hands appears on 4 month of life: the child brings his top extremities to eyes and surveys them, takes a toy on his hand (on the second half-year he can take bottle with milk and drink it, etc.);
4) on 4-5 month the coordination of movement of muscles of back develops and child begins turn from a back on abdomen, and on 5-6 month — from abdomen on a back;
5) by the end of the first year of life movement of all muscles becomes coordinated and the child follows an interesting subject in a necessary direction.

The statics is fixing and holding of the certain parts of a trunk in a necessary position.

First attribute of statics — holding of a head — appears on the second month of life, in 3 months the child should hold well a head in vertical position. Second attribute — the child sits — is advanced in 6-7 months, on 7 month crawling educes. Third attribute — the child stands — in 9-10 months educes. Fourth attribute — the child walks — by the end of the first year of life develops.

Conditioned-reflexes is a proper response of the child to stimulating factors of environment and his own requirements.

The main reflex at newborn is the food dominant.

Speech appears at the child on 4-6 week when hum (first sounds) appears. In 6 months the child begins say separate syllables, and babble appears. By the end of the first year of life there are 8-12 words in a lexicon of the kid already

Higher nervous activity. It is the sign of maturity of mental ability and intellect of the child The final conclusion about a state of the higher nervous activity can be made at 5-6 years.

Except for the considered criteria of psychological development, for an assessment of a state of nervous system the doctor - pediatrician finds out in newborns and infants the expressiveness of phylogenetically fixed instinctive reflexes.

All instinctive reflexes can be divided on 3 groups: permanent, transient and adjusting.

Constant, permanent reflexes exist during all life. The basic from them:

- swallowing;
- tendon reflex of extremities
- corneal
- conjunctival
- orbiculopalpebral

Transient reflexes - present after a birth; however gradually disappear at the certain age.

***The basic reflexes of oral automatism*:**

- sucking reflex (till 10-12 months)
- search reflex (Kussmaul's) (till 3-4 months) — at a stroking of a skin in range of an angle of a mouth (do not touch to lip) the child turns his head aside;
- trunk reflex (2-3 months) — at tender percussion by dactyl on lips the child extends them forward as trunk;
- Babkin's reflex (2-3 months) — at pressing by the big dactyls on a palm the kid opens his mouth

***The basic spinal reflexes*:**

- protective reflex (2 months) — if to put newborn on abdomen he turns a head aside
- reflex of support (2 months) — the doctor holds the child in axillaries from a back and simultaneously holds a head of child. The child with his bending in knee and hip joints legs supports on the table;
- automatic stepping reflex (2 months) — if in the position of supporting reflex doctor has incline the child a little forward, he makes some steps;
- grasping reflex(Robinson's response) (3 months) — child holds firmly the doctor's fingers enclosed in his palms; sometimes thus the child can be lifted;
- Moro's reflex (4 months). There are few methods of checking this reflex, in any cases reaction of the child is identical: he in the beginning he

widely moves apart his arms — the first phase of Moro reflex, and then hugs himself by his arms — the second phase of Moro reflex;

• doctor flaps by both hands on a surface, on which there is a child (on distance of 15-20 cm from a head),

• doctor holds the child on his hands, than lowers him down on 15-20 cm (there is a 1 phase), and lifts the child in initial position (there is the 2 phase);

• one unbends inferior extremities of the child rather quickly;

• it can be continuation of a grasp reflex — one tights the child for dactyls (not lift above a table) a little and then to let off them; then follow 2 phases of Moro reflex one after another;

• doctor claps on baby's hip;

• doctor claps the child on buttocks;

- *Kerning's reflex* (4 m.). If one bends child's leg in knee and hip joints (in lying position), then it is impossible to unbend it in knee joint.

- *Bauer's reflex* of crawling of (4 months) — if to put the child on abdomen he tries to lift a head and if to press on soles of the child he pushes from doctor's palm and tries to crawl;

- *Babinski's reflex* (4-6 months, sometimes till 1-2 years). Reflex is a parameter of a state pyramid system. If doctor draw on outside edge of sole from heel to toes there is a back extension of the big toe. The other toes can fan.

- *Gallant's reflex* (3-4 months). If to put the child on lateral position and to draw with 1 and 2 fingers on paravertebral lines from a neck to buttocks the child bents his trunk in direction of irritant;

- *Perez's reflex* (3-4 months). If the to put child on abdomen and to draw by a finger from coccyx to neck, the child:

• arches the back;

• cries loudly

• sometimes defecation and an urination are possible.

To the basic prefix reflexes which are shaped at the certain age, concern:

- *Landau's upper reflex* (appears in 4 months) - being on abdomen, the child lifts a head and the upper part of trunk

- *Landau's lower reflex* (appears in 5-6 months) — being on abdomen, the child unbends and lifts his legs.

VI. The plan and organizational structure of the class

№	The elements of practical class	Time (minutes)
1.	Announcement of the topic of the class with an emphasis on its relevance. Checking the attendees.	3 min.

2.	Input test knowledge control.	10 min.
3.	The teacher explains and demonstrates the technique of assessing the psychomotor development of a child depending on his age.	20 min.
4.	Independent work of students: mastering the method of assessing the neuro-psychological development of children of all ages, identifying in the history of factors that affect the psychomotor development of children.	25 min.
5.	Filling in reports on the results of the supervision of sick children.	10 min.
6.	The final control of knowledge: the solution of clinical situational tasks.	10 min.
7.	Task for self-preparation for the next class.	2 min.
	Total	**80 min.**

VII. The materials of methodical provision of classes

VII.1. Materials for self-control for the preparatory stage of the class:

Tests

1. What age does a child begin to babble(chipper) from?
   A. 4 months
   B. 6 months
   C. 8 months
   D. 10 months
   E. 12 months
2. What from the reflexes of new-born belongs to reflexes of oral automatism?
   A. Babkin's
   B. Moro's
   C. Kenig's
   D. Galant's
   E. Babinsky's
3. The regime of day, except for:
   A. stay on fresh air
   B. educational and playing activity
   C. acceptance of meal
   D. duration of sleep
   E. airing and quartzing of wards
4. A child pronounces separate syllables. Knows his name.Moves toys from hand to hand.Can turn from a stomach to the back.Sits independently. Specify age of child.
   A. 4 months
   B. 5 months
   C. 6 months
   D. 7 months

E. 8 months

5. A child walks independently, without support. Understands prohibition, able to speak 8-10 words. Independently drinks from a cup (keep by hands, puts on a table). Specify age of child.

A. 8 months
B. 9 months
C. 10 months
D. 11 months
E. 12 months

6.The child begins to turn from his back to his abdomen:

A. from 2-3 months
B. from 6 months
C. from 5 months
D. from 3.5 months
E. from 4-5 months

7. The beginning of the child's speech development:

A. from 2 months
B. from 2 weeks
C. from 1.5 months
D. from 6 months
E. since birth

8. Directed hand movements in a child manifest:

A. from 5 months
B. from 2-3 months
C. from 2.5 months
D. from 3-4 months
E. from 4 months

9. The child begins to stand, holding on to the support:

A. from 4 to 5 months
B. from 6 months
C. from 8 months
D. from 10 months
E. from 3 months

10. Baby regimen is correct:

A. feeding - sleep - wakefulness
B. sleep - feeding - wakefulness
C. wakefulness - feeding - sleep
D. sleep - feeding - sleep
E. not significant

Standards of answers:

1	B	6	E
2	A	7	A
3	E	8	D
4	C	9	C

5	E	10	B

VII. Materials of methodical provision of the main stage of the class:

1. List of practical tasks:

- To master the method of collecting anamnesis;
- To master the method of objective examination of the child;
- To make a conclusion about the state of psychomotor development of the child.

2. Professional algorithm for mastering skills and abilities.

№	Task	Recommendations to the students	Notes
1.	To collect complaints and anamnesis at the mother of child.	Algorithm of collection of anamnesis 1. Dynamics of psychomotor development of child: a) development of emotions; b) development of motor activity; c) development of active speech; d) understanding of speech; e) development of skills and abilities 2. Anamnesis of life: a) current of pregnancy in mother; b) current of delivery; c) condition of health of child in the neonatal and infant periods; d) morbidity of child; e) character of feeding; f) regime of day of child; g) features of psychical education of child.	It is necessary to put questions, which are up to psychomotor development of child depending on his age. It is necessary to discover the factors of risk of violations of psychomotor development of child.
2	To conduct the objective examination of child.	Algorithm of practical work of student 1. Exanination of child of 1st year of life: a) state of visual orientated reactions;	To conduct the examination of child taking into account the age features of his psychomotor development.

3.	To make a conclusion about psychomotor development of child.	b) state of auditory reference reactions; c) emotions of child; d) motions of hand and action with objects; e) common motions; f) active speech; g) understanding of speech; h) skills and abilities of child. 2. Examination of child of 2nd or 3rd year of life: a) estimation of active speech; b) understanding of speech; c) estimation of sensory development of child; d) actions with objects and participation in the game; e) development of motor activity; f) estimation of skills of child; g) constructive activity of the child. Algorithm of practical work of student 1. To estimate the indexes of psychomotor development of child. 2. To define the index of psychical development of child (QD –quotient development), estimate its level. 3. To define a group and harmony of development of child taking into account age periods. To define violations of psychomotor development of child.	To give estimation of the exposed changes of psychomotor development of child taking into account age features.

VII.3. Materials of control for the final stage of the class:

Situation tasks

Task 1.

A child cries loudly, sleeps about 22 hours on day, adopts an embryo pose, has well expressed innate unconditioned reflexes of support, crawl, automatic walking. What is the age of the child.

Task 2.

It's known from the history of 7 months child, that pregnancy in mother was accompanied by early and late toxicose. A child was born preterm, in asphyxia. Began to keep a head in 4 months, knows voice of mother, reacts different on his and the stranger name, takes a toy, moves it from one hand to another, pronounces separate syllables, from a cup does not drink, but eats a meal from a spoon. He does not response on a question "where?". Estimate psychomotor development of the child and give recommendations to mother.

Task 3.

Estimate neuro-psychical development of 1.5 year child, on the scale of estimation of level of psychical development. Information in the process of inspection of the development of the child is in a table. Give recommendations to mother.

Lines of development	Proper values, in a month	Actual values, in a month
Understanding of speech	18	12
Active relations	18	12
Sensory development	18	11
Game and actions with objects	18	12
General motions	18	11
Skills and abilities in processes	18	11

Task 4.

The child is well distinguished relatives and strangers. Distinguishes strict and gentle intonation. He takes the toy from the hands of an adult and holds it in his hands. Lie on your stomach for a long time, resting on the palms of the straightened arms. Turns from back to belly(abdomen). It stands exactly with the support under the arms. He eats half-sacked and thick food from a spoon. What is the age of the child?

Task 5.

The child pronounces separate syllables, knows your name. Shifts toys from hand to hand.Turns from the abdomen to the back. Sits on its own if planted. What is the age of the child?

Standards of answers:

Task 1.

New-born child

Task 2.

1. Estimation of indexes:

Lines of development	Proper values,	Actual values,

	in a month	in a month
Oriented reactions	7	6
Auditory reference reactions	7	5
Emotions and social behavior	7	6
Motions of hand and action with objects	7	5
Common motions	7	6
Preparatory stages of development of active speech	7	6
Skills and abilities in processes	7	6

2. Calendar age of child (CA) in weeks: 7x4=28 weeks

3. General age of psychical development of child (APD) in weeks:

(6x4 + 5x4 + 6x4 + 5x4 +6x4 + 6x4 + 6x4) : 7 = 23 weeks

4. The QD (quotient development) = 23 : 28 x 100 = 82%

5. Conclusion: psychomotor development of child does not answer age norm and he belongs to the second group with untypical inharmonious development, III stage of delays of development. Consultation of psycho-neurologist is recommended.

Task 3.

1. Calendar age of child (CA) in a month: 12 + 6 = 18 months

2. General age of psychical development of child (APD) in a month:

(12 + 12 +11 + 12 + 11 + 11) : 6 = 69 : 6 = 11,5 months

3. The QD = 11,5 : 18 x 100 = 64%

4. Conclusion: fourth group, untypical development, delay of neuropsychical development of III degree. Consultation of psychoneurologist is recommended.

Task 4.

Baby age 5 months.

Task 5.

Baby age 6 months.

VII.4. Materials of methodical provision of self-preparation of students: Indicative map for independent work of students with educational literature

Educational task	**Instructions for the assignment**
To study the concept of psychomotor development of children	To give a definition of the concept, the value of its assessment.
To study the features of psychomotor development of the new-born	To know the basic unconditional reflexes, specify their classification, the timing of extinction.

To study the criteria and indicators of psychomotor development of children 1 year of life	List and describe
To study the criteria and indicators of psychomotor development of children of the period of milk teeth	List and describe
To study the criteria and indicators of psychomotor development of children of primary and senior school age	List and describe
To study the semiotics of psychomotor development disorders	To know levels of mental retardation of children and rehabilitation measures

VIII. Literature

Basic:

Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012.

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev – Vinnytsia: Nova Knyha, 2018

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013.

Nelson textbook of pediatrics.—18th ed./ edited by Robert M. Kliegman. Part II. Growth, development and behavior // www.mdconsult.com

Topic: 6. Anatomical and physiological features, methods of clinical neurological examination of children

Course: II

Specialty: Medicine

Number of educational hours: 2 hours

Training location: classroom in the children's department

I. Relevance of the topic. Knowledge of anatomical and physiological characteristics of the nervous system in children is important for understanding the changes that may cause pathology of the development of the nervous system in children. The ability to provide correct neurological examinationin children condition will allow the student to detect symptoms and syndromes of the nervous system violation that will facilitate early detection of the disease and further establishing the correct diagnosis.

II. Learning objectives of the lesson:

- To know the anatomical and physiological features of the nervous system in children of all ages.
- To know characteristics of the cerebrospinal fluid in children of all ages.
- To be able to examine and assess the condition of the nervous system in children of all ages.
- To be able to pick from the anamnesisof a child data reflecting the presence of central and peripheral nervous system violation.
- To be able to interpret the analysis of cerebrospinal fluid in children of all ages.

III. The objectives of personality development:

- The student must learn to follow principles of medical ethics and deontology at the bedside;
- Master the ability to establish psychological contact with the patient and his family;
- To acquire a sense of responsibility for the quality of professional knowledge and professional action.

V. The content of the topic

Anatomical and physiological features of the nervous system in children of early age

Brain:

- pyramid cells do not have a peculiar form; they do not have pigment;
- underdevelopment of dendrites in nerve cells;
- the centers of the cortex are not formed; the cortex acquires adult type of cytoarchitectonics in 1-2 years old children;
- in newborn hemisphere is poorly developed, only the main furrows are formed, which have a small height and depth; temporal development is better developedat birth;
- brain tissue is rich in water;
- the gray and white matter are poorly differentiated.

Spinal cord:

- is more mature than the brain, with age only the number of nerve cells increases;
- relatively longer;
- does not have physiological thickenings;
- completely fills the dorsal canal until the 5th month of fetal development.

Peripheral nerves:

- myelination of fibers does not complete (first afferent fibers are myelinated, then efferent)
- intracranial nerves are myelinated to 3 months of age;
- peripheral nerves are myelinated up to 3 years of age, vagus nerve - up to 4-7 years.

Analyzers:

- visual - up to 2-3 months of age observed physiological photophobia, physiological nystagmus, physiological hyperopia, good accommodation from 6 months of age, the child distinguishes colors well;
- auditory - the perception of sounds in the newborns is reduced, since the drum cavity is filled with air; From 2 months of age the child differentiates sounds; From 7-8 months of life coordination of auditory and visual analyzers takes place;
- olfactory - in newborns the of sensitivity is reduced, they perceive only strong smells; From the 4th month the child differentiates several smells;
- test sensation - in newborns the receptor field is wider and above the threshold of sensitivity; From 3 months of life the child differentiates several taste sensations; delicate taste sensation is improved at the young school age.

Sensitivity:

- tactile - determined from the 7th month of the fetal period, better developed on the face, soles, hands;
- temperature - the high threshold of sensitivity, the child perceives cold better;

- painful - poorly developed, formed until the 6th day after birth, has high threshold;
- deep (vibrational, muscular-articular sensitivity, feeling of pressure, weight) - is formed up to 2 years of life.

Vegetative nervous system:

- both departments have been functioning since birthsympathicotonia in early age, balance from 4 years;
- norepinephrine predominates in the blood of newborns;
- with age there is a transition from generalized vegetative reactions to local, specialized reactions;

Spinal cord fluid:

- color and transparency - colorless, transparent, up to the 14th day of life xanthromia, transparent;
- protein - in newborns 0,33-0,8 g / l, from 14 days to 3 months 0,2-0,5 g / l; in 6 months - 0,18-0,33 g / l;
- cytosis in 1 μl - in newborns 3/3 - 30/3, predominantly represented by lymphocytes, single neutrophils may be present; older than 6 months - 3/3 - 20/3, predominantly lymphocytes;
- Pandy test - up to 14 days of life from + to ++, after 6 months (-);
- sugar - in newborn 1.7 - 3.9 mmol / l, older than 6 months - 2.2-4.4 mmol/l.

Unconditioned reflexesof newborn:

1. oral segmental automatism: sucking, search (Kussmaul), trunk, Babkin (palm-mouth)
2. spinal segmental automatisms: grappling (Robinson), Moro (covering), support, automatic step, crawling (Bauer), Galant, Perez;
3. myeloencephalicposotonic reflexes: labyrinthine tonic, symmetrical cervical tonic, asymmetric cervical tonic;
4. mesencephalic constitutional automatism: labyrinthine adjusting reflex, simple cervical and trunk adjusting reflexes.

VI. The plan and organizational structure of the class

N	Elements of practical training	Time (minutes)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10
3.	Demonstration of technique of collection anamnesis and clinical examination in children by the teacher.	20
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age sick children.	25
5.	Filling down the protocols of examination of the sick	10

	child.	
6.	Final control of knowledge, solving of clinical cases.	10
7.	The tasks for independent preparation of students for the next class.	2
TOTAL		80

VII. The materials of methodical provision of class

VII. 1. Materials for self-control for the preparatory stage of the class:

Test tasks (examples):

1. The weight of newborn brain relative to body weight is:
   A. 2,5%
   B. 5%
   C. 10%
   D. 15%
   E. 20%
2. Brain myelination comes to end in:
   A. 1-2 years
   B. 2-3 years
   C. 3-5 years
   D. 1 month
   E. 6 months
3. Feature of cerebrospinal fluid in the newborn are:
   A. Elevated level of protein, minor lymphocytic cytosis
   B. Pandey negative reaction, the presence of a small amount of red blood cells
   C. Xantochromia,low protein level
   D. Low amount of protein, increasing amount of glucose
   E. Positive Pandey test, neutrophilic cytosis
4. The spinal cord in newborn ends at the level:
   A. L 1-2
   B. L 2-3
   C. L 3-4

D. T 11-12

E. 12 T-L 1

5. Variants of hyperkinesia are:

A. atetosis

B. tremor

C. tic

D. myoclonus

E. all mentioned

6. Specify the age (in years), when appears cervical and lumbar thickening of the spinal cord?

A. 1-2

B. 3-4

C. 5-6

D. 8-10

E. 12-15

7. The reason of predilection to toxic forms of infectious diseasesin young children?

A. large size of the lateral ventricles

B. increased blood supply of brain

C. difficulties outflow of blood from the brain

D. high permeability of blood-brain barrier

E. all mentioned

8. Which of the symptoms is not abnormal for young children?

A. Kerning symptom

B. Brudzinskytop symptom

A. Brudzinskymedial symptom

C. Brudzinskylow symptom

B. Lesage symptom

9. There is white wide dermographicsduring the examination of a child. This indicates about:

A. sympathicotonia
B. vagotonia
C. normotonia
D. dystonia
E. eutonia

10. Child is on his back, the doctor tries to straight his leg, which is bent in the hip and knee joints. This causes pain and impossible. The child has positive symptom:
A. Kerning
B. Brudzinsky top
C. Brudzinsky medial
D. Brudzinsky low
E. Lesagesymptom

Standards of answers:

1	C	3	A	5	E	7	E	9	A
2	C	4	B	6	B	8	A	10	A

VII. 2. Materials for methodological support for the basic stage of class: Professional algorithms for training in practical skills.

List of practical tasks:

– Master the technique of examination of the nervous system in children.

2. Professional algorithm for mastering in skills.

N	Task	Directions	Remarks
1.	Master the technique of examination the nervous system in children	Perform the next sequence: a) inquiry; b) estimate behavior of the child – ability to respond to the environment – reaction of the child to examination – consciousness, mood	Pay attention to obstetric and perinatal history, factors that contributed to this disease. Conduct examination of child, taking into accounthis age

		– attention, memory – speech disorders – motor skillsmatch to age or not c) Inspection – position in bed – coordination and gait – Inspection of head, face, trunk, extremities – Presents of limbs tremor, their forced position d) coordination test d) presents of pathological reflexes f) study the function of cranial nerves and superficial tendon reflexes	features.

VII.3. Materials for the control of the final part of class:

Situational tasks (examples):

*Task 1.*Child is in horizontal position on his back. The doctor bends the leg of the child, in knee and hip joints, supporting it with one hand, and then tries to straight the leg.That cause pain and impossible. What symptom doctor checks?

*Task 2.*In the infectious department at Children's Hospital a 5 years old child is admitted with complaints of severe headache, frequent vomiting without prior nausea, fever, pain in eyeballs during last 3 days. At inspection condition is grave, severe intoxication symptoms present. Position of a child is forced on one side with thrown downhead and brought to the abdomen legs. What additional research needs to be done for diagnostic of the disease?

*Task 3.*The child is 6 months old. The parents have complaints restless sleep of child, frequent awakenings, tremor of the hands and chin. Mother frequently was ill during the pregnancy. In neonatal period was

established diagnosishypoxic - traumatic damage of the CNS. What research is needed to the baby?

Standards of answers:

Task 1.

Kerning symptom

Task 2.

Lumbar puncture

Task 3.

Neurosonography

VII.4. Materials for methodological support of self-preparation of students:

Indicative chardfor independent work of students with educational literature

Educational tasks	Directions to the task
To study the anatomical and physiological features of the nervous system in children of all ages;	To know the anatomical and physiological features of: – brain. – spinal cord. – autonomic nervous system.
To study the composition of cerebrospinal fluid in children of all ages	To know macroscopic and microscopic features of cerebrospinal fluid in children of all ages
To study unconditioned reflexes of new-born children	To know unconditioned reflexes of newborn child, their classification. To know persistent automatisms. To know transient rudimentary reflexes in newborn.

VIII. Literature:

Basic:

1. T. Kapitan. Propaedeutic of children diseases and nursing of the child. Vinnitsa. 2012. P.149-166.

Additional:

1. Clinical examination of the child. / OV Katilov, DV Dmitriev, KY Dmitriev and others. - Vinnitsa, 2017. - p. 358-385

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseases: Tutorial for students / S.Ilchenko, K. Duka, T. Yaroshevska, O. Korenyuk at al. - Dnepropetrovsk, 2013. - P. 158-165
3. Nelson textbook of pediatrics. – 21st ed./ edited by Robert M. Kliegman. Part XXVI. The Nervous System // www.mdconsult.com

Topic: 7 Semiotics of lesions of the nervous system in children

Course: II

Specialty: Medicine

Number of educational hours: 2 hours

Training location: classroom in the children's department

I. Relevance of the topic:

CNS diseases in children can be both independent or manifestation of other organs and systems violation. Learning and mastering of characteristic neurological symptoms at various pathologies helps the doctor to diagnose the disease, to prescribe correct treatment andorganize nursing of the child. Therefore, the future doctor should know the methods of clinical neurological examination to identify pathology and provide timely treatment.

II. Learning objectives of the lesson:

To acquaint the students with the features of collecting complaints and history in children with pathology of the NS, method of neurological examination, main neurological symptoms and syndromes, the composition of cerebrospinal fluid in norm and in pathological conditions

The students should know:

- symptoms of basic diseases of the nervous system in children;
- main syndromesof CNS violation;
- objective changes in diseases of the central nervous system;

– methods of clinical neurological examination;
– CSF composition;
– care of children with diseases of the CNS.

The student should be able to:

– conduct and evaluate reflexes;
– conduct clinical examination;
– evaluate the results of the examination;
– assess cerebrospinal fluid in children.

III. The objectives of personality development:

– The student must learn to follow principles of medical ethics and deontology at the bedside;
– Master the ability to establish psychological contact with the patient and his family;
– To acquire a sense of responsibility for the quality of professional knowledge and professional correct action.

V. The content of the topic

Central nervous system reflects the condition of all organs and systems. Main characteristic complaints at lesion of CNS are: headache, vertigo, seizure, encephalitic, meningeal and intoxication symptoms (fever, pallor, nausea, vomiting). Method of clinical examination allows to found characteristic symptoms of the disease.

Meningeal syndrome

inflammatory and non-inflammatory lesion of the meninx can cause the next symptoms:

-headache
-nausea
-vomiting
-hyperesthesia
- pulsation and bulging of large fontanel
"meningeal" symptoms
-rigid neck
- Brudzinsky top, medial and lower
- Kerning symptom after 4 months.

- Lesage symptom

cerebrospinal fluid is turbid, with high pressure, positive Pandey test, increased level of protein an cytosis

Encephalitic syndrome(brain inflammation)

-Headache, somnolence and loss of consciousness,

-Intoxication (fever)

-Focal symptomatology of lesion of brain

-Convulsions

Convulsive syndrome - tonic, clonic and tono-clonicconvulsions with loss or without loss of consciousness. Can develop at brain diseases: meningitis, encephalitis, epilepsy, hydro- and microcephaly, cranial trauma.

Different reason of convulsive syndrome are febrile infectious diseases: viral infections, pneumonia, acute intestinal diseases. Also convulsions can be caused by dehydration (dehydration), ricketyspasmophylia, hypocalcemia.

Purulent and serous meningitis

Purulent is caused by bacterial flora: meningococcus, pneumococcus, staphylococcus, streptococcus, E. coli.

Serous – viruses, tuberculous Koch's bacillus.

At purulent meningitis cerebrospinal fluid is turbid, flows under pressure cytosis (amount of cells) is 1-15 * 10^9 / L (normal 0,002-0,008*10^9 / l).

In cytogramneutrophils prevail - 40-100% (in norm - 3-5%)

protein - 0,66-16.0 g / L (normal - 0,25-0,33 g / l)

reaction Pandey - +++ - ++++

At serous meningitis liquor is transparent with high pressure, moderate cytosis,the amount of protein is increased, and positive Pandey reaction - + - ++.

Semiotics of CNS diseases.

CNS disordersmanifest by the characteristic symptoms and syndromes. The intensity and severity of these symptoms can talk about the severity and depth of the CNS. Congenital disorders of the CNS include:

a) hydrocephalus

b) microcephaly

c) Down's syndrome

d) Cerebral palsy

Acquired diseases are meningitis (purulent, serous), encephalitis

Hydrocephalus - increase in brain ventricles and high pressure of cerebrospinal fluid.

Congenital hydrocephalus - when child is born with increased size of the skull, opened cranial sutures, protrusion and big size of fontanel, visible veins of the head, "sunset" symptom - when part of the white sclera between the cornea and the upper eyelid is visible.

Also possible development of acquired hydrocephalus when the size of the head gradually increases and intracranial pressure rises.

Child has delay in psychological development.

For each disease certain symptoms and signs are characteristic.

Typical symptoms of CNS disorders

Hydrocephalus:

-Increased skull

-increasedcerebrospinal fluid pressure

-open cranial sutures

-visible veins on the head

-large forehead

"Sunset" symptom

-delay in psychological development

Microcephaly:

-Reduction head sizes

-facial part of the skull is relatively increased

-fontanel and seams are closed

-narrow forehead

Down syndrome is the disease based on the trisomy 21 th chromosome pair:

-delay in psychological development

-expressed muscle hypotonia

- motor dyscoordination

-mental underdevelopment - mental retardation

- "Mongolic"cut of eyes

- wide and flat nasal bridge

-big and pushed out of the mouth tongue

-short neck

-short and wide palm and "monkey furrow"

-decreased internal organs sizes

-underdevelopment of brain

-congenital heart defects

Cerebral palsy:

-Violation of movement

-central paralysis with expressed muscular hypertonia

-violation of speech

-violation of vision, hearing, sensitivity

-convulsive syndrome

Meningitis:

-severe headache

-nausea, vomiting

-general hypersensitivity

-pulsation and protrusion of large fontanelle

-rigid neck symptom

- Kerning symptom

- Brudzinski top, medial and low symptoms

- Lesage symptom

Encephalitis:

- lethargy
- headache
- rised body temperature
- symptoms of organic brain damage (loss of cranial nerves), vestibular disorders

- impaired in cognitive function (memory, attention)

VI. The plan and organizational structure of the class

N	Elements of practical training	Time (minutes)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10
3.	Theoretical discussion of the theme of class.	20
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age children with pathology of nervous system.	25
5.	Filling down the protocols of examination of the sick child.	10
6.	Final control of knowledge, solving of clinical cases.	10
7.	The tasks for independent preparation of students for the next class.	2
TOTAL		80

VII. Materials formethodological provisionof class:

VII. 1. Materials for the preparatory stage of class control:

List of theoretical questions:

1. Main symptoms of CNS affection

2. Main symptoms of hydrocephalus

3. Down syndrome

4. Main symptoms of cerebral palsy

5. Semiotics of meningitis in children

6. Symptoms of encephalitis

7. Composition of cerebrospinal fluid in norm

8. Composition of cerebrospinal fluid in meningitis

9. Care for children with nervous system diseases

Tests (examples):

1. Meningeal symptoms include the following, except for:

A. rigid neck

B. Brudzinskisymptom

C. Kerning symptom

D. Babinski symptom

E. Laseguesymptom

2. The child is lying on his back, the doctor fixes the chest with his left hand, gently pressing them, and brings his right hand under his head and tries liftchild's head forward toward the chest. This is difficult, cause pain, even impossible due to neck muscles tension. This indicates positive symptom:

A. top Brudzinskisymptom

B. low Brudzinskisymptom

C. rigid neck

D. Kerning symptom

E. Laseguesymptom

3. The child is 4 months old,it's the first day of the disease. General condition is grave. There are high fever, irritability, convulsions of the extremities, tension of big fontanel, throwing head back. What syndrome is in a child?

A. convulsive

B. meningeal

C. encephalitis

D. hydrocephalic

E. spasmophylic

4. 6 months old child at objective examination showsviolation of movements, increase in muscle tone, increased tendon reflexes of the upper and lower extremities. What type of paralysis takes place?

A. monoplegia

B. hemiplegia

C. paraplegia top

D. paraplegialower

E. tetraplegia

5. Which of the symptoms is not characteristic forhydrocephalic syndrome?

A. increasing the size of the head

V. open sutures

C. increasing and protrusionof big fontanel

D. early close of big fontanel

E. extension of veins on the scalp

6. At examination 4 months old child has increasing the volume of the head, bulging and increasing of large fontanel, expanding veins on the scalp, "sunset" symptom and horizontal nystagmus. What syndrome is in this child?

A. meningeal

B. convulsive

C. encephalitis

D. hydrocephalic

E. paralysis

7. The medical examination of the 8 months old child shows the sharp decrease in the volume of muscle (degenerative atrophy), decreased muscle tone, complete absence of reflexes, periodic involuntary contractionsof musclse. For what syndrome itis typical?

A. central paralysis

B. peripheral paralysis

C. convulsive

D. hydrocephalic

E. meningeal

8. Doctor while examination of 7 years old boy finds increased muscle tone of limbs, hyperreflexia, expansion of reflexes, clonus of feet, of hands, protective reflexes. Which syndrome we can think about?

A. convulsive

B. meningeal

C. central paralysis

D. encephalitis

E. peripheral paralysis

9. The child is 5 years old. In CSF (cerebrospinal fluid)is observed turbidity, increased pressure, neutrophilic cytosis 800 in 1 microliter,high protein level - 0.65 g/l. What syndrome takes place?

A. hypertension - hydrocephalic

B. purulent meningitis

C. serous meningitis

D. convulsive

E. paralysis syndrome

10. 5 years old child is admitted to the clinic with complainson severe headache, repeated vomiting, t = 40 ° C. Main symptoms are general weakness, sopor, attacks of convulsions, muscular pain in of the muscles of the shoulder girdle and the neck, violation of movements. From history we know that two weeks ago child was bitten by a tick. For what syndrome is in this case?

A. hypertension - hydrocephalic

B. meningeal

C. convulsive

D. encephalitis

E. paralysis syndrome

Standards of answers:

1	C	3	B	5	D	7	B	9	B
2	C	4	B	6	D	8	C	10	D

VII. 2. Materials formethodological support of the basic stage of class:

List of practical tasks:

- be able to conduct and evaluate reflexes;
- additional methods of examination;
- master the method of determining the symptoms of CNS lesions;
- master symptoms in hydrocephalus;
- know the symptoms of cerebral palsy definition;
- know the symptoms of Down syndrome definition;

- master the method of determining the symptoms of meningitis;
- master the method of evaluating the symptoms of encephalitis;
- develop the skills assessment cerebrospinal fluid;
- grasp the changes of cerebrospinal fluid pathology.

2. Professional algorithms for training in practical skills.

N	Task	Directions	Remarks
1.	Master the basic syndromes CNS	Assess the condition of health of the patient, describe the symptoms of each syndrome	Pay attention on the set of symptoms
2.	Master the method of evaluating the composition of cerebrospinal fluid	Identify the features of cerebrospinal fluid in lesions of nervous system	Pay attention on the features of cerebrospinal fluid

VII. 3. Materials for thefinal stage of the class control:

Situational tasks (examples):

*Task 1.*The child is lying on his back, the doctor fixes the chest with his left hand, gently pressing them, and brings his right hand under his head and tries move the head forward toward the chest. This is difficult, cause pain, even impossible due to tensionneckmuscles. What positive symptom in a child? What syndrome is in a child? What further examination should be conducted?

Task 2. 6 months old child at objective examination shows increase in muscular tone, increased tendon reflexes of the upper and lower extremities. Whatkind of paralysis is present? What disease is possible talk about? At whatperiod of childhood violationofnervous systemhappened?

*Task 3.*The child is 4 months old, it’s the first day of the disease. General condition is grave. There are high fever, irritability, convulsions of the extremities, tension of big fontanel, throwing head back. What syndrome is in a child?What further examination should be conducted?

*Task 4.*At examination 4 months old child has increasing the volume of the head, bulging and increasing of large fontanel, expanding veins on the scalp, "sunset" symptom and horizontal nystagmus. What syndrome is in this child?

What further examination should be conducted?

Standards of answers:

Task 1.

Rigid neck. Meningeal syndrome. Lumbar puncture, CSF analysis.

Task 2.

Hemiplegia. Cerebral palsy. Intranatal period.

Task 3.

Meningeal syndrome. Lumbar puncture, CSF analysis.

Task 4.

Hypertension-hydrocephalic syndrome. Ultrasonography.

VII. 4. Materials of methodical support for self-preparation of students: Indicative chart for independent work of students with educational literature

Educational tasks	Directions to the task
Explore:	
- cyndrom CNS	to assess health
- CNS symptoms	describe symptoms
- Main symptoms of hydrocephalus	characterized
- Main symptoms of microcephaly	
- signs of Down syndrome	characterized
- symptoms of cerebral palsy	
- symptoms of meningitis	characterized
- symptoms of encephalitis	characterized
- composition of cerebrospinal fluid	characterized
- changes in CSF in meningitis	characterized
- care of disorders of the nervous system	characterized
	characterized
	characterized

VIII. Literature

Basic:

2. T. Kapitan. Propaedeutic of children diseases and nursing of the child. Vinnitsa, 2012.-P.149-166.

Additional:

4. Clinical examination of the child. / OV Katilov, DV Dmitriev, KY Dmitriev and others. - Vinnitsa, 2017. - P. 358-385
5. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseases: Tutorial for students / S.Ilchenko, K. Duka, T. Yaroshevska, O. Korenyuk at al. - Dnepropetrovsk, 2013. - P. 158-165
6. Nelson textbook of pediatrics. – 21st ed./ edited by Robert M. Kliegman. Part XXVI. The Nervous System // www.mdconsult.com

Topic: 8. Modern principles of breastfeeding
Course II

Specialty Medicine

Number of education hours: 2 hours

Training location: classroom in the children's department

INTRODUCTION

Optimalinfantandyoungchildfeeding(IYCF)practicesarecriticalforchild nutritionandsurvival.BreastfeedingisavitalcomponentofIYCF.The“globals trategyforIYCF”statesthat“breastfeedingisanunequalledwayofproviding idealfoodforthehealthygrowthanddevelopmentofinfants;itisalsoan integral part of the reproductive process with importantimplicationsforthehealthofmothers.Asaglobalpublichealthreco mmendation, infants should be exclusively breastfedfor the first 6 months of life to achieve optimal growth,development and health. Thereafter, to meet their evolvingnutritionalrequirements,infantsshouldreceivenutritionallyadeq uateandsafecomplementaryfoodswhilebreastfeedingcontinues for up to 2 years of age or beyond.” Presently,when global efforts are on to achieve better nutritionalstatusandsurvivalforchildrenenshrinedinthemillenniumdeve lopment goals (MDGs), breastfeeding emerges as a veryeffectiveinterventiontoachievethesetargets.

DEFINITIONSRELATEDTOBREASTFEEDING

Various definitions used in context of breastfeeding aresummarizedinthe**Table4.2.1**.

RecommendationsforBreastfeeding

Child health and nutrition programs all across the world(including India) conform to these guidelines based on theglobalrecommendations.Theserecommendationsarebased on the available scientific evidence, some of which aredefinedasfollows:

InitiationofBreastfeedingImmediatelyafterBirth,Preferablywithin1Hour

Early initiation has been documented to improve neonatalsurvival,andprotectiveagainsttheinfectionspecificmortalityamong newborn infants. Early initiation of breastfeedinghelpstodevelopabondbetweenamotherandherbaby.Earlyinitiation isextremelyimportanttoestablishsuccessfuland

sustainedlactation.Itstimulatescontractionsandexpulsionof placenta. The practice of delaying breastfeeding after birthand giving something else, i.e. prelacteal feeds expose theinfanttoinfectionsandalsoleadtoproblemsinestablishinga successful lactation. Scientific evidence suggests that earlyis the initiation of breastfeeding, more are the chances ofsurvivalofneonate.

Aftercesareansection,somedelayininitiationofbreastfeeding may be unavoidable due to the condition of themotherorinfant.Aftercesareansectionwithspinalanesthesia,breastfeeding canoftenbeinitiatedimmediately.Withgeneralanesthesia,breastfeedingcan beinitiatedwithinafewhoursassoonasthemotherregainsconsciousness.

ExclusiveBreastfeedingfortheFirst6Months

Exclusive breastfeeding is recommended as breast milkcontains all the necessary nutrients which are sufficient tosustain appropriate growth and development of a healthyterm infant for the first 6 months of life. There is sufficientevidencethatasignificantnumberofunder-5monthdeathsinresourcepoorcountriescouldbepreventedthroughachievement of 90% coverage with exclusive breastfeedingfor6months.Any supplementation during the first 6 months will expose infant to infections and also decrease breast milkoutput.

Appropriate and Adequate Complementary Feedingafter6MonthsofAgewhileContinuingBreastfeeding

Additionalfoodsareneededatthisstagetocomplementthebreastmilktosustainthegrowthanddevelopmentoftheinfant.Alongwiththebreastfeeding,children age6–24monthsshouldbefedfromthreeormoredifferentfoodgroups;twotothreetimesaday(seemoredetailsinChapter4.1).

ContinuedBreastfeedinguptotheAgeof2YearsorBeyond

Breastfeedingalongwithotherfoodsremainsanimportantand safe source of high-quality protein, energy and othernutrients like vitamin A and vitamin C between 6 monthsand 24 months of life. It is, therefore, crucial in preventingundernutrition and morbidities. It can provide about one-third of energy needs, half of protein and 75% of the vitaminArequirementsofachildofthisage**.** Thus,breastmilk helps a child to get enough energy and high quality nutrients from breastfeeding during thesecondyearoflife.Thesenutrientsmaynotbeeasilyavailablefromthefamilydiet. Continuing to breastfeed during the second year canhelptopreventmalnutritionandvitamindeficiencies.

VI. The plan and organizational structure of the class

N	**Elements of practical training**	**Time (minutes)**
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10
3.	Demonstration of technique of collection anamnesis and clinical examination in children by the teacher.	20
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age sick children.	25
5.	Filling down the protocols of examination of the sick child.	10
6.	Final control of knowledge, solving of clinical case studies.	10
7.	The tasks for independent preparation of students for the next class.	2
TOTAL		80

2. Professional algorithms for training in practical skills.

N	Task	Directions	Remarks
1.	Master the basic syndromes CNS	Assess the condition of health of the patient, describe the symptoms of each syndrome	Pay attention on the set of symptoms
2.	Master the method of evaluating the composition of cerebrospinal fluid	Identify the features of cerebrospinal fluid in lesions of nervous system	Pay attention on the features of cerebrospinal fluid

VII. The materials of methodical provision of class

VII. 1. Materials for self-control for the preparatory stage of the class:

List of theoretical questions for self-control:

VIII. Literature

Basic:

3. T. Kapitan. Propaedeutic of children diseases and nursing of the child. Vinnitsa, 2012.-P.149-166.

Additional:

7. Clinical examination of the child. / OV Katilov, DV Dmitriev, KY Dmitriev and others. - Vinnitsa, 2017. - P. 358-385
8. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseases: Tutorial for students / S.Ilchenko, K. Duka, T. Yaroshevska, O. Korenyuk at al. - Dnepropetrovsk, 2013. - P. 158-165
9. Nelson textbook of pediatrics. – 21st ed./ edited by Robert M. Kliegman. Part XXVI. The Nervous System // www.mdconsult.com

9. Rules for the correct attachment of the baby to the breast

Course II

Specialty Medicine

Number of education hours: 2 hours

Training location: classroom in the children's department

NUTRITIONAL COMPOSITION OF BREASTMILK

The breast milk contains all the macronutrients (carbohy-drates, proteins and fats), micronutrients such as vitaminsand minerals, and adequate water to meet the requirementsof a healthy term infant for the first 6 months of life. Apartfrom the nutrients, breast milk provides a variety of bioactivefactors which protect the infant against infection, and alsomodulatethecompositionoftheindigenousintestinalmicrobiota. Breast milk also contains some factors to help indigestionandabsorptionofnutrients.

Fats

The mature human breast milk contains 3.2–3.8 g/dL of fats.Fatsprovide50%ofthetotalenergycontentofthebreastmilk.Breastmilkfatinimmediatepostpartumperiodcontainsfatneededforgraymatterdevelopmentandinlatermonths,fatwhichisneededformyelination.Breastmilkfathassteadyhigher level of cholesterol than animal milks and formula.Breastfed babies have significantly higher total cholesterolandlow-densitylipoprotein(LDL)cholesterolcomparedtomixedfedbabiesinthefirst6monthsoflifewithimprovinghigh-density lipoprotein (HDL) cholesterol/LDL cholesterolratio at 6 months. High cholesterol intake in infancy mayhave a beneficial long-term programming effect on synthesisofcholesterolbydownregulationofhepaticenzymes.Human milk contains essential fatty acids and n-3 fattyacids (docosahexaenoic acid and eicosapentaenoic acid),which are needed for a baby's growing brain and eyes

Carbohydrates

Lactoseisthe main carbohydrate in human breast milkand provides about 50% of its energy content. Breast milkalsocontainsoligosaccharidessuchasglucose,galactose,N-acetylglucosamine and sialic acid. These oligosaccharidesattaches to the epithelial cell surface in the intestines andpreventadhesionofmicroorganisms thereby preventingtheirgrowth.

Proteins

Proteins in breast milk provide amino acids for growth andanti-infectivefactors.Maturebreastmilkcontains0.9g/dLof protein while colostrum contains 2.3 g/dL. The breast milkprotein contains more whey protein and less casein. Due tohigh whey to casein ratio, the breast milk forms softer curdswhichareeasiertodigest.

In human milk, much of the whey protein consists ofanti-infectiveproteins,whichhelptoprotectababyagainstinfection.Theanti-infectiveproteinsinhumanmilkincludelactoferrin (which binds iron and prevents the growth ofbacteriawhichneediron)andlysozyme(whichkillsbacteria)as well as antibodies (immunoglobulin, mostly IgA). Animalmilk and formula may lack the amino acid cystine, andformula may lack taurine which newborns need especiallyfor brain growth. Human infant is ill equipped to handlephenylalanine and tyrosine, two amino acids which are inhigh concentration in the animal milk in comparison tobreastmilk.

DYNAMICCOMPOSITIONOFBREASTMILK

Thecompositionofbreastmilkisnotalwaysthesame.Itvariesaccordingtotheageofthebaby,andfromthebeginningtothe end of a feed. It also varies between feeds, and may bedifferentatdifferenttimesoftheday.

Colostrum

Themilkproducedduringthefirstfewdaysafterthedeliveryisknownascolostrum, whichisaspecial,thick,sticky,brightlemonyyellowishfluid.Itissecretedinsmallquantitiesforfirst3–4daysoflife.Althoughitisinsmallquantities,itissufficient to meet the needs of the newborn baby. Colostrumcontainsmoreproteinthanlatermilk. Colostrumisconsideredthe first immunization for newborn as it is rich in the anti-infective factors that helps protect the baby against diarrhea,respiratory and other infections. Colostrum contains moreepidermalgrowthfactorsincomparisontomaturebreastmilk, which help a baby's immature intestine to develop afterbirth.Thishelpstopreventthebabyfromdevelopingallergiesand

intolerance to other foods. Colostrum helps to cleanbaby's intestine which is important to prevent jaundice in thenewborn.ColostrumisalsorichinvitaminA.

TransitionalMilk

During the transition from colostrum to the mature milk, theamountofimmunoglobulin,proteins,vitaminAandvitaminEdecreases, and amount of lactose, fats, energy and water-solublevitaminsincreases.

MatureMilk

Afterafewdays,colostrumchangesintomaturemilk.Maturemilk is in large amounts and the breasts feel full, hard andheavy.Somepeoplecallthisasthemilk"comingin".

Foremilk is the bluish milk that is produced early in afeed. Foremilk is produced in larger amounts, and it providesplenty of protein, lactose and other nutrients. Because a babygets large amounts of foremilk, he or she gets all the waterthatheorsheneedsfromit.Hindmilkisthewhitermilkthatis produced later in a feed. It contains more fat than foremilk.Thisfatprovidesmuchoftheenergyofabreastfeed.Thisiswhyitisimportantnottotakeababyoffabreasttooquickly,notuntilheorsheleavesthebreastonher/hisown.

BENEFITSOFBREASTFEEDING

Thebenefitsofbreastfeedingforinfant,motherandcommunityinclude:

- Breastfeedingprovidesall the nutrients a baby needsfor the first 6 months of life, after which it continues toprovideamajorportionoftheinfant'snutritionalongwith appropriate family foods. It provides almost half ofthenutritionalrequirementsbetween6monthsand12monthsofage,anduptoone-thirdbetween12monthsand24monthsofage
- Breastmilkiseasilydigestedbythebaby
- Breastmilkcontainsantibodiesandotherfactorswhichprotectthe babyagainst diarrhea andother infections
- Breastmilkcontainsenoughwaterwhichissufficientevenforverydryandhotclimates
- Breastmilkisclean,safeandcheap

- Breastfeedingprovidesaperfectopportunityforbuildingaclosebondbetweenmotherandbaby
- Ithelpsthemotherbyreducingthepostdeliverybleedingandthuspreventinganemia
- Breastfed babies are less prone to have diabetes, heartdisease, eczema, asthma, rheumatoid arthritis and otherallergicdisorderslateroninlife
- Breastfeedingenhancesbraindevelopment,visualdevelopmentandvisualacuityleadingtolearningreadiness
- Breastfeedinghascontraceptiveeffectforthemother,ifsheexclusivelybreastfeedsherinfantforfirst6months
- Mothershave alower riskof breastand ovariancancers
- Breastfeeding costs less in terms of healthcare expenses asbreastfedinfantsgetilllessoften
- Breastfeedingprotectstheenvironment.

RisksofFormulaFeeding

Infant formula, which is generally used as an artificialsubstitute for human breast milk, is time consuming, lessnutritious and expensive. It is also fraught with innumerablerisks for the infants and children in comparison with thebreastfeeding.Someoftheserisksaredepictedinthe**Table4.2.2**.

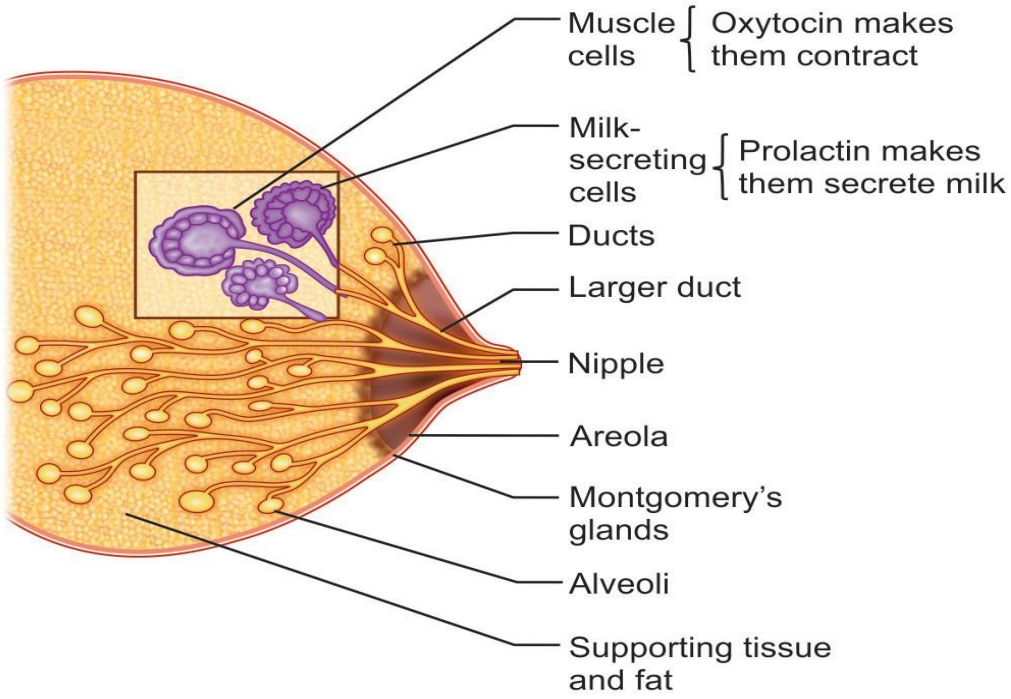
ScienceofMilkTransfer

Understanding the structure of breast and the process ofbreastmilkproductionandtransfertotheinfantisusefultoprovideeffectiveskilledhelptothelactatingmother.

ANATOMYOFTHEBREAST

Thehumanbreastconsistsofthenippleandareola,mammarytissue,thesofttissueincludingsupportingconnectivetissueand fat, blood and lymphatic vessels and nerves **(Fig. 4.2.2)**.Thenippleistheareafromwhichthemilkcomesoutofthebreast through multiple small openings. This area of breastis very richly supplied with nerves. The nerve endings in thenipple are important to provide stimulus for the hormonalreflexesimportantforproductionandreleaseofthemilkfrombreast.Theareolaisthedarkskinsurroundingthenipple.Themilkductsbeneaththeareolaarefilledwithmilkandbecomewider during a feed. Areola is an important anatomicallandmarkasitisimportanttoensurethatmajorityofareolais

in baby's mouth during the feed to achieve an effectivesuckling. The mammary tissue is composed of alveoli, whichare small sacs,made up of millionsof milk secreting cells.



(World Health Organization. Infant and young child feeding:model chapter for textbooks for medical students and allied healthprofessionals.Geneva:WHOpress;2009;Reproducedwithpermission.)

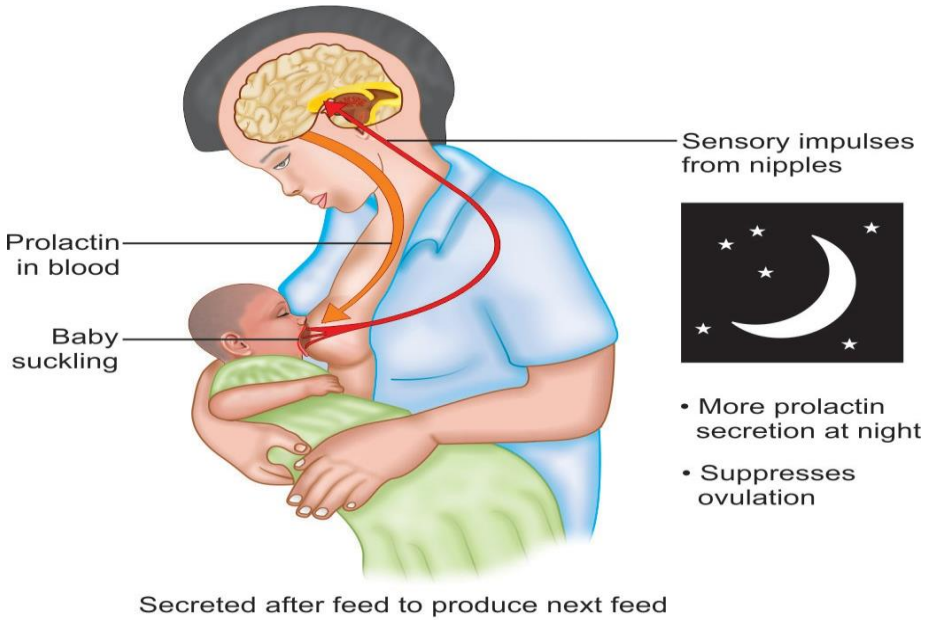
Milkproducedinthealveoliiscarriedtowardthenippleviatubular structures called ducts. These ducts open outside atthe nipple area.

The alveoli are surrounded by myoepithelialtissuewhichhelpsinpushingthemilkpresentinthealveolitowardnipple.

ProductionofBreastMilk

Production of the breast milk is controlled by the hormoneprolactin.Whenababysucklesatthebreast,sensoryimpulsesgofrom

thenippletothebrain.Inresponse,theanteriorpartofthepituitaryglandattheb aseofthebrainsecretesprolactin.Prolactingoesinthebloodtothebreastandm akesthemilksecreting cells produce milk. This process is known as theprolactin reflex **(Fig. 4.2.3)**. From this, it is evident that milkproduction is dependent on the suckling stimulus. If the babysucklesmore,thebreastwillproducemoremilk.Forthesamereason, if a mother has two babies, breast milk productionincreases accordingly. Prolactin is present in the blood forabout 30 minutes after the baby finishes the feed. It makesthebreastproducemilkforthenextfeed.Moreprolactinisproduced at night due to the inhibition of dopaminergic driveduring sleep so breastfeeding at night is especially helpful forkeepingupthemilksupply.Prolactinsuppressesovulationsobreastfeedingc anhelptodelayanewpregnancy.

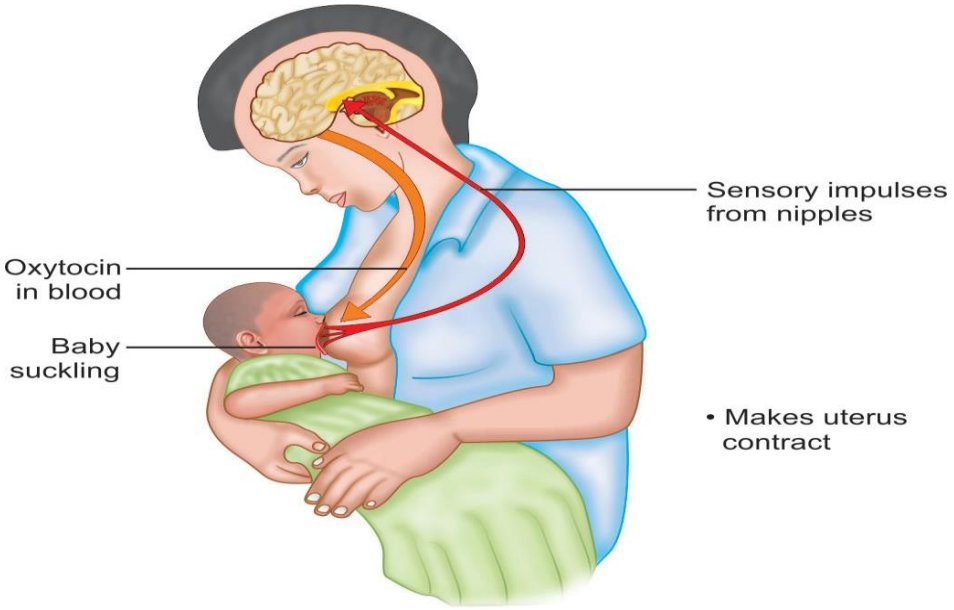


Flow of Breast Milk

When a baby suckles, sensory impulses go from the nippletothebrain.Inresponse,theposteriorpartofthepituitary glandat the base of the brain secretes the hormone oxytocin. Oxytocin goes in the blood to the breast and makes the muscle cells around the alveoli contract. This makes the milk which has collected in the alveoli flowalongtheductstowardnipple.Itmakesthemilk in thebreastflowforthisfeed**(Fig.4.2.4)**.Sometimesthemilkis ejected in fine streams. This is the oxytocin reflex or themilkejectionreflex.Oxytocincanstartworkingbeforeababy suckles, when a mother expects a feed. The

oxytocinreflexispositivelyaffectedbymother'ssensationsandfeelingslikethinkinglovinglyaboutthebaby;touching,smellingorseeingthebaby; or hearing the baby cry. Iftheoxytocinreflexdoes not work well, the baby mayhave difficulty in getting the milk. This may happen, if themother is emotionally disturbed or experiencing pain anddiscomfort.Insuch a condition, mother needs supporttomakeher physically and/or emotionally comfortabletomaketheoxytocinreflexworkagainandletthemilkflow.

Signs of an active oxytocin reflex are a tingling sensationin the breast before or during a feed, milk flowing frombreasts when mother thinks of the baby or hears him/hercrying,milkflowingfromtheotherbreastwhenthebabyissuckling, milk flowing from the breast in streams, if sucklingis interrupted, and uterine pain or a flow of blood from theuterusduringthefeed.However,theabsenceofthesesignsdoesnotindicateaninadequateoxytocinreflex.



Works before or during a feed to make the milk flow

Breast Milk Inhibitor

Breast milk production is also controlled within the breastitself. Sometimes one breast stops making milk, while theother breast continues to make milk although oxytocin andprolactin go equally to both breasts. There is a substance inbreast milk which can reduce or inhibit milk production. If alot of milk is left in a breast, the inhibitor stops the cells fromsecretinganymore.Ifbreastmilkisremovedbysucklingor expression, the inhibitor is also removed and the breastmakesmoremilk.

Positioning and Attaching the Baby at the Breast

For effective milk transfer from mother to the infant, goodbreastfeeding skills including proper positioning of the babyandgoodattachmentatthebreastarerequired.

Positioning

A woman can feed her baby in any comfortable position suchas sitting, lying or even standing. If the baby suckles properlyfromthebreast,heorshewillgetsufficientmilk.However,for a good attachment on breast, some basic principle needto be observed for relative positioning of the baby whilebreastfeeding.Theseare:

- Babyturnedtowardsmotherandhisorherears,shoulderandbuttockareinas traightline
    - His face should face the breast with nose opposite thenipple
    - Mothershouldholdthebabyclosetoher
    - In a newborn, she should support his bottom with handandnotjusthisheadandshoulders.

    The mother should be explained how to support the breastwithherhandwhileofferingittothebaby:

    - With her fingers and palm placed on her chest wall belowthe breast so that her first finger forms a support at thebaseofthebreast
    - With her thumb placed on the top of the breast so that it iseasierforherbabytoattachwell.
    - Sheshouldnotholdherbreasttooneartothenipple.

    Themothershouldbeexplainedhowtobringthebabytothebreast:

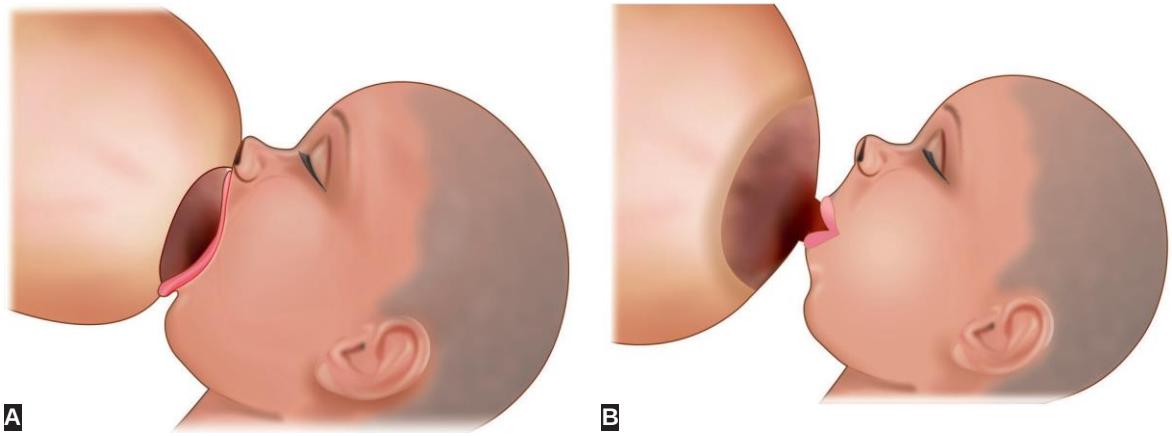
    - Touchbaby'slipswithhernipple
    - Waituntilbaby'smouthiswideopen
    - Movethebabyquicklyontothebreastfrombelow.

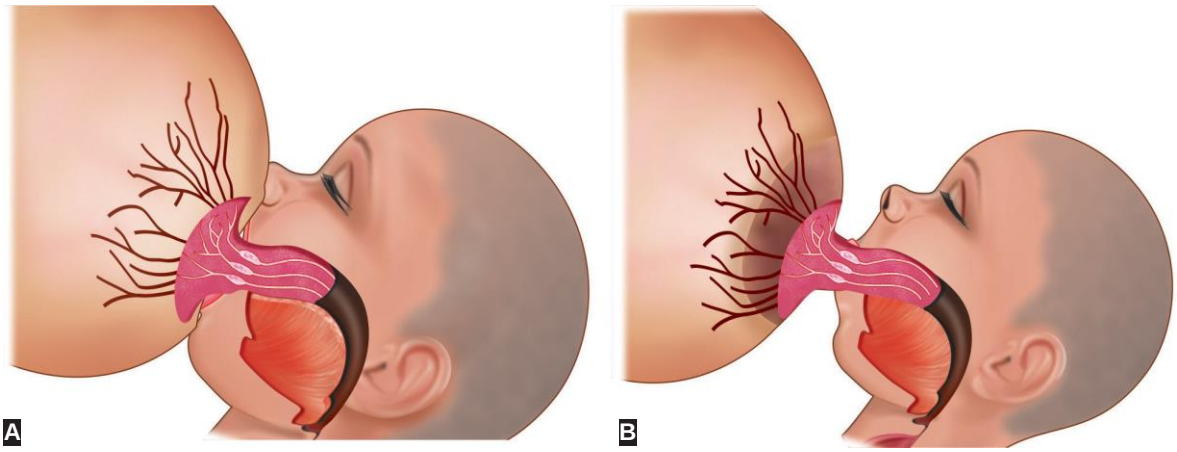
Attachment

This is important how baby's mouth is attached to mother'sbreastforasuccessfulsuckling**(Figs4.2.5and4.2.6)**.Ingoodsuckling position, baby is suckling with nipple and a largerbreast tissue having in his or her mouth. In poor sucklingposition, baby is suckling with nipple only or nipple with asmallbreasttissueinhisorhermouth.

Signsofgoodsucklingattachmentare

- Thebaby's chintouches the breast
- Hismouthiswideopen
- Hislowerlipisturnedoutwards
- Onecanseemoreofthareolaabovehisorhermouthandless below. This shows that he or she is reaching with histongue under the lactiferous sinuses to press out the milk.Poor attachment may lead to pain and damage to mother'snippleandshemay develop soresor fissure sinnipple. Itmay also lead to engorgement of the breast due to improper milk





removal. The babyremains hungryandfrustratedthatleadsto refusal to suck. Ultimately, it leads to production of

lessmilkinthebreast;babyisnotabletofeedproperly,leadingto weight loss. Common causes of poor attachment are useoffeedingbottle,inexperienceofmotherandlack of skilled support.

VI. The plan and organizational structure of the class

N	Elements of practical training	Time (minutes)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10
3.	Demonstration of technique of collection anamnesis and clinical examination in children by the teacher.	20
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age sick children.	25
5.	Filling down the protocols of examination of the sick child.	10
6.	Final control of knowledge, solving of clinical case studies.	10
7.	The tasks for independent preparation of students for the next class.	2
TOTAL		80

2. Professional algorithms for training in practical skills.

N	Task	Directions	Remarks
1.	Master the basic syndromes CNS	Assess the condition of health of the patient, describe the symptoms of each syndrome	Pay attention on the set of symptoms
2.	Master the method of evaluating the composition of cerebrospinal fluid	Identify the features of cerebrospinal fluid in lesions of nervous system	Pay attention on the features of cerebrospinal fluid

VII. The materials of methodical provision of class

VII. 1. Materials for self-control for the preparatory stage of the class:

List of theoretical questions for self-control:

VIII. Literature

Basic:

4. T. Kapitan. Propaedeutic of children diseases and nursing of the child. Vinnitsa, 2012.-P.149-166.

Additional:

10. Clinical examination of the child. / OV Katilov, DV Dmitriev, KY Dmitriev and others. - Vinnitsa, 2017. - P. 358-385

11. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseases: Tutorial for students / S.Ilchenko, K. Duka, T. Yaroshevska, O. Korenyuk at al. - Dnepropetrovsk, 2013. - P. 158-165

12. Nelson textbook of pediatrics. – 21st ed./ edited by Robert M. Kliegman. Part XXVI. The Nervous System // www.mdconsult.com

Topic: 10. Difficulty latching on to the breast, maternal and child reasons

Course II

Specialty Medicine

Number of education hours: 2 hours

Training location: classroom in the children's department

Practices for Successful Breastfeeding

Toensureadequatemilkproductionandflowfor6monthsof exclusive breastfeeding and thereafter continued breast-feeding,certainpracticesareveryimportant.

- Theinfantshouldbefedasfrequentlyandforaslongasheorshewantsto,duringbothdayandnight.Thesucklingshouldbealloweduntiltheinfantspontaneouslyreleasesthe nipple. This is called demand feeding. Restrictinglength of the breastfeeding session may result in thebaby getting less of the energy rich hindmilk. The 24 houraverage intake of milk is about 800 mL per day during thefirst6months.
- Atthetimeofdelivery,beforebreastfeedingisinitiated, no prelacteal feed should be given to the infant. Apartfromhavingtheharmful effects on the infant likerisk of infection, such a practice may interfere in theestablishmentofbreastfeeding.Lateron,inthefirst6 months of life, no supplementary feed, like other

milks,shouldbegiventotheinfant.Thismayleadtoadecreasedsupplyof breastmilk.

- Sometimes, mother may have the perception that her milkis not sufficient for her infant. Adequacy of breastfeedingmay be ascertained by documenting, if the infant hasregained the birth weight by 2 weeks of age, and thecumulative weight gain is more than 500 g in a month andtheinfantispassingadequateurineatleastsixtimesaday,whileonexclusivebreastfeeding.

Hospital Practices and Breastfeeding

Maternity homes and healthcare practices should supportexclusivebreastfeedingduringthefirst6monthsoflifeandcontinued breastfeeding along with appropriate comple-mentary feeds thereafter. To ensure successful breastfeeding,the World Health Organization (WHO) and the UnitedNations Children's Fund (UNICEF) launched the baby-friendly hospital initiative (BFHI) in 1991. The initiative is aglobaleffortforimprovingtheroleofmaternityservicestoenablemotherstobreastfeedbabiesforthebeststartinlife.Itaims at improving the care of pregnant women, mothers andnewbornsathealthfacilitiesthatprovidematernityservicesforprotecting,promotingandsupportingbreastfeeding.

Sinceitslaunching,BFHIhasgrownwithmorethan20,000designated facilities in 152 countries around the world overthe last 15 years. The initiative has measurable and provenimpact, increasing the likelihood of babies being exclusivelybreastfedforthefirst6months.

Components of Baby-friendly Hospital Initiative

Amaternityfacilitycanbedesignated "babyfriendly" whenithasimplementedtenstepsgiveninthetosupportsuccessfulbreastfeeding.

Breastfeeding the Preterm Babies

The nutritional managementplaysalargeroleintheimmediate survival and subsequent growth, and developmentof the preterm infants. The optimal diet for premature infantsshould support growth at intrauterine rates without imposingstress on the infant's immature metabolic and excretoryfunctions and ensures healthy short-term and long-termoutcomes. Breast milk produced during early postpartumperiod offers nutritional advantage because of its higherprotein and

electrolyte concentrations. Preterm infant fedpretermmilkdemonstrateincreaseinweight,lengthandheadcircumferenceaswellasretentionratesofvariousnutrientscomparable to those for the fetus of similar postconceptionage. Fat absorption in preterm babies fed their own mother'smilk is significantly higher in comparison to infants fedcow's milk formula. Long-chain polyunsaturated fatty acids(LCPUFAs), which are important for mental and visualdevelopment,arealsohigherinhumanmilk.

Preterminfantsfedbreastmilkhavelesserincidenceof necrotizing enterocolitis in comparison to feeding withformulamilk.Evenifthediseaseoccursininfantsfedwithbreast milk, the course of disease is less severe and theprevalence of intestinal perforation is lower. This is due to various protective factors in breastmilk like immunoglobulin,

erythropoietin, interleukin-10 (IL-10), epidermal growthfactor,plateletactivatingfactor,acetylhydrolaseandoligosaccharides which are in greater quantity than in termmilk. These factors may prevent intestinal attachment ofenteropathogens by acting as receptor homologues resultingin the suppression of enteral colonization with harmfulmicroorganisms. Breast milk also prevents a host of neonatalinfections, a leading cause of neonatal mortality across theglobe. The use of human milk can be adopted as an importanthealthcareinterventioninneonatalunits.

Breast Conditions and Difficulties in Breastfeeding

Thereareseveralcommonbreastconditionswhichsometimes cause difficulties with breastfeeding. Manage-mentofthese conditions is important both to relievethe mother and to enable successful breastfeeding. Thedifficulties in breastfeeding can be overcome by carefulguidance, reassurance and encouragement to the motherduringantenatalperiodtoprepareforbreastfeedingandbyprovidingskilledcounselingafterbirth.

Flat Nipple

Many a times, mother becomes apprehensive that a flatnippleisahindranceinsuccessfulbreastfeeding.However,in a good suckling attachment, the infant takes the nippleandthebreasttissueunderlyingtheareolaintohismouthtoforma“

teat".Theanatomicalnippleonlyformsaboutone-thirdofthe"teat"ofbreasttissueinthebaby'smouth.Thisis therefore evident that shape of the nipple is immaterial forsuccessful suckling. The nipple is just a guide to show wherethe baby has to take the breast. A woman with flat nipplesshould be reassured that she has normal nipples, even if theylookshortprovidedhernipplesprotracteasily.

Inverted Nipple

Sometimesanippledoesnotprotractandonattemptingto pull out the nipple, it goes deeper into the breast. Theconditionisknownasinvertednipple**(Fig.4.2.7)**.Themotherneeds support in such a situation. She should be reassuredthatwithsomehelpshewillbeabletobreastfeedherinfantsuccessfully.Helpismostimportantsoonafterdeliverywhenthebabystartsbreastfeeding.

A mother with the inverted nipple may be helped with thesyringemethodasfollows**(Fig.4.2.8)**:

- Cutthenozzleendofadisposablesyringe(10–20mL).
- Introducethepistonfromtheraggedcutendside.
- Ask the mother to apply the smooth side of the syringe onthe nipple and gently pull out the piston and let her waitforaminute.
- Nipple would then protrude into the syringe. Ask themotherto slowlyrelease the suctionand put thebaby to breast; at this time it helps the nipple to erect out and babyisabletosuckleintheproperposition.
- Afterfeedingthenipplemayretractback,butdoingiteachtimebeforefeeding overaperiodoffewdayswill help to solve the problem.

Ifbreastsarenotemptied,themilkgetscollectedinthebreastleadingtoengorgement.Theengorgedbreastistight,shiny (becauseofedema)andpainful.Also,themilkmaystopflowing.Thefactorswhichcauseengorgementofbreastsare:

- Givingprelactealfeedstothebaby
- Delayed initiation of breastfeeds
- Longintervalsbetweenfeeds
- Earlyremovalofthebabyfromthebreast
- Bottle-feeding and any other restrictions on breastfeeding.Engorgement of the breast can be prevented by avoidingfactorsmentionedearlier.Ifthebabyisabletosuckle,heorshesh ouldfeedfrequently.Ifpainandtightnessofthebreastdoesnotallowsuckli

ng,expressedmilkmaybegiventotheinfantwithcup/spoon.Oncethem otherfeelscomfortable,sheshouldbeadvisedagaintobreastfeedtheinfa ntondemand.Edemaofthebreastsmaybereducedbyapplyingcoldcom ress.

Engorgedbreastsmaycausemildfever,whichsubsidesspontaneouslywith inadayor two

VI. The plan and organizational structure of the class

N	Elements of practical training	Time (minutes)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10
3.	Demonstration of technique of collection anamnesis and clinical examination in children by the teacher.	20
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age sick children.	25
5.	Filling down the protocols of examination of the sick child.	10
6.	Final control of knowledge, solving of clinical case	10
7.	studies.	2
	The tasks for independent preparation of students for the next class.	
TOTAL		80

2. Professional algorithms for training in practical skills.

N	Task	Directions	Remarks
1.	Master the basic syndromes CNS	Assess the condition of health of the patient, describe the symptoms of each syndrome	Pay attention on the set of symptoms
2.	Master the method of evaluating the composition of cerebrospinal fluid	Identify the features of cerebrospinal fluid in lesions of nervous system	Pay attention on the features of cerebrospinal fluid

VII. The materials of methodical provision of class

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Additional:

13. Clinical examination of the child. / OV Katilov, DV Dmitriev, KY Dmitriev and others. - Vinnitsa, 2017. - P. 358-385

14. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseases: Tutorial for students / S.Ilchenko, K. Duka, T. Yaroshevska, O. Korenyuk at al. - Dnepropetrovsk, 2013. - P. 158-165

15. Nelson textbook of pediatrics. – 21st ed./ edited by Robert M. Kliegman. Part XXVI. The Nervous System // www.mdconsult.com

11. Complementary foods, rules and timing of the introduction of complementary foods in children. Nutrition for children under 2 years old

Course II

Specialty Medicine

Number of education hours: 2 hours

Training location: classroom in the children's department

Mastitis and Abscess

Mastitisisaninflammationofthebreastwhichbecomesred,hot,tenderandswollen.Themotherfeelssick,hasfeverandseverepaininbreast.Mastitisusuallyaffectsapartofthebreastandusuallyunilateral.Mastitismaydevelopinanengorgedbreast,oritmayfollowaconditioncalledblockedduct.Mastitismust be treated promptly and adequately. If treatment isdelayedorincomplete,thereisanincreasedriskofdevelopingbreastabscess.Anabscessiswhenacollectionofpusformsinpartofthebreast.Themostimportantpartoftreatmentissupportivecounselingandimproveddrainageofmilkfromtheaffectedpartofthebreast.Themotherneedsclearinformationandguidanceaboutallmeasuresneededfortreatment,howtocont

inuebreastfeedingorexpressingmilkfromtheaffectedbreast. This is important to help the mother to improveinfant's attachment at the breast with frequent unrestrictedbreastfeeding.Ifnecessaryexpressbreastmilkbyhandorwith a pump until suckling is resumed. Antibiotic should be given,iflaboratorytestsindicateinfection,symptomsaresevere,orsymptomsdonotimproveafter12–24hoursofimprovedmilkremoval.Painshouldbetreatedwithananalgesicandwarmpackstothebreast.Incisionanddrainageshouldbedone,ifabscessdevelops.

Soreand Cracked Nipples

The most common cause of sorenipplesispoorattachmentin which the infant pulls the nipple in and out as he or shesucks and rubs the skin of the breast against his or her mouth.If the baby continues to suckle in this way, it damages thenippleskinandcausesacrackorfissure.Oralthrushintheinfant's mouth is another important cause of sore nipplebut it usually develops when a baby is few weeks old. Thesituationisverypainfulforthemother.Ifamotherhassoreorcracked nipples, improving infant's attachment to the breastrelieves the pain. Medicated creams are best avoided as theymayworsenthesoreness.Hindmilk,which is rich infat should be applied on the nipple after feeding. For oral thrush1%gentianvioletshouldbeappliedoverthenippleaswellasinsidethe baby's mouth

Breastfeedingand MaternalI llness

Maternalillnessescanhaveadverseeffectsonlactation.A sick woman may perceive that her milk supply has gonedownbecauseofillness.Shemayalsobelievethathermilkwillmake the baby ill. These factors may lead to discontinuationof breastfeeding. Minor illnesses such as cold and other mildviralinfection,whichareself-limiting,shouldnotpreventamother to continue breastfeeding. However, major illnessrequires a more careful approach. The potential role ofbreastfeedinginthetransmissionofinfectionsmustalsobeacknowledged andappropriateprecautionsshouldbetaken.If the mother has tuberculosis, the mother-infant dyad shouldbe treated together and breastfeeding should be continued.Similarly, in case of hepatitis (A, B and C) breastfeeding

cancontinuenormallyastheriskoftransmissionbybreastfeedingisverylow.Inhumanimmunodeficiencyvirus(HIV)positivemother, mother should be provided with counseling andsupportforappropriateinfantfeedingpractice.Withadequateandappropriateantiretroviraldrugstomotherandinfant,exclusivebreastfeedingforfirst6monthsoflifeisnowthepreferredrecommendationinIndia.

Certain maternal drugs may affect the breastfed infantadverselyastheyaresecretedinthebreastmilk.Breastfeedingshouldbeavoided,ifmotherisconsumingcytotoxicdrugs,likecyclophosphamide,methotrexateanddoxorubicin,radioactive compounds like gallium 67 (^{67}Ga), indium 111(^{111}In),iodine131(^{131}I)andtechnetium99m(^{99m}Tc).

Infant Feeding during Emergencies

Indisastersandemergencieslikeearthquakes,floods,typhoonsandtsunami,breastfeedingisthesafest,oftentheonlyreliablechoiceforinfantsandyoungchildren.Itprovidesadequateandappropriatenutritiontotheaffected infants in a situation where child survival is a keyissue.Indisasters,infantsaremorelikelytobecomeillanddiefrommalnutrition.Uncontrolleddistributionofbreastmilk substitutes during disasters may lead to early andunnecessary cessation of breastfeeding. For the vast majorityof infants, emphasis should be on protecting, promotingandsupportingbreastfeedingandensuringtimely,safeandappropriatecomplementaryfeeding.

Protecting Breastfeeding from Commercial Influence

During last many decades, extensive promotion by the infantfoodmanufacturingcompaniesthroughadvertisements,freesamples,giftsto mothers and health workers hasledtoconvincethemthatformulafeedingisasgoodas

breastfeeding. This has also made a dent in the confidenceof lactating women in her capacity to optimally breastfeedand has contributed to the decline of breastfeeding rates.Recognizing this trend, the Indian parliament enacted the“infant milk substitutes (IMS), feeding bottles and infantfoods (regulation of production, supply and distribution)Act1992IMSAct”.TheIMSActwasfurtheramendedintheyear2003.The IMSActcontrolsmarketingandpromotionof infant milk substitutes, infant foods and feeding bottles.SomesalientfeaturesoftheIMSActinclude:

- Itbansanykindofpromotionoradvertisementofinfantmilk substitutes, infant foods and feeding bottles to

thepublicincludingelectronicandprintmedia.

- Itprohibitsprovidingfreesamplesofinfantmilksubstitute, infant foods and feeding bottles and gifts to anyone including pregnant women, mothers of infants andmembersofthefamilies.
- Itprohibitsdonationoffreeorsubsidizedsuppliesofinfant milksubstitute,infantfoodsandfeedingbottlesforhealth-careinstitutionsexceptdonationstotheorphanages.
- It prohibits display of posters of infant milk substitutes,infant foods and feeding bottles at healthcare facilities,hospitalsandhealthcenters.
- It prescribes rules for information on the containers andlabels of infant milk substitutes and infant foods includinga specific statement in English and local languages that"mother'smilkisbestforthebaby"incapitalletters.
- Itprohibitshavingpicturesofinfantsorwomenorphrases designedtoincreasethesaleoftheproductonthelabelsoftheproducts.
- Itprohibitsanycontactofemployersmanufacturinganddistributing company with pregnant women even forprovidingeducationalmaterialtothem.
- It prohibits direct or indirect financial inducement orgifttohealthworkerortoanymembersofhisfamilybythe producer, supplier or distributor of the infant milksubstitute,infantfoodsandfeedingbottles.
- The IMS Act also prohibits offering or giving any contribution or pecuniary benefit to a health worker or anyassociation thereof including funding of seminar, meeting,conference,educationalcourse,contests,fellowship,

VI. The plan and organizational structure of the class

N	Elements of practical training	Time (minutes)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10
3.	Demonstration of technique of collection anamnesis and clinical examination in children by the teacher.	20
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age sick children.	25
5.	Filling down the protocols of examination of the sick child.	10

6. 7.	Final control of knowledge, solving of clinical case studies. The tasks for independent preparation of students for the next class.	10 2
TOTAL		80

2. Professional algorithms for training in practical skills.

N	Task	Directions	Remarks
1.	Master the basic syndromes CNS	Assess the condition of health of the patient, describe the symptoms of each syndrome	Pay attention on the set of symptoms
2.	Master the method of evaluating the composition of cerebrospinal fluid	Identify the features of cerebrospinal fluid in lesions of nervous system	Pay attention on the features of cerebrospinal fluid

VII. The materials of methodical provision of class

VII. 1. Materials for self-control for the preparatory stage of the class:

List of theoretical questions for self-control:

VIII. Literature

Basic:

6. T. Kapitan. Propaedeutic of children diseases and nursing of the child. Vinnitsa, 2012.-P.149-166.

Additional:

16. Clinical examination of the child. / OV Katilov, DV Dmitriev, KY Dmitriev and others. - Vinnitsa, 2017. - P. 358-385

17. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseases: Tutorial for students / S.Ilchenko, K. Duka, T. Yaroshevska, O. Korenyuk at al. - Dnepropetrovsk, 2013. - P. 158-165

18. Nelson textbook of pediatrics. – 21st ed./ edited by Robert M. Kliegman. Part XXVI. The Nervous System // www.mdconsult.com

Topic: 12. Natural and artificial nutrition of children. Complications of early and late introduction of complementary foods

Course II

Specialty Medicine

Number of education hours: 2 hours

Training location: classroom in the children's department

Support for mothers in the community

Health workers do not always have the opportunity to ensure that mothers successfully establish breastfeeding. Mothers may give birth at home, or they may be discharged from a maternity facility within a day or so after delivery. Difficulties may arise in the first few weeks with breastfeeding, and later on when complementary foods are needed. Illness of infants and young children is often associated with poor feeding. Families and friends are usually a mother's main source of advice about feeding her children, but this advice is sometimes fraught by misconceptions.

Mothers need continuing support to maintain exclusive and continued breastfeeding, to implement other methods of infant feeding when breastfeeding is not possible, and to establish adequate complementary feeding when the child is 6 months of age and older (*1*). If a child becomes ill, the mother may require skilled support from a health worker to continue feeding her child. This support can be provided by trained personnel in the community, and in various other settings, such as a primary care facility or a paediatric department in a hospital.

There should be no missed opportunities for supporting feeding in any contact that a mother and child have with the health system, whether it involves doctors, midwives, nurses or community health workers. Lay or peer counsellors who have the skills and knowledge to support optimal infant and young child feeding can also contribute to improved feeding practices (*2*). Collectively, all these providers should ensure a continuum of care from pregnancy through the postnatal period into early childhood. When they help a mother, they should also

talk to other family members, showing respect for their ideas, and helping them to understand advice on optimal feeding. In addition, they can share information and create awareness about the importance of appropriate infant and young child feeding through other channels, for example, by involving school children or extension workers from other sectors.

This multi-pronged approach to promoting and supporting infant and young child feeding has been shown to be effective in many settings (*3*).

Box 9 summarizes key points of contact that mothers might have with a health worker who is knowledgeable and skilled to support her in practising appropriate infant and young child feeding. Mothers who are not breastfeeding also need help with infant feeding at these times, and many of the skills needed by health workers to support them are similar.

5.2 Infant and young child feeding counselling

Infant and young child feeding counselling is the process by which a health worker can support mothers and babies to implement good feeding practices and help them overcome difficulties. Details of infant and young child feeding counselling depend on the child's age and the mother's circumstances. Generally, a health worker should:

Use good communication and support skills:

K Listen and learn

K Build confidence and give support.

Assess the situation:

K Assess the child's growth

K Take a feeding history

K Observe a breastfeed

K Assess the health of the child and the mother.

Manage problems and reinforce good practices:

K Refer the mother and child if needed

K Help the mother with feeding difficulties or poor practices

K Support good feeding practices

K Counsel the mother on her own health, nutrition and family planning.

5.3 Using good communication and support skills

If a health care worker is to effectively counsel a mother or other caregiver, he or she should have good communication skills. The same skills are useful in many situations, for example for family planning, and also in ordinary life. They may be described in slightly different ways and with different details in different publications, but the principles are the same. The tools described here include the basic skills useful in relation to infant and young child feeding. There are a number of similar tools that can be used for the same purpose.

VI. The plan and organizational structure of the class

N	Elements of practical training	Time (minutes)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10
3.	Demonstration of technique of collection anamnesis and clinical examination in children by the teacher.	20
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age sick children.	25
5.	Filling down the protocols of examination of the sick child.	10
6.	Final control of knowledge, solving of clinical case studies.	10
7.	The tasks for independent preparation of students for the next class.	2
TOTAL		80

2. Professional algorithms for training in practical skills.

N	Task	Directions	Remarks
1.	Master the basic syndromes CNS	Assess the condition of health of the patient, describe the symptoms of each syndrome	Pay attention on the set of symptoms

2.	Master the method of evaluating the composition of cerebrospinal fluid	Identify the features of cerebrospinal fluid in lesions of nervous system	Pay attention on the features of cerebrospinal fluid

VII. The materials of methodical provision of class

VII. 1. Materials for self-control for the preparatory stage of the class:

List of theoretical questions for self-control:

VIII. Literature

Basic:

7. T. Kapitan. Propaedeutic of children diseases and nursing of the child. Vinnitsa, 2012.-P.149-166.

Additional:

19. Clinical examination of the child. / OV Katilov, DV Dmitriev, KY Dmitriev and others. - Vinnitsa, 2017. - P. 358-385

20. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseases: Tutorial for students / S.Ilchenko, K. Duka, T. Yaroshevska, O. Korenyuk at al. - Dnepropetrovsk, 2013. - P. 158-165

21. Nelson textbook of pediatrics. – 21st ed./ edited by Robert M. Kliegman. Part XXVI. The Nervous System // www.mdconsult.com

13. Complementary feed preparation technology

Course II

Specialty Medicine

Number of education hours: 2 hours

Training location: classroom in the children's department

PURPOSE To provide guidance on nutritional and technical aspects of the production of Formulated Complementary Foods for Older Infants and Young Children as defined in Section 3.1, including: i. Formulation of such foods, based on the nutritional requirements of older infants and young children; ii. Processing techniques; iii. Hygienic requirements; iv. Provisions for packaging;

v. Provisions for labelling and instructions for use. 2. SCOPE The provisions of these Guidelines apply to Formulated Complementary Foods for Older Infants and Young Children as defined in Section 3.1 below and include but are not limited to porridges containing cereals, ready-to-use products and food-based home fortificants. Micronutrient supplements, processed cereal based foods1 , and canned baby foods2 are not covered by these Guidelines. These Guidelines should be used in accordance with the Global Strategy for Infants and Young Child Feeding and World Health Assembly Resolution WHA54.2 (2001). 3. DESCRIPTION 3.1 Formulated Complementary Foods for Older Infants and Young Children means foods that are suitable for use during the complementary feeding period. These foods are specifically formulated with appropriate nutritional quality to provide additional energy and nutrients to complement the family foods derived from the local diet by providing those nutrients which are either lacking or are present in insufficient quantities. 3.2 Older infants means persons from the age of 6 months and not more than 12 months of age. 3.3 Young children means persons from the age of more than 12 months up to the age of three years (36 months). 3.4 Complementary feeding period means the period when older infants and young children transition from exclusive feeding of breastmilk and/or breastmilk substitutes to eating the family diet3 . 4. SUITABLE RAW MATERIALS AND INGREDIENTS 4.1 Basic Raw Materials and Ingredients The following raw materials, most of which are locally available, are suitable ingredients for the production of Formulated Complementary Foods for older infants and young children under the specified conditions given below: 4.1.1 Cereals 4.1.1.1 All milled cereals suitable for human consumption may be used provided that they are processed in such a way as to reduce the fibre content, when necessary, and to decrease and, if possible, to eliminate antinutrients such as phytates, tannins or other phenolic materials, lectins, trypsin, and chymotrypsin inhibitors which can lower the protein quality and digestibility, amino acid bioavailability and mineral absorption. The use of appropriate enzymes may be considered to decrease fibre and anti-nutrients, if

needed. 4.1.1.2 Besides carbohydrates (mainly consisting of starch) cereals contain a significant quantity of protein (8-12%) but are limiting in the amino acid lysine. Combining cereals with legumes and/or pulses, which are higher in lysine, can compensate for the limiting level in cereals. 4.1.2 Legumes and Pulses 4.1.2.1 Legumes and pulses, such as chick peas, lentils, peas, cowpeas, mungo beans, green gram, kidney beans and soya beans, containing at least 20% protein on a dry weight basis.

On the whole, legumes and pulses are deficient in L-methionine. Depending on the nature of the other ingredients in the formulation, the addition of L-methionine may be desirable in order to improve the nutritional value of the product. 4.1.2.3 Legumes and pulses must be appropriately processed to reduce, as much as possible, the anti-nutritional factors normally present, such as phytate, lectins (haemagglutenins), trypsin and chymotrypsin inhibitors. When phytoestrogen containing legumes and pulses such as soya are added as an ingredient, products with low levels of phytoestrogens should be used. Lectins can be reduced by moist heat treatment;• Trypsin inhibitor activity may be reduced to acceptable levels by heating to high temperatures or• by prolonged boiling. Phytate can be reduced enzymatically or by soaking or fermentation.• Phytoestrogens can be reduced by fermentation.• 4.1.2.4 Field beans or faba beans (Viciafaba L.) should not be used in the formulation of Complementary Food for Older Infants and Young Children because of the danger of favism. Heat treatment does not completely inactivate the toxic components (vicine and co-vicine). 4.1.3 Oil Seed Flours and Oil Seed Protein Products 4.1.3.1 Flours, protein concentrates and protein isolates of oil seeds are acceptable if manufactured to appropriate specifications4,5,6,7 which assure sufficient reduction of anti-nutritional factors and undesirable toxic substances such as trypsin and chymotrypsin inhibitors and gossypol. The decision to add oil seeds flour to a formulated complementary food should take into account local conditions and requirements. Such oil seeds may include Soya beans: dehulled flour, (full fat and defatted) protein concentrate, protein isolate Groundnuts:

paste, protein isolate Sesame seed: whole ground and defatted flour Cottonseed: defatted flour Sunflower seed: defatted flour, full fat Low erucic acid rapeseed: full fat flour. 4.1.3.2 Defatted oil seed flours and protein isolates, if produced and appropriately processed for human consumption, can be good sources of protein (50-95%). 4.1.4 Animal Source Foods Animal source foods such as meat, fish, poultry, eggs, milk and milk products are nutrient dense and good sources of high quality proteins and micronutrients and incorporation of these foods or their derived protein concentrates in Formulated Complementary Foods as technologically feasible is encouraged. 4.1.5 Fats and Oils 4.1.5.1 Fats and oils can be incorporated in adequate quantities as technologically feasible for the purpose of increasing the energy density of the product. Care must be taken to avoid oxidized fat which will adversely affect nutrition, flavour and shelf life. Such care is important for fat-containing ingredients (e.g., oil seed flours and oil seed protein products, fish meals, and fish protein concentrates) as well as fats and oils. 4.1.5.2 Partially hydrogenated fats (and oils) should not be used in Formulated Complementary Foods. 4.1.6 Fruits and Vegetables Fruits and vegetables may be good sources of micronutrients and can be added to Formulated Complementary Foods, when technologically feasible

Other Ingredients Other ingredients, including those listed below, may be used to improve the nutritional quality and/or acceptability of the Formulated Complementary Foods provided that they are readily available and have been proven to be suitable and safe for their intended purpose. 4.2.1 Digestible carbohydrates Energy density of Formulated Complementary Foods can be increased by the addition of appropriate digestible carbohydrates. 4.2.2 Food additives and flavourings Food additives and flavourings listed in the Standard for Processed Cereal-Based Foods for Infants and Young Children (CODEX STAN 74-1981) and the Standard for Canned Baby Foods (CODEX STAN 73-1981) may be used in Formulated Complementary Foods to the maximum limits given in those Standards. Only the food additives referred to in those Standards may be present in the foods covered by these Guidelines, as a result of carry-

over from a raw material or other ingredients (including food additives) used to produce the food, subject to the following conditions: a) The amount of the food additive in the raw materials or other ingredients (including food additives) does not exceed the maximum level specified; and b) The food into which the food additive is carried over does not contain the food additive in greater quantity than would be introduced by the use of the raw material or ingredients under good manufacturing practice, consistent with the provisions on carry-over in the Preamble of the General Standard for Food Additives (CODEX STAN 192-1995). 5. TECHNOLOGIES FOR AND EFFECTS OF PROCESSING 5.1 Preliminary Treatment of Raw Materials Cereals, legumes, pulses and oilseeds should first be treated to obtain wholesome and clean raw materials of good quality. Such treatments include, but are not limited to: 5.1.1 Cleaning or washing: to eliminate dirt, damaged grains, foreign grains and noxious seeds, insects and insect excreta and any adhering material. 5.1.2 Dehulling: when necessary, pulses, legumes, oilseeds and certain cereals such as oats, barley, sorghum, millet and teff should be dehulled as completely as is feasible to reduce the fibre content to acceptable levels and to decrease, and if possible, to eliminate phytates, tannins and other phenolic materials, trypsin and chymotrypsin inhibitors which can lower the protein digestibility and amino acid bioavailability and mineral absorption. 5.1.3 Degermination: where necessary and appropriate, degermination of wheat, corn, soy and other crops should be considered in order to reduce the phytate content. 5.2 Milling 5.2.1 Milling or grinding of suitable raw materials should be carried out in such a way as to minimize the loss of nutritional value and to avoid undesirable changes in the technological properties of the ingredients. 5.2.2 Dry raw materials may be milled together, if technologically feasible, or mixed after milling or grinding. 5.2.3 Formulations containing milled cereals, legumes, pulses and/or oilseeds that have not been otherwise processed require adequate boiling to gelatinize the starch portions and/or eliminate anti-nutritional factors present in legumes and pulses. Boiling improves the digestibility and absorption of nutrients. 5.2.4 The

bulkiness of foods from food formulations containing dry ingredients obtained by milling of the raw materials can be reduced by adding, during the formulation, adequate amounts of enzymes such as alphaamylase which, during the slow heating to boiling, predigest partially the starch and reduce the amount of water needed for the preparation of the food. 5.3 Toasting 5.3.1 Toasting (dry heating) enhances the flavour and the taste of the food through dextrinization of starch. It also improves digestibility and contributes to reducing the bulkiness of the formulated food. Moreover, it reduces microorganisms and enzyme activity and destroys insects, thus improving keeping qualities.

2 Protein damage due to the Maillard reaction may occur in the presence of reducing carbohydrates. The toasting process should therefore be carefully controlled. 5.3.3 Pulses as well as oilseeds such as soya beans, groundnuts and sesame seeds can be toasted as whole grains directly or after soaking. 5.3.4 Toasted raw materials can be milled or ground for use as ingredients. 5.4 Sprouting, Malting and Fermentation 5.4.1 Cereals and pulses can be induced to germinate by soaking or humidifying. It is necessary, however, to ensure that growth of mycotoxin producing microorganisms does not occur. The action of natural amylases contained in the grains results in the predigestion of the starchy portion of the grain (dextrinization) thus reducing the bulk of the food when prepared for feeding and, ultimately, increasing the nutrient density of the food. Sprouting, malting and fermentation can induce hydrolysis of phytates and decrease its inhibitory effect on mineral absorption, and may improve B vitamin content. 5.4.2 During the germination process, the seed coat of the grain splits and can be removed by washing. The malted raw material is milled or ground after drying. 5.5 Other Processing Technologies 5.5.1 Extrusion Cooking 5.5.1.1 The mix of milled or ground basic ingredients (cereals, pulses, oilseed flours) may be further processed by extrusion cooking. Extrusion cooking may decrease available L-lysine, sulphur-containing amino acids, Larginine, L-tryptophan and vitamins. The process should therefore be carefully controlled. The extruded product, after drying if necessary, is milled or ground to the desired particle size.

5.5.1.2 The effects of this technology are: gelatinization of the starchy portion of the mixture with minimal quantities of water;• inactivation of lectins and reduction of trypsin inhibitor activity;• a reduction in the quantities of water needed for preparation of the food;• flavour development.• 5.5.2 Enzymatic Predigestion 5.5.2.1 With this process the milled or ground basic ingredients (cereals, pulses, and oilseed flours) can be processed in the presence of water and appropriate enzymes under continuous stirring until the mixture acquires the desired fluidity. In the case of the use of amylase, starch molecules are split into dextrins and reducing sugars. After raising the temperature to inactivate the enzyme, the slurry is dried and comminuted to flour or to small flakes to allow for greater nutrient density. 5.5.2.2 The predigested product may have improved organoleptic characteristics, higher digestibility, good solubility, requires less water for the preparation of the food, and hence higher nutrient density.

VI. The plan and organizational structure of the class

N	Elements of practical training	Time (minutes)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10
3.	Demonstration of technique of collection anamnesis and clinical examination in children by the teacher.	20
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age sick children.	25
5.	Filling down the protocols of examination of the sick child.	10
6.	Final control of knowledge, solving of clinical case studies.	10
7.	The tasks for independent preparation of students for the next class.	2
TOTAL		80

2. Professional algorithms for training in practical skills.

N	Task	Directions	Remarks

1.	Master the basic syndromes CNS	Assess the condition of health of the patient, describe the symptoms of each syndrome	Pay attention on the set of symptoms
2.	Master the method of evaluating the composition of cerebrospinal fluid	Identify the features of cerebrospinal fluid in lesions of nervous system	Pay attention on the features of cerebrospinal fluid

VII. The materials of methodical provision of class

VII. 1. Materials for self-control for the preparatory stage of the class:

List of theoretical questions for self-control:

VIII. Literature

Basic:

8. T. Kapitan. Propaedeutic of children diseases and nursing of the child. Vinnitsa, 2012.-P.149-166.

Additional:

22. Clinical examination of the child. / OV Katilov, DV Dmitriev, KY Dmitriev and others. - Vinnitsa, 2017. - P. 358-385

23. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseases: Tutorial for students / S.Ilchenko, K. Duka, T. Yaroshevska, O. Korenyuk at al. - Dnepropetrovsk, 2013. - P. 158-165

24. Nelson textbook of pediatrics. – 21st ed./ edited by Robert M. Kliegman. Part XXVI. The Nervous System // www.mdconsult.com

Topic: 14. Rational nutrition for children over 2 years old

Course II

Specialty Medicine

Number of education hours: 2 hours

Training location: classroom in the children's department

NUTRITIONAL COMPOSITION AND QUALITY FACTORS 6.1 General Aspects 6.1.1 The selection of raw materials and ingredients for the formulation of Formulated Complementary Foods for Older Infants and Young Children should be made having regard to the provisions in Sections 4 and 5 and taking into account the following aspects: nutrient content of the local diet;• dietary habits and infant feeding practices;• other socio-economic aspects as determined by the national authorities dealing with nutrition;• availability and quality of raw materials and ingredients.• 6.1.2 All processing should be carried out in a manner that maintains protein quality and minimizes loss of micronutrients and maintains overall nutritive value.

Ten to fifty grammes of the Formulated Complementary Food, when prepared according to the instructions, is considered a reasonable quantity which an older infant or young child during the complementary feeding period can ingest easily in one feeding and who may receive two or more feedings per day, depending on age. The range in amount per feeding allows for the various types of Formulated Complementary Foods. The lower part of the range applies to products with higher energy density (e.g. lipid-based products) whereas the upper part of the range would apply to products with lower energy density (e.g. porridges containing cereals). 6.2 Energy 6.2.1 The energy density of a mixture of milled cereals and pulses and defatted oilseed meals and flours on dry weight basis is relatively low. 6.2.2 The energy density of the food can be increased during manufacture by the addition of energy containing ingredients (i.e. fats and oils and/or digestible carbohydrates) and/or processing the basic raw materials and ingredients as indicated in Section 5. 6.2.3 The energy density of the Formulated Complementary Food should be at least 4 kcal per gram on dry weight basis. 6.3 Proteins 6.3.1 Mixtures of cereals, legumes, pulses and/or oilseed flours, can constitute an appropriate source of proteins, provided that the proteins in the Formulated Complementary Food satisfy the criteria below. Protein quality can also be improved by the inclusion of fish products, milk and milk products and/or other animal source foods. 6.3.2 The Protein Digestibility

Corrected Amino Acid Score (PDCAAS)8910 should not be less than 70 per cent of that of the WHO amino acid reference pattern for children from 2 – 5 years . 6.3.3 If, for technical reasons, the PDCAAS digestibility of a protein cannot be determined, the protein quality should be measured by biological assays. Alternatively, the protein quality may be calculated from published data on essential amino acid patterns of dietary proteins and their digestibility. 6.3.4 The addition of methionine, lysine, tryptophan or other limiting amino acids, solely in the L-form should be contemplated only when, for economic and technological reasons, no mixture of vegetable and/or animal proteins makes it possible to obtain an adequate protein quality (see 6.3.2). 6.3.5 Taking into account the preceding considerations, the energy from protein11 should not be less than 6 % of the total energy from the product and typically should not exceed 15%12 6.4 Fat 6.4.1 Incorporation of fats and/or oils in Formulated Complementary Foods serves to increase the energy density and the amount of essential fatty acids as well as reduce total volume of the food consumed. At least 20 % of energy derived from fat13 is desirable. 6.4.2 The level of linoleic acid (in the form of glycerides) should not be less than 333 mg per 100 kcal or 1.6 g per 100 g of dry product and the fat or oil when used in the production of Formulated Complementary Foods should ensure a ratio between linoleic acid and alpha-linolenic acid of between 5:1 and 15:1. 6.4.3 The use of edible oils containing polyunsaturated fatty acids, including omega-3 fatty acids and in particular docosahexaenoic acid, should be considered. The levels in the FAO/WHO recommendations14 may be considered.

Carbohydrates 6.5.1 Starch is likely to be a major constituent of many Formulated Complementary Foods. To ensure that its energy value is realized, this starch should be provided in a readily digestible form. Guidance on increasing the digestibility of starches is given in Section 5. Any carbohydrate added for sweetness should be used sparingly. 6.5.2 Dietary fibres and other non-absorbable carbohydrates are partially fermented by the intestinal flora to produce short-chain fatty acids, lactate and ethanol which may subsequently be

absorbed and metabolized. Increasing the intake of dietary fibres15 increases stool bulk, may cause flatulence and decrease appetite. Fibre load also can reduce the energy density of Formulated Complementary Foods. They also may affect the efficiency of absorption of important nutrients from diets with marginal nutrient contents. The dietary fibre content of the Formulated Complementary Food should therefore be reduced to a level not exceeding 5 g per 100 g on a dry weight basis. 6.6 Vitamins and Minerals 6.6.1 Setting levels for the addition of vitamins and minerals 6.6.1.1 The decision to add vitamins and minerals to a Formulated Complementary Food should take into account local conditions including the nutrient contribution to the diet from local foods, vitamins and minerals provided by national programs, food processing technologies applied and the nutritional status of the target population as well as the requirements stipulated by national legislation and the General Principles for the Addition of Essential Nutrients to Foods (CAC/GL 9-1987). 6.6.1.2 If the dietary intake data for the target population are available, they can be used to determine appropriate levels for the addition of vitamins and/or minerals to ensure a low prevalence of either inadequate or excessive nutrient intakes using available assessment or monitoring tools. 6.6.1.3 If the dietary intake data for the target population is not available, the vitamins and minerals listed in the Table in the Annex to these Guidelines can be used as a reference for the selection of particular vitamins and minerals and their amounts for addition to a Formulated Complementary Food. 6.6.2 National authorities should ensure that the total micronutrient intake from the Formulated Complementary Foods, local diet (including breastmilk and/or breastmilk substitutes) and other sources do not regularly exceed recommended upper levels of micronutrient intake for older infants and young children. 6.6.3 Selecting vitamins and/or minerals for nutrient addition 6.6.3.1 When establishing the specifications for the premix of vitamin compounds and mineral salts, the vitamin and mineral content and presence of antinutritive substances in the other ingredients used in the formulation of the food should be taken into account. 6.6.3.2 Vitamins and/or minerals should be

selected from the Advisory Lists of Nutrient Compounds for Use in Foods for Special Dietary Uses intended for Infants and Young Children (CAC/GL 10-1979) those authorised for cereal-based foods and canned baby foods. 6.6.3.3 The choice of a vitamin and/or mineral compound should take into account its relative bioavailability within the food vehicle, the effect on the sensory properties of the food vehicle and its stability in the packaged food vehicle under normal storage conditions. The General Principles for the Addition of Essential Nutrients to Foods (CAC/GL 9-1987) provides specific guidelines in this area. 7. CONTAMINANTS 7.1 Pesticides Residues The products should be prepared with special care under good manufacturing practices, so that residues of those pesticides which may be required in the production, storage or processing of the raw materials or the finished food ingredients do not remain, or, if technically unavoidable, are reduced to the maximum extent possible. These measures should take into account the specific nature of the products concerned and the specific population group for which they are intended.

Other Contaminants The product should not contain contaminants or other undesirable substances (e.g. biologically active substances) in amounts which may represent a hazard to the health of older infants and young children. The product covered by the provisions of these Guidelines shall comply with those maximum residue limits and maximum levels established by the Codex Alimentarius Commission. 8. HYGIENE 8.1 It is recommended that the products covered by the provisions of these Guidelines be prepared and handled in accordance with the appropriate sections of the General Principles of Food Hygiene (CAC/RCP 1-1969) and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice. The product should comply with any microbiological criteria established in accordance with the Principles and Guidelines for the Establishment and Application of Microbiological Criteria Related to Foods (CAC/GL 21- 1997). 8.2 The ingredients and final product should be prepared, packed and held under sanitary conditions and should comply with relevant Codex texts16 . 9. PACKAGING 9.1 It is recommended

that Formulated Complementary Foods for Older Infants and Young Children be packed in containers which will safeguard the hygienic and other qualities of the food. 9.2 The containers, including packaging material, shall be made only of materials which are safe and suitable for their intended uses. Where the Codex Alimentarius Commission has established a standard for any such substance used as packaging material, that standard shall apply. 10. LABELLING 10.1 It is recommended that the labelling of Formulated Complementary Foods for Older Infants and Young Children be in accordance with the General Standard for the Labelling of and Claims for Prepackaged Foods for Special Dietary Uses (CODEX STAN 146-1985), the Guidelines for Use of Nutrition and Health Claims (CAC/GL 23-1997) and the Guidelines on Nutrition Labelling (CAC/GL 2-1985). 10.2 The following mandatory provisions should apply: 10.2.1The Name of the Food The name of the food to be declared on the label shall indicate that the food is a Formulated Complementary Food for Older Infants and Young Children. The appropriate designation indicating the true nature of the food should be in accordance with national legislation. The major sources of protein and the age from which the product is recommended for use shall appear in close proximity to the name of the food. 10.2.2 List of Ingredients The list of ingredients shall be declared in accordance with Section 4.2 of the General Standard for the Labelling of Prepackaged Foods (CODEX STAN 1-1985). 10.2.3 Declaration of Nutritive Value The declaration of energy and nutrients on the label or in labelling shall contain the following information expressed per 100 grammes of the Formulated Complementary Food as sold or otherwise distributed as well as per feeding of the food ready for consumption: (a) energy value, expressed in kilocalories and kilojoules; (b) the amounts of protein, carbohydrates and fat, expressed in grammes; (c) in addition to any other nutritional information required by national legislation, the total quantity per feeding of the Formulated Complementary Food ready for consumption of each vitamin and mineral added in accordance with Section 6.6, expressed in metric units.

Instructions for use 10.2.4.1 The label should indicate clearly from which age the product is recommended for use. This age shall not be less than six months for any product. In addition, the label shall include a statement indicating that the decision when precisely to introduce formulated complementary feeding, including any exception to six months of age, should be made in consultation with a health worker, based on the individual infant's specific growth and development needs. Additional requirements in this respect may be made in accordance with the legislation of the country in which the product is sold. 10.2.4.2 Directions as to the preparation and use of the food shall be given; preferably accompanied by graphical presentations. 10.2.4.3 The suggested number of feedings per day should be indicated. 10.2.4.4 In the case that addition of water is needed, the directions for the preparation shall include a precise statement that: (a) where the food contains non-heat-processed basic ingredients, the food must be adequately boiled in a prescribed amount of water; (b) where the food contains heat-processed basic ingredients: (i) the food requires boiling, or (ii) can be mixed with boiled water that has been cooled. 10.2.4.5 For Formulated Complementary Foods to which fats, sugars or other digestible carbohydrates should be added during preparation, the instructions for use shall identify appropriate sources and indicate the amounts of the ingredients to be added. In such situations, fats and oils with an appropriate essential fatty acid ratio should be recommended. 10.2.4.6 Directions for use shall include a statement that only an amount of food sufficient for one feeding occasion should be prepared at one time. Foods not consumed during the feeding occasion should be discarded, unless consumed within a period as recommended by the manufacturer under the instructions for use. 10.2.4.7 The label should also include a statement that Formulated Complementary Foods are to be consumed to complement family foods and breastmilk/breastmilk substitutes. 11. Additional Requirements: The products covered by these Guidelines are not breastmilk substitutes and shall not be presented as such.

VI. The plan and organizational structure of the class

N	Elements of practical training	Time (minutes)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10
3.	Demonstration of technique of collection anamnesis and clinical examination in children by the teacher.	20
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age sick children.	25
5.	Filling down the protocols of examination of the sick child.	10
6.	Final control of knowledge, solving of clinical case studies.	10
7.	The tasks for independent preparation of students for the next class.	2
TOTAL		80

2. Professional algorithms for training in practical skills.

N	Task	Directions	Remarks
1.	Master the basic syndromes CNS	Assess the condition of health of the patient, describe the symptoms of each syndrome	Pay attention on the set of symptoms
2.	Master the method of evaluating the composition of cerebrospinal fluid	Identify the features of cerebrospinal fluid in lesions of nervous system	Pay attention on the features of cerebrospinal fluid

VII. The materials of methodical provision of class

VII. 1. Materials for self-control for the preparatory stage of the class:

List of theoretical questions for self-control:

VIII. Literature

Basic:

9. T. Kapitan. Propaedeutic of children diseases and nursing of the child. Vinnitsa, 2012.-P.149-166.

Additional:

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27. Nelson textbook of pediatrics. – 21st ed./ edited by Robert M. Kliegman. Part XXVI. The Nervous System // www.mdconsult.com

Topic: 15. Anatomic and physiological features of the skin, subcutaneous fat, lymphoid system

Course II

Specialty Medicine

Number of education hours: 2 hours

Training location: classroom in the children's department

Skin diseases affect 20-33% of the population at any one time, and around 54% of the UK population will experience a skin condition in a given year. Nurses observe the skin of their patients daily and it is important they understand the skin so they can recognise problems when they arise. This article, the first in a two-part series on the skin, looks at its structure and function.
Citation: Lawton S (2019) Skin 1: the structure and functions of the skin. *Nursing Times* [online]; 115, 12, 30-33.
Author: Sandra Lawton, Queen's Nurse and nurse consultant and clinical lead dermatology, The Rotherham NHS Foundation Trust.

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Introduction

Skin diseases affect 20-33% of the UK population at any one time (All Parliamentary Group on Skin, 1997) and surveys suggest around 54% of the UK population will experience a skin condition in a given year (Schofield et al,

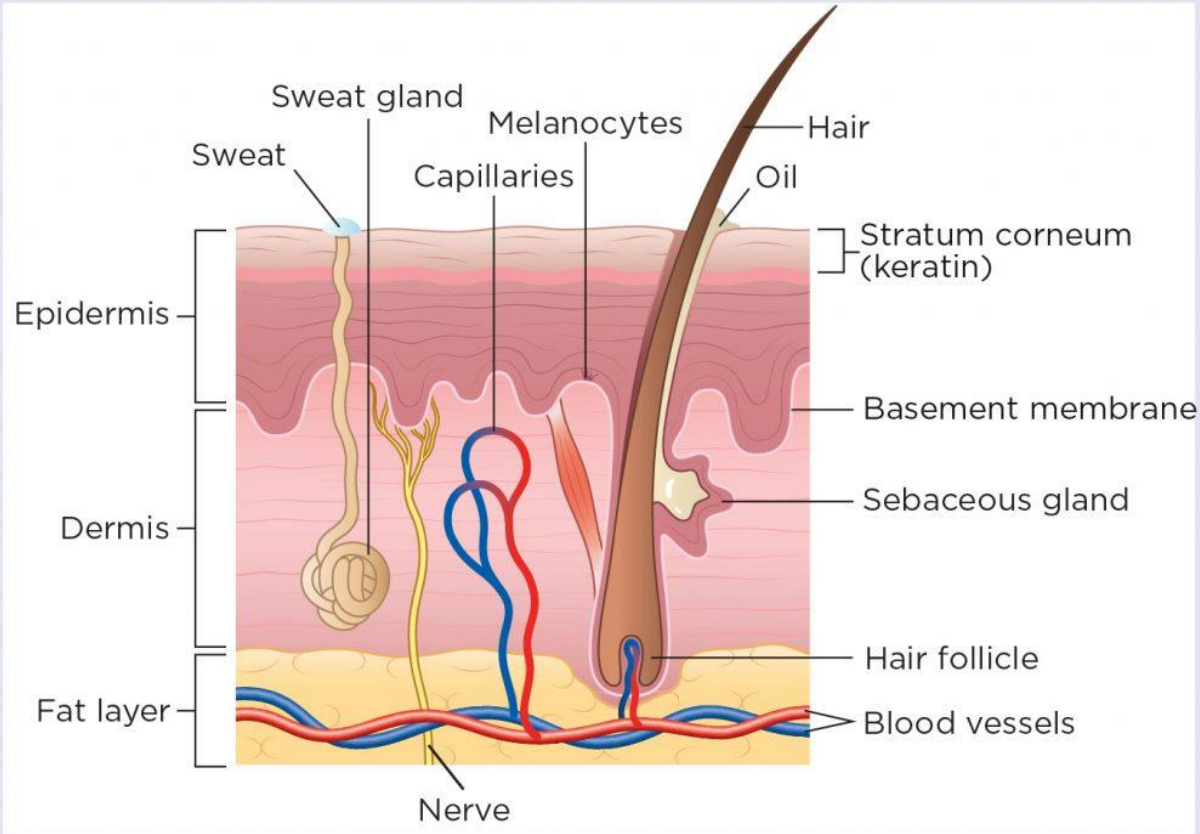
2009). Nurses will observe the skin daily while caring for patients and it is important they understand it so they can recognise problems when they arise.

The skin and its appendages (nails, hair and certain glands) form the largest organ in the human body, with a surface area of 2m2 (Hughes, 2001). The skin comprises 15% of the total adult body weight; its thickness ranges from <0.1mm at its thinnest part (eyelids) to 1.5mm at its thickest part (palms of the hands and soles of the feet) (Kolarsick et al, 2011). This article reviews its structure and functions.

Structure of the skin

The skin is divided into several layers, as shown in Fig 1. The epidermis is composed mainly of keratinocytes. Beneath the epidermis is the basement membrane (also known as the dermo-epidermal junction); this narrow, multilayered structure anchors the epidermis to the dermis. The layer below the dermis, the hypodermis, consists largely of fat. These structures are described below.

Fig 1. **Cross-section through the skin**



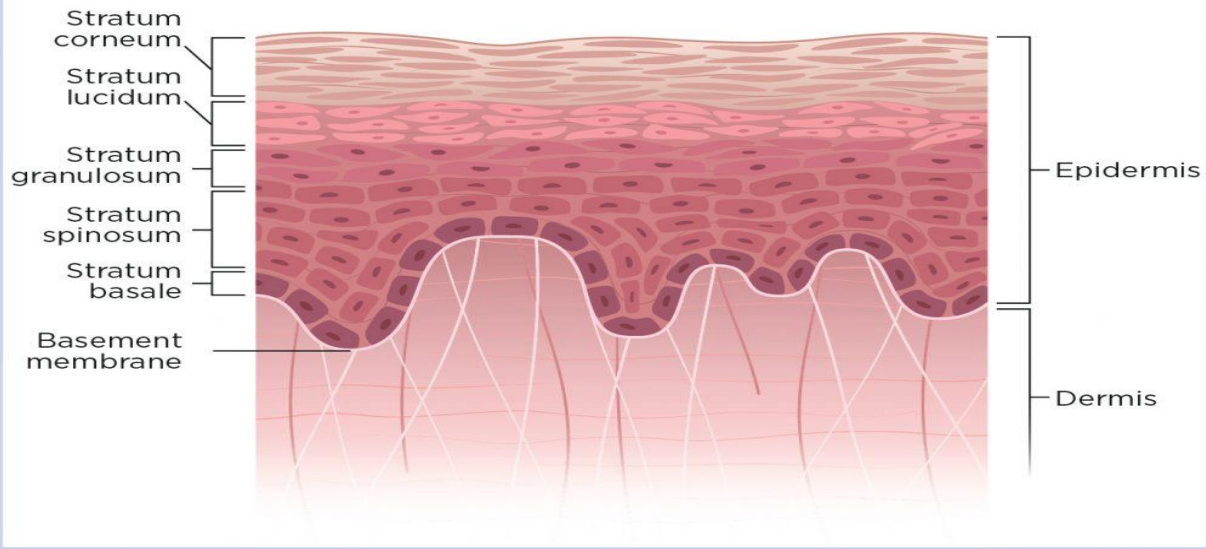
Epidermis

The epidermis is the outer layer of the skin, defined as a stratified squamous epithelium, primarily comprising keratinocytes in progressive stages of differentiation (Amirlak and Shahabi, 2017). Keratinocytes produce the protein keratin and are the major building blocks (cells) of the epidermis. As the epidermis is avascular (contains no blood vessels), it is entirely dependent on the underlying dermis for nutrient delivery and waste disposal through the basement membrane.

The prime function of the epidermis is to act as a physical and biological barrier to the external environment, preventing penetration by irritants and allergens. At the same time, it prevents the loss of water and maintains internal homeostasis (Gawkrodger, 2007; Cork, 1997). The epidermis is composed of layers; most body parts have four layers, but those with the thickest skin have five. The layers are:

- Stratum corneum (horny layer);
- Stratum lucidum (only found in thick skin – that is, the palms of the hands, the soles of the feet and the digits);
- Stratum granulosum (granular layer);
- Stratum spinosum (prickle cell layer);
- Stratum basale (germinative layer).

Fig 2. **Layers of the skin**



The epidermis also contains other cell structures. Keratinocytes make up around 95% of the epidermal cell population – the others being melanocytes, Langerhans cells and Merkel cells (White and Butcher, 2005).

Keratinocytes. Keratinocytes are formed by division in the stratum basale. As they move up through the stratum spinosum and stratum granulosum, they differentiate to form a rigid internal structure of keratin, microfilaments and microtubules (keratinisation). The outer layer of the epidermis, the stratum corneum, is composed of layers of flattened dead cells (corneocytes) that have lost their nucleus. These cells are then shed from the skin (desquamation); this complete process takes approximately 28 days

Between these corneocytes there is a complex mixture of lipids and proteins (Cork, 1997); these intercellular lipids are broken down by enzymes from keratinocytes to produce a lipid mixture of ceramides (phospholipids), fatty acids and cholesterol. These molecules are arranged in a highly organised fashion, fusing with each other and the corneocytes to form the skin's lipid barrier against water loss and penetration by allergens and irritants (Holden et al, 2002).

The stratum corneum can be visualised as a brick wall, with the corneocytes forming the bricks and lamellar lipids forming the mortar. As corneocytes contain a water-retaining substance – a natural moisturising factor – they attract and hold water. The high water content of the corneocytes causes them to swell, keeping the stratum corneum pliable and elastic, and preventing the formation of fissures and cracks (Holden et al, 2002; Cork, 1997). This is an important consideration when applying topical medications to the skin. These are absorbed through the epidermal barrier into the underlying tissues and structures (percutaneous absorption) and transferred to the systemic circulation.

The stratum corneum regulates the amount and rate of percutaneous absorption (Rudy and Parham-Vetter, 2003). One of the most important factors affecting this is skin hydration and environmental humidity. In healthy skin with normal hydration, medication can only penetrate the stratum corneum by passing through the tight, relatively dry, lipid barrier between cells. When skin hydration is increased or the normal skin barrier is impaired as a result of skin disease, excoriations, erosions, fissuring or prematurity, percutaneous absorption will be increased (Rudy and Parham-Vetter, 2003).

Melanocytes. Melanocytes are found in the stratum basale and are scattered among the keratinocytes along the basement membrane at a ratio of one

melanocyte to 10 basal cells. They produce the pigment melanin, manufactured from tyrosine, which is an amino acid, packaged into cellular vesicles called melanosomes, and transported and delivered into the cytoplasm of the keratinocytes (Graham-Brown and Bourke, 2006). The main function of melanin is to absorb ultraviolet (UV) radiation to protect us from its harmful effects. Skin colour is determined not by the number of melanocytes, but by the number and size of the melanosomes (Gawkrodger, 2007). It is influenced by several pigments, including melanin, carotene and haemoglobin. Melanin is transferred into the keratinocytes via a melanosome; the colour of the skin therefore depends of the amount of melanin produced by melanocytes in the stratum basale and taken up by keratinocytes.

Melanin occurs in two primary forms:

- Eumelanin – exists as black and brown;
- Pheomelanin – provides a red colour.

Skin colour is also influenced by exposure to UV radiation, genetic factors and hormonal influences (Biga et al, 2019).

Langerhans cells. These are antigen (micro-organisms and foreign proteins)-presenting cells found in the stratum spinosum. They are part of the body's immune system and are constantly on the lookout for antigens in their surroundings so they can trap them and present them to T-helper lymphocytes, thereby activating an immune response (Graham-Brown and Bourke, 2006; White and Butcher, 2005).
Merkel cells. These cells are only present in very small numbers in the stratum basale. They are closely associated with terminal filaments of cutaneous nerves and seem to have a role in sensation, especially in areas of the body such as palms, soles and genitalia (Gawkrodger, 2007; White and Butcher, 2005).
Basement membrane zone
(dermo-epidermal junction)
This is a narrow, undulating, multi-layered structure lying between the epidermis and dermis, which supplies cohesion between the two layers (Amirlak and Shahabi, 2017; Graham-Brown and Bourke, 2006). It is composed of two layers:

- Lamina lucida;
- Lamina densa.

The lamina lucida is the thinner layer and lies directly beneath the stratum basale. The thicker lamina densa is in direct contact with the underlying dermis.

It undulates between the dermis and epidermis and is connected via rete ridges called dermal papillas, which contain capillary loops supplying the epidermis with nutrients and oxygen.

This highly irregular junction greatly increases the surface area over which the exchange of oxygen, nutrients and waste products occurs between the dermis and the epidermis (Amirlak and Shahabi, 2017).

Dermis

The dermis forms the inner layer of the skin and is much thicker than the epidermis (1-5mm) (White and Butcher, 2005). Situated between the basement membrane zone and the subcutaneous layer, the primary role of the dermis is to sustain and support the epidermis. The main functions of the dermis are:

- Protection;
- Cushioning the deeper structures from mechanical injury;
- Providing nourishment to the epidermis;
- Playing an important role in wound healing.

The network of interlacing connective tissue, which is its major component, is made up of collagen, in the main, with some elastin. Scattered within the dermis are several specialised cells (mast cells and fibroblasts) and structures (blood vessels, lymphatics, sweat glands and nerves).

The epidermal appendages also lie within the dermis or subcutaneous layers, but connect with the surface of the skin (Graham-Brown and Bourke, 2006).

Layers of dermis. The dermis is made up of two layers:

- The more superficial papillary dermis;
- The deeper reticular dermis.

The papillary dermis is the thinner layer, consisting of loose connective tissue containing capillaries, elastic fibres and some collagen. The reticular dermis consists of a thicker layer of dense connective tissue containing larger blood vessels, closely interlaced elastic fibres and thicker bundles of collagen (White and Butcher, 2005). It also contains fibroblasts, mast cells, nerve endings, lymphatics and epidermal appendages. Surrounding these structures is a viscous gel that:

- Allows nutrients, hormones and waste products to pass through the dermis;
- Provides lubrication between the collagen and elastic fibre networks;
- Gives bulk, allowing the dermis to act as a shock absorber (Hunter et al, 2003).

Specialised dermal cells and structures. The fibroblast is the major cell type of the dermis and its main function is to synthesise collagen, elastin and the viscous gel within the dermis. Collagen – which gives the skin its toughness and strength – makes up 70% of the dermis and is continually broken down and replaced; elastin fibres give the skin its elasticity (Gawkrodger, 2007). However both are affected by increasing age and exposure to UV radiation, which results in sagging and stretching of the skin as the person gets older and/or is exposed to greater amounts of UV radiation (White and Butcher, 2005).
Mast cells contain granules of vasoactive chemicals (the main one being histamine). They are involved in moderating immune and inflammatory responses in the skin (Graham-Brown and Bourke, 2006).

Blood vessels in the dermis form a complex network and play an important part in thermoregulation. These vessels can be divided into two distinct networks:

- Superficial plexus – made up of interconnecting arterioles and venules lying close to the epidermal border, and wrapping around the structures of the dermis, the superficial plexus supplies oxygen and nutrients to the cells;
- Deep plexus – found deeper at the border with the subcutaneous layer, its vessels are more substantial than those in the superficial plexus and connect vertically to the superficial plexus (White and Butcher, 2005).

The lymphatic drainage of the skin is important, the main function being to conserve plasma proteins and scavenge foreign material, antigenic substances and bacteria (Amirlak and Shahabi, 2017).

About 1 million nerve fibres serve the skin – sensory perception serves a critically important protective and social/sexual function. Free sensory nerve endings are found in the dermis as well as the epidermis (Merkel cells) and detect pain, itch and temperature. There are also specialised receptors – Pacinian corpuscles – that detect pressure and vibration; and Meissner’s corpuscles, which are touch-sensitive.

The autonomic nerves supply the blood vessels and sweat glands and arrector pili muscles (attached to the hair) (Gawkrodger, 2007).

Hypodermis

The hypodermis is the subcutaneous layer lying below the dermis; it consists largely of fat. It provides the main structural support for the skin, as well as insulating the body from cold and aiding shock absorption. It is interlaced with blood vessels and nerves.

Functions of the skin

The skin has three main functions:

- Protection;
- Thermoregulation;
- Sensation.

Within this, it performs several important and vital physiological functions, as outlined below (Graham-Brown and Bourke, 2006).

Protection

The skin acts as a protective barrier from:

- Mechanical, thermal and other physical injury;
- Harmful agents;
- Excessive loss of moisture and protein;
- Harmful effects of UV radiation.

Thermoregulation

One of the skin's important functions is to protect the body from cold or heat, and maintain a constant core temperature. This is achieved by alterations to the blood flow through the cutaneous vascular bed. During warm periods, the vessels dilate, the skin reddens and beads of sweat form on the surface (vasodilatation = more blood flow = greater direct heat loss). In cold periods, the blood vessels constrict, preventing heat from escaping (vasoconstriction = less blood flow = reduced heat loss). The secretion and evaporation of sweat from the surface of the skin also helps to cool the body.

Sensation

Skin is the ‘sense-of-touch’ organ that triggers a response if we touch or feel something, including things that may cause pain. This is important for patients with a skin condition, as pain and itching can be extreme for many and cause great distress. Also touch is important for many patients who feel isolated by their skin as a result of colour, disease or the perceptions of others as many experience the fact that they are seen as dirty or contagious and should not be touched.

Immunological surveillance

The skin is an important immunological organ, made up of key structures and cells. Depending on the immunological response, a variety of cells and chemical messengers (cytokines) are involved. These specialised cells and their functions will be covered later.

Biochemical functions

The skin is involved in several biochemical processes. In the presence of sunlight, a form of vitamin D called cholecalciferol is synthesised from a derivative of the steroid cholesterol in the skin. The liver converts cholecalciferol to calcidiol, which is then converted to calcitriol (the active chemical form of the vitamin) in the kidneys. Vitamin D is essential for the normal absorption of calcium and phosphorous, which are required for healthy bones (Biga et al, 2019). The skin also contains receptors for other steroid hormones (oestrogens, progestogens and glucocorticoids) and for vitamin A.

Physiologicoanatomical features of the skin in children

The skin in a newborn is velvety smooth, puffy and friable, especially around the eyes, the legs, the dorsal aspect of the hands and feet, and the scrotum or labia

There are some peculiarities of the epidermis in the newborn and young children:

In the newborn the epidermis is thinner than in adults

The basal layer is well developed and has 2 kinds of cells - basal and melenocytes. The last ones do not produce melanin until the infant is 6 month. That is why the skin in the newborn is lighter in the first days of life

The grantilar layer is thinner, consists of 2-3 lines of cells It is poorly developed except soles and palms. The absence of keratogliadin protein makes the skin transparent considerably, because keratogliadin protein gives the skin a white hue

The glassy layer is absent

The corneal layer is poorly developed, thin, it has only 2-3 lines of flattened corneal cells. The structure of the corneal layer is friable and puffy *The clinical significance.* In newborn and younger children the skin is susceptible to superficial bacterial infection, candidosis (oral moniliasis) and intertrigo with maceration, weeping and erosion

The dermis comprises the major portion of the skin. It is firm, fibrous, and elastic connective tissue network containing an elaborate system of blood and lymphatics vessels, nerves. It varies throughout the body from 1 to 4 mm in thickness. It is invaded by the epidermal downgrowth of hair follicles, sweat and sebaceous glands. The dermis consists of papillary and reticular layers.

There are some peculiarities of the dermis in the newborn and young (little) children

In the newborn the papillary layer is poorly developed. In the premature infant it is absent

The dermis has an embryonic structure - it has a lot of cellular elements and a little amount of fibrous structures. Elastic fibres are absent. They first appear in 5-6 months of life

Labrocytes (mast cells) have a high biological activity.

In the newborn the quantity of water is higher than in an adult (80 % and 6-8 % respectively) in the dermis

The basal membrane is poorly developed. It leads to easy separation of the epidermis from the dermis, it results in epidermolysis

Morphological maturity of the derma occurs by 6 years.

The clinical significance. A newborn and an infant more often show blistering (bullous) reactions caused by the poor adherence between the epidermis and the dermis and frequently affected by chronic atopic dermatitis (eczema).

Sebaceous glands are well developed, begin to function since 7-months of the intrauterine life. The quantity of sebaceous glands in 1 cm^2 is relatively large in a newborn

Millia is often seen in the newborn. That is the obstruction of the excretory duct of sebaceous glands. Millia localizes on the nose and cheeks, have yellow-roseate color, its size is 1x1 mm. Millia disappears by 2-3 month

Sweat glands are poorly developed

There are two types of sweat glands: eccrine and apocrine. In a newborn eccrine sweat glands are well formed, but their excretory ducts are feebly developed and obstructed. Eccrine sweat glands begin secretory function by 2 months

Morphological and physiological maturity of eccrine sweat glands occurs by 5-7 years

The formation of apocrine sweat glands finishes by one year but they begin to function only in the puberty period

Hair. The hair covering the skin in a newborn falls gradually during the first year of life instead of permanent hair appearance. With age the hair becomes thicker

Subcutaneous fat. In a newborn the thickness of subcutaneous fat is relatively larger than in an adult (12 % and 8 % in an adult). Distribution of the fat is not regular in a newborn. They have good subcutaneous fat all over the body except the abdomen where there is insensitive deposition during the first 6 months.

The subcutaneous fat has an embryonic structure; it gives the possibility to deposit fat and to perform the hemopoietic function

If we look at the chemical structure of the subcutaneous fat we will see the predomination of saturated fatty acids. This gives a good turgor to the skin

The next peculiarity of the subcutaneous fat in the newborn is the presence of a brown

The next peculiarity of the subcutaneous fat in the newborn is the presence of a brown adipose tissue. It localizes in the back neck part, in the axillary area, around the thyroid gland and the kidneys, in the intrascupullar space and around great vessels. The main function of the brown fat is heat production without muscle contraction. In 5-6 months the brown fat disappears. The subcutaneous fat is absent in the abdomen, peritoneal and thoracic cavities, therefore the inner organs are movable.

The peculiarity of the skin in newborn

At birth the skin is covered with grayish-white, cheese-like substance called *vernix caseosa*. If it is not removed during the first bath, it will dry and disappear in 24 or 48 hours. It is thought to have insulating and bacteriostatic properties. A fine, downy hair called lanugo is present on the skin, especially on the forehead, cheeks, shoulders and back. It usually disappears spontaneously in a few weeks

The technique of the examining of the skin

The skin is assessed for color, texture, temperature, moisture, and turgor. Hair is also inspected for color, texture, quality, distribution,

and elasticity. The examination of the skin and its accessory organs primarily involves inspection and palpation

Physical factors influencing assessment. The doctor examines the child in a well-illuminated room, with nonglare lighting. Ideally, the room should be neutral in color. Colors such as pink, blue, yellow, or orange cast deceiving glows on the skin. The room should also be comfortably warm, since air-conditioning can cause a cold-induced cyanosis and excessive heat can produce flushing. Poor hygiene and artificial paint on nails or lips also mask the true determination of color. Sometimes it is necessary to clean the skin with soap and water and to remove cosmetics before beginning the inspection. Although not a common situation in pediatrics, the doctor should remembers that such factors can hide the signs of ecchymoses, petechiae, pallor, or cyanosis.

Texture, temperature, moisture, and turgor can be subjectively inspected, but palpation must be done for a greater accuracy. Clothing always interferes with palpation, thereby necessitating that the doctor examines each area of the body nude either as the part of the general overall examination or combined with the assessment of each body system. Since texture is affected by climatic exposure, such as cold, sun, wind, and so on, the doctor should compare the texture of the areas of the body that are usually clothed with those that are generally exposed

Assessment of the lymph nodes

Lymph nodes are usually assessed when the part of the body in which they are located is examined. Although the body's lymphatic drainage system is extensive, the usual sites for palpating accessible lymph nodes are shown in Fig. 6.2. Since the major function of lymph nodes is to collect and filter the lymph of bacteria and other foreign matter as it returns to the circulatory system, a doctor must have knowledge of the lymph's directional flow. Tender, enlarged warm lymph nodes are generally indicative of infection or inflammation proximal to their location. For example, occipital or postauricular adenopathy is often seen in local scalp infection, such as pediculosis, tick bite, or external otitis. Cervical adenopathy usually accompanies acute infections in or around the mouth or throat. In children, however, small, nontender, movable nodes are frequently normal

Nodes are palpated with the distal portion of the fingers, by gently but firmly pressing in a circular motion along the regions where nodes are normally present. When assessing the nodes in the head and neck, the child's head is tilted upward slightly but without tensing the sternocleidomastoid or trapezius muscle. This position facilitates palpation of the submental, submaxillary, tonsillar, and cervical nodes. The axillary nodes are palpated with the arms relaxed at the side but slightly abducted. The inguinal nodes are best assessed with the child in the supine position

Localization, quantity, size, shape, mobility, consistency (elastic or dense), temperature, and tenderness are noted, as well as reports by the parents regarding any visible change of enlarged node.

VI. The plan and organizational structure of the class

N	Elements of practical training	Time (minutes)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10
3.	Demonstration of technique of collection anamnesis and clinical examination in children by the teacher.	20
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age sick children.	25
5.	Filling down the protocols of examination of the sick child.	10
6.	Final control of knowledge, solving of clinical case studies.	10
7.	The tasks for independent preparation of students for the next class.	2
TOTAL		80

2. Professional algorithms for training in practical skills.

N	Task	Directions	Remarks
1.	Master the basic syndromes CNS	Assess the condition of health of the patient, describe the symptoms of each syndrome	Pay attention on the set of symptoms
2.	Master the method of evaluating the	Identify the features of cerebrospinal fluid in lesions	Pay attention on the features of

	composition of cerebrospinal fluid	of nervous system	cerebrospinal fluid

VII. The materials of methodical provision of class

VII. 1. Materials for self-control for the preparatory stage of the class:

List of theoretical questions for self-control:

VIII. Literature

Basic:

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Nelson textbook of pediatrics. – 21st ed./ edited by Robert M. Kliegman. Part XXVI. The Nervous System // www.mdconsult.com

Topic: 16. Semiotics of skin lesions of subcutaneous adipose tissue in children

Course II

Specialty Medicine

Number of education hours: 2 hours

Training location: classroom in the children's department

Children's skin problems span nearly two decades from birth through adolescence. Several common pediatric skin conditions will be discussed including: diaper dermatitis, atopic dermatitis, warts, and acne.

Diaper dermatitis

Diaper dermatitis, or diaper rash as it is more commonly known, is not a diagnosis but rather a category of skin conditions affecting the diaper area. There are four types of diaper dermatitis, including:

- Irritant contact dermatitis.
- Overgrowth of yeast (*Candida albicans*).
- Allergic contact dermatitis.
- Inflammatory skin conditions such as seborrheic dermatitis.

The most common type of diaper dermatitis is irritant contact dermatitis, associated with skin exposure to either urine or feces (or both) for a long period of time. Irritant contact dermatitis usually appears as bright red, sometimes slightly swollen, or even blister-like patches in the diaper area. Prolonged irritant contact dermatitis can increase the risk of infection in the affected area.

The primary treatment and prevention of irritant contact dermatitis includes frequent diaper changes to prevent extended contact with moisture and barrier creams and ointments, most commonly containing zinc oxide. A mild topical steroid ointment or cream can also be very helpful in more quickly reducing the inflammation.

The next most common type of diaper dermatitis is the overgrowth of yeast, most commonly *Candida albicans*. The warm, moist, and often irritated environment of the diaper makes the skin more prone to an overgrowth of yeast. This condition generally develops on top of irritant contact dermatitis.

Usually, it appears as bright red bumps, patches, and sometimes pus-bumps that are found on the skin and in its folds. The condition can be treated with an over-the-counter topical antifungal cream such as clotrimazole (Mycelex®), mycostatin (Nystatin®), or with a prescription medication. A barrier cream, often containing zinc oxide, is also recommended to treat and prevent this skin condition. If irritant contact dermatitis is also present, sometimes an additional mild topical steroid is prescribed. If this condition is only treated with topical steroids, the yeast infection can worsen.

Rarely, allergic contact dermatitis will occur. This condition is usually associated with a component of the diaper itself such as elastic or adhesive, or fragrance or preservatives in baby wipes. Symptoms include redness and swelling with itchiness that continues to recur in the same area such as the near the diaper's adhesive tape or around the leg where there is elastic in the diaper.

Treatment of allergic contact dermatitis is very similar to the treatment of irritant contact dermatitis: barrier creams and ointments, most commonly containing zinc oxide, or mild topical steroid ointment if necessary.

To prevent allergic contact dermatitis, you need to identify the material that is causing the problem and avoid it.

Seborrheic dermatitis, commonly known as cradle cap in infants and dandruff in older children and adults, can also be the cause of diaper dermatitis. This condition also affects other areas of the body such as the scalp, face, neck, as well as the skin folds. Treatment includes topical antifungal creams and often the careful use of mild topical steroid.

Topical steroids require very careful use, especially in the diaper area to prevent potential side effects such as thinning of the skin and stretch marks. These effects can be prevented by using low potency topical steroids, such as hydrocortisone 1 to 2.5 percent, and applying topical steroids sparingly to the affected areas only twice daily as needed for no longer than two weeks at a time.

Atopic dermatitis

Atopic dermatitis, or eczema, is a skin condition that can occur at any time in life. It often starts early in childhood and may not diminish until early adulthood. Over half of infants with atopic dermatitis grow out of the condition by age 2, though many adults will continue to have sensitive skin and some continue to flare throughout life.

Atopic dermatitis is a chronic condition, which means that it cannot be cured but it can be treated and controlled with proper guidance from a physician.

The condition is most common in families who have a history of seasonal allergies and asthma. Though food allergies are more common in children with atopic dermatitis, foods are rarely the cause of atopic dermatitis flares.

Atopic dermatitis can get worse when the skin comes into contact with irritating substances such as saliva; harsh soaps; and scratchy, tight fitting clothing. Friction can also contribute, especially when affected children start to crawl.

symptoms of atopic dermatitis

In infants:

- Red, very itchy dry patches of skin.
- Rash on the cheeks that often begins at 2 to 6 months of age.
- Rash oozes when scratched.

Symptoms can become worse if the child scratches the rash and openings in the skin can become infected.

In adolescence and early adulthood:

- Red scaly rash on creases of hands, elbows, wrists and knees and sometimes on the feet, ankles and neck.
- Thickened skin markings.
- Skin rash may bleed and crust after scratching.

atopic dermatitis treatmen

Gentle skin care with mild soap, short daily baths and lots of moisturizer is the best way to prevent atopic dermatitis flares. Moisturizers that contain ceramides help to repair the skin barrier and are especially helpful. During flares, treatment is aimed at reducing extreme itching and inflammation in the skin and treating infection if it develops. It includes topical steroid creams and oral antihistamines. Treatment will depend on the age of the child and the severity of the symptoms. Follow your healthcare provider's instructions for using the medications.

To help your child, you can also:

- Avoid long, hot baths, which can dry the skin. Short, daily baths in lukewarm water are recommended
- Apply moisturizing cream with ceramides right after bathing or showering This step will help trap moisture in the skin.
- Use moisturizers often, at least twice daily. Thick creams work better than lotions.
- Keep the room temperature as regular as possible. Changes in room temperature and humidity can dry the skin.
- Keep your child dressed in cotton. Wool, silk and man-made fabrics such as polyester can irritate the skin.
- Use mild laundry soap without fragrance and dyes and make sure that clothes are well rinsed.
- Watch for skin infections, which are more likely with eczema. Contact your healthcare provider if you notice an infection.
- Avoid rubbing or scratching the rash.

If atopic dermatitis is severe, oral medications may need to be used. If open wounds result from excessive itching, a topical antibiotic (mupirocin, Bactroban®) may be used. Occasionally, an oral antibiotic is necessary to treat infection. If these treatment methods are not effective, alternative therapy such as phototherapy (light therapy) may be recommended for older children.

Warts result from an infection with a virus, and are common in children of all ages. Warts commonly appear as hard bumps on fingers, hands and feet.

Molluscum contagiosum is a similar type of infection caused by a different virus. It causes pink or skin- colored smooth bumps that can appear anywhere on the

body. They are not harmful and will generally go away on their own in a couple of years, but treatment can help them go away more quickly.

Common and flat warts are caused by the human papilloma virus (HPV), while molluscum contagiosum warts are caused by a pox virus. Warts usually spread through direct contact. It is also possible to pick up the virus in moist environments such as in showers and locker rooms.

Unfortunately there are no antiviral treatments that actually target the virus itself. Instead, the treatment available is targeted against the skin in which the virus is living.

Over-the-counter treatments include liquid and film medications containing salicylic acid, which softens the abnormal skin cells and dissolves them. Higher percentages of salicylic acid (20 to 40 percent) are most effective.

Over-the-counter wart treatments are very effective to treat warts, but must be used daily. First, soak the wart in warm water to soften the skin. Then gently file thickened skin with a disposable emory board. Throw away the used portion so you do not re-infect the skin. Apply the medicine and cover with a bandage (replace the bandage if it gets wet). Repeat daily. Warts usually require weeks to months of treatment to completely resolve.

In the dermatologist's office, wart treatment will depend on the age of the child, the number and location of the warts, and the patient's and parent's decision. Wart treatment options by the doctor include:

- Freezing the wart with liquid nitrogen (cryotherapy).
- Destroying the wart with chemicals (trichloroacetic acid or cantharidin preparations).
- Burning the wart off with electricity or a laser (such as a flash lamp or CO2 lasers).
- Injecting the wart with yeast preparations to stimulate the immune system.
- Oral cimetidine (Tagamet®) may be prescribed along with one of the methods above. It has been shown to boost the immune system to better mount an immune response to the wart virus infection. Cimetidine is usually used for a trial two to three months.
- Imiquimod (Aldara®) is a cream that may be prescribed to help your body’s immune system fight warts.

Molluscum contagiosum treatment methods by the doctor include:

- Topical tretinoin (Retin-A®) or over-the-counter Differin® gel.
- Destroying the wart with chemicals (trichloroacetic acid or cantharidin preparations).
- Freezing the wart with liquid nitrogen (cryotherapy).

- Scraping the wart off (curettage).

It is important to mention that these wart treatments often need to be repeated every 3 to 4 weeks until the wart is gone. Individual molluscum lesions can usually be cured in fewer treatments.

All of these treatment methods may cause scarring and/or blisters so it is important to practice good wound care throughout the healing process.

Certain precautions can be taken to reduce the chance of getting warts, including:

- Wearing rubber sandals or shoes in public shower areas or swimming pools.
- Avoiding direct physical contact with those who have visible warts.
- Practicing good hygiene.

Acne

Acne is one of the most common skin problems. Acne is most common during the hormonal surge of adolescence, but also affects 20 percent of adults. Though it usually improves with age, adolescent acne usually benefits from treatment.

Causes acne

Poor hygiene, poor diet and stress can aggravate acne but do not cause it.

Acne starts when tiny hair follicles or pores become plugged with oily secretions (sebum) from the skin's sebaceous glands as well as keratin (a skin protein). This blockage is known as a black head or a white head. These plugged follicles can develop into swollen, red, tender pus bumps, or larger cysts or nodules that can cause temporary or permanent scarring.

If the acne is predominantly around the hairline, it may be associated with hair products such as conditioner, hair gels, hair mousse, oils, and grease. This type of acne can be improved by limiting hair products and pulling the hair away from the face.

Comedogenic (pore-blocking) moisturizer or cosmetics should be avoided. Try switching to a water based non-comedogenic moisturizer and/or cosmetics.

Skim milk is the only food that has been shown to be associated with acne.

Treatment

Mild acne may improve with over-the-counter cleansers containing either benzoyl peroxide or a low percentage of salicylic acid or with Differin® gel,

which is a mild vitamin A cream (retinoid) now available over the counter. If the use of these products does not improve the acne within 8 to 12 weeks, it may be necessary to see a dermatologist. It is important not to wait too long before seeking treatment to avoid unnecessary scarring.

Prescribed acne treatments will depend on the age of the patient, skin type, and most importantly, the severity of the acne. Topical retinoids (Retin-A®, Differin®) are a mainstay of treatment and help prevent the blocked pores that develop into acne lesions. The topical regimen often includes an acne wash containing benzoyl peroxide and sometimes a topical antibiotic. Switching to a gentle non-soap cleanser is helpful if the other prescribed acne treatments are causing excessive dryness or mild irritation.

Depending upon the patient's age and the type of acne, an oral antibiotic (minocycline, doxycycline or erythromycin) may be beneficial.

It is important for the patient to follow the prescribed treatment for at least 8 to 12 weeks before considering changing therapy. During a follow-up visit with the dermatologist, a re-evaluation can determine whether or not the treatment plan needs to be modified.

Other medications that have been helpful are oral birth control pills for females, especially when they report acne flare-ups around the menstrual period. If an individual has severe scarring acne, or if aggressive standard therapy does not improve their acne, an oral retinoid (Accutane®) may be necessary. If this is dosed and monitored appropriately, it is a safe option for treatment and the only treatment that can lead to a permanent cure.

VI. The plan and organizational structure of the class

N	Elements of practical training	Time (minutes)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10
3.	Demonstration of technique of collection anamnesis and clinical examination in children by the teacher.	20
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age sick children.	25
5.	Filling down the protocols of examination of the sick child.	10
6.	Final control of knowledge, solving of clinical case studies.	10
7.	The tasks for independent preparation of students for	2

	the next class.	
TOTAL		80

2. Professional algorithms for training in practical skills.

N	Task	Directions	Remarks
1.	Master the basic syndromes CNS	Assess the condition of health of the patient, describe the symptoms of each syndrome	Pay attention on the set of symptoms
2.	Master the method of evaluating the composition of cerebrospinal fluid	Identify the features of cerebrospinal fluid in lesions of nervous system	Pay attention on the features of cerebrospinal fluid

VII. The materials of methodical provision of class

VII. 1. Materials for self-control for the preparatory stage of the class:

List of theoretical questions for self-control:

VIII. Literature

Basic:

11. T. Kapitan. Propaedeutic of children diseases and nursing of the child. Vinnitsa, 2012.-P.149-166.

Additional:

30. Clinical examination of the child. / OV Katilov, DV Dmitriev, KY Dmitriev and others. - Vinnitsa, 2017. - P. 358-385

31. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseases: Tutorial for students / S.Ilchenko, K. Duka, T. Yaroshevska, O. Korenyuk at al. - Dnepropetrovsk, 2013. - P. 158-165

Nelson textbook of pediatrics. – 21st ed./ edited by Robert M. Kliegman. Part XXVI. The Nervous System // www.mdconsult.com

Topic: 17. AFF of the musculoskeletal system in children

Course II

Specialty Medicine

Number of education hours: 2 hours

Training location: classroom in the children's department

I. Relevance of the topic:

Pathology of organs of the skeletal system occupies one of leading positions in the structure of morbidity of children, especially of early age children. The skeletal system in children has morphological and functional features, and it is necessary to take them into account during physical examination, estimation of its results and establishment of clinical diagnosis.

II. Learning objectives of the lesson

The student should know:

- anatomical and histological features of the musculoskeletal system in children, depending on age
- distribution of muscles in different age periods
- state of muscle strength
- state of muscle tone
- the main signs of the musculoskeletal system violation
- histological structure of bone in the age aspect
- anatomical and histological features of bone in children depending on age
- body proportions at different age
- features of the skull in infants
- features of the spine
- features the chest
- eruption of milk teeth

– change of milk teeth and permanent teeth eruption

The student should learn:

– the method of collection of complaints and anamnesis in children with disorders of the musculoskeletal system

– method of inspection and assessment of the state of the musculoskeletal system

– palpation and assessment of muscle tone and strength

– the method of collection of complaints and anamnesis in children with disorders of the skeletal system

– the method of examination and assessment of skeletal system in children of different ages

– palpation of skeletal system

– skills of care for childwith disorders of the musculoskeletal system

The student should be able to:

– assess the complaints and history data in children with disorders of the musculoskeletal system

– to review and evaluate the distribution of muscle in children depending on age

– to conduct palpation and assess the strength and muscle tone

– identify the main clinical signs of muscular system

– assess the complaints and history data in children with disorders of the skeletal system

– to inspect the state of the skeleton in children of all ages

– assess the condition of the skeletal system (head, thorax, spine, lower limbs)

– To conduct palpation of the skeletal system (to determine the size of fontanel, assess the condition of joints, determine bone density)

– identify the main signs of the skeletal system (symptoms of rickets, disorders of the spine, disorders of the hip joint)

III. The objectives of personality development:

– The student must learn to follow the principles of medical ethics and deontology at the bedside;

– Master the ability to establish psychological contact with the patient and his family;

– To acquire a sense of responsibility for the quality of professional knowledge and professional correct action.

V. The content of the topic.

Functions of skeletal system

1. Support of body
2. Protection of internal organs and bone marrow
3. The reservoir of inorganic substances (calcium, magnesium, phosphorus)
4. Hematopoietic (red bone marrow)
5. Trap and depot for alien ions (heavy metals)

Ways of a bone formation

1. Dermal (by connective tissue – bones of a skull, a bone of a facial skull, a mandible, diaphysis of clavicles
2. Chondral (cartilaginous) – all other bones

Stages of a bone formation

1. Creation of the protein matrix which consist of 90-95 % collagen. Regulation of this stage realizes by thyroxin, somatotropin, insulin, androgens. Sufficient entering of proteins, vitamins A, C, K, B is necessary
2. Mineralization of bones. Regulation realizes by parathormone, thyrocalcitonin. Some macroelements – calcium, phosphorus, magnesium and microelements – fluorine, manganese, zinc, copper are necessary. Vitamin D, an alkaline phosphatase take part in process of mineralization also
3. Remodulation and self-regeneration of a bone, which occurs during all human's life. Process adjustes by parathormone, and needs of vitamin D. Moderate mechanical load stimulates all stages of osteogenesis.

Anatomic and physiological peculiarity of skeletal system in children

1. Bone tissue contains more waters and organic substances, less mineral substances. Deformations of bones in children arrases easy, but fractures are not so often.
2. Periosteum is thick, therefore fractures of bones in children occur like green brunch

3. The blood supply of bones is plentiful especial in zones of endochondral ossifications. Therefore, during first 2 years the opportunity of development of a purulent osteomyelitis is increased
4. Long bones are filled with a red bone marrow
5. Coronal, occipital and sagittal seams of a skull in newborn are open. Seams close by 3-4 months. The big (anterior) fontanel is opened in all newborns and it's closed by 1 year. The small (posterior) fontanel is open in 25 % of mature newborns and it's closed by 2 months.
6. The backbone in newborns doesn't have any physiological curvature. Forward spinal curvature is lordosis, backward is kyphosis. The cervical lordosis is shaped by 2 months when the child starts to hold a head. The thoracic kyphosis appears in 6 months when the baby starts to sit. A lumbar lordosis and a sacral kyphosis appear with the beginning of independent walking. Fixing of a backbone is imperfect (weak ligaments), therefore formation of pathological spinal curvatures are possible
7. Chest of neonates is short and wide. Ribs have horizontal position, and deep respiration is impossible.
8. Diaphysisof long bones are filled by osseous tissue, but their epiphyses and short bones mainly by cartilaginous tissue. The occurrence of ossification centers in bones of a wrist characterizes the skeletal age. There is 1 focus of ossification in 6 months-old child. Then till 12 years one focus of ossification appears annually. The skeletal age of the child (years) equal the number of focuses of ossification in wrist minus 1.
9. Teeth in children appear in the certain sequence. By 6 months there are lower central incisors, then upper central, upper lateral and by 12 months – lower lateral. By 1 year there are 8 milk teeth. During the second year appear another 12 milk teeth. Consistently lower and upper first molar teeth, then canines, then the second molar teeth appear. Quantity of milk teeth till 24 months of life is possible to count by the formula *n-4*, where *n* – age in months. Changing of milk teeth on permanent begins by 6 years and occurs in the same sequence, as milk dentition. Number of a constant teeth equally *4n-20*, where *n* is age in years up to 12. The quantity of a teeth in child characterizes his dental age

<u>Functions of muscles</u>

1. Coordination of movements
2. Muscular skeleton of a body and backbone
3. Activation of metabolism by speeding up of a blood-circulation and respiration during muscular work
4. Thermogenesis

<u>Anatomic and physiological peculiarity of muscular system</u>

1. Muscular fibers are short, thin, and gentle, with plenty of nucleuses. With the years thickness of myofibrils enlarges, the quantity of nucleus decreases

2. Myofibrils contain more waters and less mineral salts, lipids and contractive fibers – actin and myosin. Muscular fibers contain fetal myosin. An elasticity of muscles in children is increased and myorrhexis occurs rather seldom
3. Muscles in are not relaxed even in children's sleep. It promotes to thermogenesis. Till 2-3 months the tone of flexors is increased
4. The plentiful blood supply of muscles promotes fast removing from them lactic acid, therefore children get tired less.
5. Relative muscular mass in children is low, and averages only 23 % of mass of body in newborns
6. Distribution of a muscular tissue is non-proportional, more on a trunk, less on extremities. In adults it is on the contrary
7. Children, as well as adults, have 2 types of muscular fibers. In red (slow) fibers processes of an aerobic glycolysis prevail, in white (fast) - anaerobic glycolysis prevails. Infants have more red muscular fibers; then quantity of white muscular fibers increases.
8. Development of various groups of muscles occurs not simultaneously. Large muscles develop first of all. Small muscles, for example, muscles of fingers capable to fine work only by 6 years. That determines school maturity.

<u>The basic signs of skeletal system lesion in children</u>

The basic complaints

- ossalgia (at osteomyelitis)
- joint pain – arthralgia – at arthritis
- restriction of mobility of joints
- change of configuration of joints

At inspection:

- Change of the sizes of a head – a microcephaly, macrocephaly
- Change of the form of a head: augmentation of frontal tuber and parietal tuber, flattening of nape, the tower skull (acrocephaly).
- Deformations of the thorax: killed chest, funnel chest, a cardiac hump, Harrison's perypneumonic furrow (retraction of a thorax in a place of diaphragm attaching)
- Spine curvature: sideward – scoliosis, forward – lordosis, backward – kyphosis
- Deformity of extremities and change of their length
- Deformity of foot: a platypodia, varus foot (the external edge of foot is lowered), valgus foot (the internal edge of foot is lowered).

Following signs can by determined by palpation:

- Softening of occiput - craniomalacia – craniotabes,
- early and late closing of the big fontanel
- beading of the ribs
- rickety thickening of wrists - bracelets, thickenings in the field of diaphysis of phalanxes of fingers – threads of pearls

- changes of joints: enlarging in volume, infringement of mobility, deformation, change of soft tissues over the joint; the local rise of temperature, hyperemia and rash are possible

Signs of lesion of muscular system

- asymmetry of muscular mass may be observed at myasthenia, myopathy, paralyses, lesion of joints, temporary restriction of movement
- change of a muscle tone.

External attributes of muscular hypertension:

1. opisthotonus
2. forced position of hands: fingers in a fist, claw hand, flipper hand, an athetosic position of fingers - in several flats

External attributes of muscular hypotonia:

1. pathological bearing, winged scapula, flaccid abdomen
2. hypermobility of joints
3. Hovers' sign. Rising from a prone position, the child in the beginning bases on knees and elbows, then on palms and soles, then on knees by hands and only after that lift a trunk

For estimation of a muscle tone in children of early age it is necessary to use special techniques.

Assay on a traction. Doctor takes laying on a back child by wrists and pulls to himself. At a normal muscle tone the child in the beginning unbends his arms (1 phase), then bands them (2 phase). In a case of muscle hypotonia 2nd phase absents, in a case of hypertonia first phase absents.

In newborn muscle tone depend of gestation age

- till 30 weeks – lays on a back with the extended arms and legs
- till 34 weeks – upper extremities are bent only
- 36-38 weeks – arms and legs are bent, but after extension remain extended
- 39-40 weeks – after extension of extremities they come back in initial position

The basic pathological sets of symptoms of lesion of skeletal system

Rickets

1. On the part of nervous system – irritability, sweating are observed
2. Baldness of a nape
3. Manifestations of osteomalacia: edges of fontanel are soft, craniotabes can be defined
4. Manifestation of osteoid hyperplasia – augmentation of frontal and parietal tubers, rachitic beading of the ribs, bracelets, strings of pearls
5. Late dentition
6. O-shaped or X-shaped curvature of the lower extremities

7. Consequences of osteomalacia – rachitic hump, deformations of a thorax, Harrison's furrow, deformation of facial skull – low nasal bridge, flat orbits, Gothic palate, flat rachitic pelvis
8. Augmentation of abdomen and size of a liver
9. Muscular hypotonia
10. Excessive alkaline phosphatase, diminished of phosphorus and calcium in a blood plasma

Signs of a congenital dislocation of the femur

1. Early symptoms: asymmetry of dermal pleats on hips
2. Shorting of extremity
3. Decrease of an angle of abduction of bent in knee and hip joints extremities
4. Ortolany's sign – doctor turns inside bent in knee and a hip joint leg, then adducts and turns outside. Under the fingers of the doctor laying on the head of femur, click is defined
5. Late attributes: Trendelenburg's sign. The child stands on a sick leg and healthy leg bents in a knee joint. Thus the pelvis is inclined in the healthy side, and the buttock will be lowered
6. Waddling (goose) gait
7. Strengthened lumbal lordosis

Signs of spasmophilia

The latent spasmophilia.

- Chvostec's symptom. Percussion in points of an exit of a trigeminal nerve results in spasm of a mimic muscles
- Trousseau's symptom. At compressing of neurovascular fascicle in the field of a brachium there is a spasm of muscles of the hand (obstetrician's hand)
- Lust's symptom. At compressing the calf there is a plantar flexion of sole

Manifest spasmophilia

- laryngospasm – sudden apnea, clammy sweat, then a noisy inspiration on type cock's cry
- carpopedal spasm – spontaneous appears of an obstetrician's hand and a plantar flexion of sole
- eclampsia – an attack of convulsion with a loss of consciousness, involuntary defecation and emiction

VI. The plan and organizational structure of the class

N	Elements of practical training	Time (minutes)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10

3.	Demonstration of technique of collection anamnesis and clinical examination in children by the teacher.	20
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age sick children.	25
5.	Filling down the protocols of examination of the sick child.	10
6.	Final control of knowledge, solving of clinical case studies.	10
7.	The tasks for independent preparation of students for the next class.	2
TOTAL		80

VII. The materials of methodical provision of class

VII. 1. Materials for self-control for the preparatory stage of the class:

List of theoretical questions for self-control:

1). Anatomic and physiologic features of the skeletal system in the children of a different age and their clinical value.

2). Method of clinical examination of patient with pathology of the skeletal system:

a) inquire;

b) features of inspection: estimation of proportion of separate parts of body, inspection of skull, trunk, upper and lower extremities (estimation of their sizes, form, presents of deformations), estimation of the state of teeth, feature of bite, inspection of configuration of joints, the volume of mobility of joints, physical activity of child, development of muscles, volume of active moving activity.

c) Features of palpation:

- estimation of development of muscles, muscular force, tone of muscles, turgor of soft tissue, state of separate muscles;
- palpation of bones of the skull, presence of fontanels, measuring of their sizes, palpation of thorax (form, direction of ribs, expressed of intercostals intervals, epigastric corner), spine (exposure of declination of its axis in different departments), extremities;

- measuring of sizes of big fontanel: from one side of rhombus to other its side (that between the parallel sides of rhombus);
- palpation of joints (increase temperature, painful, edema, active and passive mobility).

3). Semiotics of violation of the skeletal system in children:

a) rickets;
b) congenital dislocation of hip joint
c) scoliosis
d) arthritis;
e) congenital violation of the skeletal system in children

4). Main syndromes of violation of the muscular system in children:

- muscular hypertonia
- muscular hypotonia

Tests (examples):

1. At examination of the oral cavity in child doctor found 8 teeth. What is dental age of this child?

A. 8 months
B. 10 months
C. 12 months
D. 16 months
E. 20 months

2. At what age replacement of milk teeth by permanent onebegins?

A. 3-4 years
B. 4-5 years
C. 5-6 years
D. 6-7 years
E. 7-8 years

3. Specify the average size of a big fontanel in newborn

A. 1,2 × 1,7 cm.

B. 5,0 × 3,5 cm.

C. 2,0 × 4,0 cm.

D. 3,2 × 4,0 cm.

E. 2,0 × 2,5 cm.

4. Specify,in which age muscular hypotonia can be presentin preterm infants?

A. 2-3 weeks

B. 3-4 weeks

C. 6-8 weeks

D. 3-4 months

E. 5-6 months

5. Indicate, in which age hypertoniaof upper extremities disappearsin healthy children?

A. 2-3 months

B. 1-2 months

C. 6-8 months

D. 3-3,5 months

E. 5-6 months

6. At what age disappears muscular hypertension of lower extrmities?

A. from 1 to 2 months

B. from 2 to 4 months

C. 4 to 6 months

D. from 8 to 10 months

E. from 9 to 10 months

7. What features of the muscular fibersare typical for children during the first months of life?

A. have well-developed interstitial tissue;

B. contain few myofibrils

C. muscles 5 times thinner than in adults;

D. muscular fibers contain fetal myosin;

E. all of the above

8. What features of the skull in newborn?

A. advantage of cerebral part above facial

V. advantage of facial part above cerebral

S. widebridge of nose

D. wide position of eyes

E. open skull sutures

9. The doctor examines the muscular system of newborn. What features takes place in this child?

A. flexor muscle hypertonia;

B. reduced mechanical excitability of muscles;

C. increased contractility of the muscles;

D. extensor muscle hypotonia;

E. all mentioned

10. What symptoms do not meet at scoliosis?

A. asymmetry of the shoulder girdle

B. asymmetry of blades

C. asymmetry of collarbone

D. asymmetry of foot

E. asymmetry of waist triangles

Standards of answers:

1	C	3	E	5	D	7	E	9	E
2	C	4	D	6	B	8	A	10	D

VII. 2. Materials for methodological support for the basic stage of class:

List of practical tasks:

- master the method of collection of complaints and anamnesis
- master the inspection technique
- master the palpation technique
- master the method of evaluating disorders of the musculoskeletal system

- master the method of assessment disorders of the skeletal system in age aspect.

Professional algorithms for training in practical skills.

Task	Directions	Remarks
To capture the methods of gathering complaints, medical history; Master the technique of examination and palpation of the musculoskeletal system; Learn to evaluate muscle tone, muscle strength; Evaluate the clinical manifestations of disorders of the musculoskeletal system; To capture the methods and sequence estimation term teething, method of evaluating the physiological characteristics of the bones in the age aspect, the method of evaluation of clinical disorders of the skeletal system	Consistently collect medical history and assess the musculoskeletal system of the patient describe the symptoms of each syndrome	Pay attention to the set of symptoms

VII. 3. Materials of control for the final stage of the class:

Situational tasks (examples):

Task 1. At clinical examination of 1month old child doctor assess the function of the hip joint. He bents legs of the child in knee and hip joints, then turns them inward and after thatturns them outside and feels the characteristic "click". What does it mean? What symptoms checks the doctor?

Task 2. Full-term5 months old baby has birth weight 3850 g, height 50 cm. He isbottle-fed from2 months old. In child is present increased sweating of forehead, sour smell of sweat, irritability, poor sleep. Body weight is 7200 g. height63 cm. Objective: conditionis satisfactory, skin andmucous membranes are pale. Motor activity is slightly reduced.Frontal and parietal tubers are increased,nape is flat and bald, craniotabes ("felt hat" symptom)

ispresent.Anterior fontanel is 3,5 x 3,5 cm, with soft edges. Harrison'sfurrow, "ricketyrosaries" are found at examination. Muscular tone and tissue turgor are reduced. Your diagnosis. What can cause this disease?

Task 3. During examination of 12-years old girl doctor found the asymmetry of the shoulders, clavicles and shoulder blades, asymmetry of waisttriangles. What pathology is in this patient?

*Task 4.*A child is 10 months old. In mother it was the first pregnancy with nephropathy. During the pregnancy mother lived in the north. Child is bottle-fed from 2 months and from 4 months receives semolina porridge 2 times a day. There are often ARVI in child, he is rarely walk outdoor. Mother complaints on anxiety, sweating, poor sleep and appetite in child, lag in the psycho-motor development. Objective: BM is 8200 g, height is 71 cm. Mucous membranes are pale, there are 2teeth with defective enamel. Tissue turgor and muscle toneare reduced, frontal and parietal tubers are augmented, forehead is "Olympic". Craniotabes is present. Anteriorfontanelis 3.5 x 3 cm;its edgesare soft. Child has deformation of the chest, expressed Harrison's furrow, "rachitic rosaries",kyphosis,X-shaped curvature of low extremities. Your diagnosis. What can cause this disease?

Standards of answers:

Task 1.

Dislocation of the hip joint. Symptom Ortolani.

Task 2.

Rickets

Task 3.

Scoliosis

T*ask 4.*

Rickets. Pregnancy with nephropathy. Living in the north. Early artificial feeding with excess of cereals. Frequent ARVI.

VII. 4. Materials of methodical support for self-preparation of students:

Indicative chart for independent work of students with educational

literature

Educational tasks	Directions to the task
Explore:	
- Anatomical features of the muscular system	Specify
- Functional features of musculoskeletal system	Describe
- Physiological states in age aspect (distribution, shape, strength, tone)	Specify technique of inspection and palpation of the muscular system
- Semiotics of disorders of the musculoskeletal system	Specify
- Features of care for children with disorders of the musculoskeletal system	Specify particular care
- Anatomical and physiological characteristics of skeletonin different ages	Describe
- Number and terms of eruption of milk and permanent teeth	Know
- Semiotics of disorders of the skeletal system	Specify
- Features of care for children with disorders of the skeletal system	Specify particular care

VIII. Literature

Basic:

1. Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition, updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012. – P.237-246

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev – Vinnytsia: Nova Knyha, 2018. – P.81-102

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013. – P. 56-60, 129-132

2. Nelson textbook of pediatrics. —21st ed./ edited by Robert M. Kliegman. Part XXXI. Bone and Joint Disorders// www.mdconsult.com

Topic: 18. Semiotics of lesions of the musculoskeletal system in children

Course II

Specialty Medicine

Number of education hours: 2 hours

Training location: classroom in the children's department

I. Relevance of the topic:

Pathology of organs of the skeletal system occupies one of leading positions in the structure of morbidity of children, especially of early age children. The skeletal system in children has morphological and functional features, and it is necessary to take them into account during physical examination, estimation of its results and establishment of clinical diagnosis.

II. Learning objectives of the lesson

The student should know:

- anatomical and histological features of the musculoskeletal system in children, depending on age
- distribution of muscles in different age periods
- state of muscle strength
- state of muscle tone
- the main signs of the musculoskeletal system violation
- histological structure of bone in the age aspect
- anatomical and histological features of bone in children depending on age
- body proportions at different age
- features of the skull in infants
- features of the spine
- features the chest
- eruption of milk teeth

– change of milk teeth and permanent teeth eruption

The student should learn:

– the method of collection of complaints and anamnesis in children with disorders of the musculoskeletal system

– method of inspection and assessment of the state of the musculoskeletal system

– palpation and assessment of muscle tone and strength

– the method of collection of complaints and anamnesis in children with disorders of the skeletal system

– the method of examination and assessment of skeletal system in children of different ages

– palpation of skeletal system

– skills of care for childwith disorders of the musculoskeletal system

The student should be able to:

– assess the complaints and history data in children with disorders of the musculoskeletal system

– to review and evaluate the distribution of muscle in children depending on age

– to conduct palpation and assess the strength and muscle tone

– identify the main clinical signs of muscular system

– assess the complaints and history data in children with disorders of the skeletal system

– to inspect the state of the skeleton in children of all ages

– assess the condition of the skeletal system (head, thorax, spine, lower limbs)

– To conduct palpation of the skeletal system (to determine the size of fontanel, assess the condition of joints, determine bone density)

– identify the main signs of the skeletal system (symptoms of rickets, disorders of the spine, disorders of the hip joint)

III. The objectives of personality development:

– The student must learn to follow the principles of medical ethics and deontology at the bedside;

– Master the ability to establish psychological contact with the patient and his family;

– To acquire a sense of responsibility for the quality of professional knowledge and professional correct action.

V. The content of the topic.

Functions of skeletal system

6. Support of body
7. Protection of internal organs and bone marrow
8. The reservoir of inorganic substances (calcium, magnesium, phosphorus)
9. Hematopoietic (red bone marrow)
10. Trap and depot for alien ions (heavy metals)

Ways of a bone formation

3. Dermal (by connective tissue – bones of a skull, a bone of a facial skull, a mandible, diaphysis of clavicles
4. Chondral (cartilaginous) – all other bones

Stages of a bone formation

4. Creation of the protein matrix which consist of 90-95 % collagen. Regulation of this stage realizes by thyroxin, somatotropin, insulin, androgens. Sufficient entering of proteins, vitamins A, C, K, B is necessary
5. Mineralization of bones. Regulation realizes by parathormone, thyrocalcitonin. Some macroelements – calcium, phosphorus, magnesium and microelements – fluorine, manganese, zinc, copper are necessary. Vitamin D, an alkaline phosphatase take part in process of mineralization also
6. Remodulation and self-regeneration of a bone, which occurs during all human's life. Process adjustes by parathormone, and needs of vitamin D. Moderate mechanical load stimulates all stages of osteogenesis.

Anatomic and physiological peculiarity of skeletal system in children

10. Bone tissue contains more waters and organic substances, less mineral substances. Deformations of bones in children arrases easy, but fractures are not so often.
11. Periosteum is thick, therefore fractures of bones in children occur like green brunch

12. The blood supply of bones is plentiful especial in zones of endochondral ossifications. Therefore, during first 2 years the opportunity of development of a purulent osteomyelitis is increased
13. Long bones are filled with a red bone marrow
14. Coronal, occipital and sagittal seams of a skull in newborn are open. Seams close by 3-4 months. The big (anterior) fontanel is opened in all newborns and it's closed by 1 year. The small (posterior) fontanel is open in 25 % of mature newborns and it's closed by 2 months.
15. The backbone in newborns doesn't have any physiological curvature. Forward spinal curvature is lordosis, backward is kyphosis. The cervical lordosis is shaped by 2 months when the child starts to hold a head. The thoracic kyphosis appears in 6 months when the baby starts to sit. A lumbar lordosis and a sacral kyphosis appear with the beginning of independent walking. Fixing of a backbone is imperfect (weak ligaments), therefore formation of pathological spinal curvatures are possible
16. Chest of neonates is short and wide. Ribs have horizontal position, and deep respiration is impossible.
17. Diaphysisof long bones are filled by osseous tissue, but their epiphyses and short bones mainly by cartilaginous tissue. The occurrence of ossification centers in bones of a wrist characterizes the skeletal age. There is 1 focus of ossification in 6 months-old child. Then till 12 years one focus of ossification appears annually. The skeletal age of the child (years) equal the number of focuses of ossification in wrist minus 1.
18. Teeth in children appear in the certain sequence. By 6 months there are lower central incisors, then upper central, upper lateral and by 12 months – lower lateral. By 1 year there are 8 milk teeth. During the second year appear another 12 milk teeth. Consistently lower and upper first molar teeth, then canines, then the second molar teeth appear. Quantity of milk teeth till 24 months of life is possible to count by the formula *n-4*, where *n* – age in months. Changing of milk teeth on permanent begins by 6 years and occurs in the same sequence, as milk dentition. Number of a constant teeth equally *4n-20*, where *n* is age in years up to 12. The quantity of a teeth in child characterizes his dental age

<u>Functions of muscles</u>

5. Coordination of movements
6. Muscular skeleton of a body and backbone
7. Activation of metabolism by speeding up of a blood-circulation and respiration during muscular work
8. Thermogenesis

<u>Anatomic and physiological peculiarity of muscular system</u>

9. Muscular fibers are short, thin, and gentle, with plenty of nucleuses. With the years thickness of myofibrils enlarges, the quantity of nucleus decreases

10. Myofibrils contain more waters and less mineral salts, lipids and contractive fibers – actin and myosin. Muscular fibers contain fetal myosin. An elasticity of muscles in children is increased and myorrhexis occurs rather seldom
11. Muscles in are not relaxed even in children's sleep. It promotes to thermogenesis. Till 2-3 months the tone of flexors is increased
12. The plentiful blood supply of muscles promotes fast removing from them lactic acid, therefore children get tired less.
13. Relative muscular mass in children is low, and averages only 23 % of mass of body in newborns
14. Distribution of a muscular tissue is non-proportional, more on a trunk, less on extremities. In adults it is on the contrary
15. Children, as well as adults, have 2 types of muscular fibers. In red (slow) fibers processes of an aerobic glycolysis prevail, in white (fast) - anaerobic glycolysis prevails. Infants have more red muscular fibers; then quantity of white muscular fibers increases.
16. Development of various groups of muscles occurs not simultaneously. Large muscles develop first of all. Small muscles, for example, muscles of fingers capable to fine work only by 6 years. That determines school maturity.

<u>The basic signs of skeletal system lesion in children</u>

The basic complaints

- ossalgia (at osteomyelitis)
- joint pain – arthralgia – at arthritis
- restriction of mobility of joints
- change of configuration of joints

At inspection:

- Change of the sizes of a head – a microcephaly, macrocephaly
- Change of the form of a head: augmentation of frontal tuber and parietal tuber, flattening of nape, the tower skull (acrocephaly).
- Deformations of the thorax: killed chest, funnel chest, a cardiac hump, Harrison's perypneumonic furrow (retraction of a thorax in a place of diaphragm attaching)
- Spine curvature: sideward – scoliosis, forward – lordosis, backward – kyphosis
- Deformity of extremities and change of their length
- Deformity of foot: a platypodia, varus foot (the external edge of foot is lowered), valgus foot (the internal edge of foot is lowered).

Following signs can by determined by palpation:

- Softening of occiput - craniomalacia – craniotabes,
- early and late closing of the big fontanel
- beading of the ribs
- rickety thickening of wrists - bracelets, thickenings in the field of diaphysis of phalanxes of fingers – threads of pearls

- changes of joints: enlarging in volume, infringement of mobility, deformation, change of soft tissues over the joint; the local rise of temperature, hyperemia and rash are possible

Signs of lesion of muscular system

- asymmetry of muscular mass may be observed at myasthenia, myopathy, paralyses, lesion of joints, temporary restriction of movement
- change of a muscle tone.

External attributes of muscular hypertension:

1. opisthotonus
2. forced position of hands: fingers in a fist, claw hand, flipper hand, an athetosic position of fingers - in several flats

External attributes of muscular hypotonia:

1. pathological bearing, winged scapula, flaccid abdomen
2. hypermobility of joints
3. Hovers' sign. Rising from a prone position, the child in the beginning bases on knees and elbows, then on palms and soles, then on knees by hands and only after that lift a trunk

For estimation of a muscle tone in children of early age it is necessary to use special techniques.

Assay on a traction. Doctor takes laying on a back child by wrists and pulls to himself. At a normal muscle tone the child in the beginning unbends his arms (1 phase), then bands them (2 phase). In a case of muscle hypotonia 2nd phase absents, in a case of hypertonia first phase absents.

In newborn muscle tone depend of gestation age

- till 30 weeks – lays on a back with the extended arms and legs
- till 34 weeks – upper extremities are bent only
- 36-38 weeks – arms and legs are bent, but after extension remain extended
- 39-40 weeks – after extension of extremities they come back in initial position

The basic pathological sets of symptoms of lesion of skeletal system

Rickets

11. On the part of nervous system – irritability, sweating are observed
12. Baldness of a nape
13. Manifestations of osteomalacia: edges of fontanel are soft, craniotabes can be defined
14. Manifestation of osteoid hyperplasia – augmentation of frontal and parietal tubers, rachitic beading of the ribs, bracelets, strings of pearls
15. Late dentition
16. O-shaped or X-shaped curvature of the lower extremities

17. Consequences of osteomalacia – rachitic hump, deformations of a thorax, Harrison's furrow, deformation of facial skull – low nasal bridge, flat orbits, Gothic palate, flat rachitic pelvis
18. Augmentation of abdomen and size of a liver
19. Muscular hypotonia
20. Excessive alkaline phosphatase, diminished of phosphorus and calcium in a blood plasma

Signs of a congenital dislocation of the femur

8. Early symptoms: asymmetry of dermal pleats on hips
9. Shorting of extremity
10. Decrease of an angle of abduction of bent in knee and hip joints extremities
11. Ortolany's sign – doctor turns inside bent in knee and a hip joint leg, then adducts and turns outside. Under the fingers of the doctor laying on the head of femur, click is defined
12. Late attributes: Trendelenburg's sign. The child stands on a sick leg and healthy leg bents in a knee joint. Thus the pelvis is inclined in the healthy side, and the buttock will be lowered
13. Waddling (goose) gait
14. Strengthened lumbal lordosis

Signs of spasmophilia

The latent spasmophilia.

- Chvostec's symptom. Percussion in points of an exit of a trigeminal nerve results in spasm of a mimic muscles
- Trousseau's symptom. At compressing of neurovascular fascicle in the field of a brachium there is a spasm of muscles of the hand (obstetrician's hand)
- Lust's symptom. At compressing the calf there is a plantar flexion of sole

Manifest spasmophilia

- laryngospasm – sudden apnea, clammy sweat, then a noisy inspiration on type cock's cry
- carpopedal spasm – spontaneous appears of an obstetrician's hand and a plantar flexion of sole
- eclampsia – an attack of convulsion with a loss of consciousness, involuntary defecation and emiction

VI. The plan and organizational structure of the class

N	Elements of practical training	Time (minutes)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10

3.	Demonstration of technique of collection anamnesis and clinical examination in children by the teacher.	20
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age sick children.	25
5.	Filling down the protocols of examination of the sick child.	10
6.	Final control of knowledge, solving of clinical case studies.	10
7.	The tasks for independent preparation of students for the next class.	2
TOTAL		80

VII. The materials of methodical provision of class

VII. 1. Materials for self-control for the preparatory stage of the class:

List of theoretical questions for self-control:

1). Anatomic and physiologic features of the skeletal system in the children of a different age and their clinical value.

2). Method of clinical examination of patient with pathology of the skeletal system:

d) inquire;

e) features of inspection: estimation of proportion of separate parts of body, inspection of skull, trunk, upper and lower extremities (estimation of their sizes, form, presents of deformations), estimation of the state of teeth, feature of bite, inspection of configuration of joints, the volume of mobility of joints, physical activity of child, development of muscles, volume of active moving activity.

f) Features of palpation:

- estimation of development of muscles, muscular force, tone of muscles, turgor of soft tissue, state of separate muscles;
- palpation of bones of the skull, presence of fontanels, measuring of their sizes, palpation of thorax (form, direction of ribs, expressed of intercostals intervals, epigastric corner), spine (exposure of declination of its axis in different departments), extremities;

- measuring of sizes of big fontanel: from one side of rhombus to other its side (that between the parallel sides of rhombus);
- palpation of joints (increase temperature, painful, edema, active and passive mobility).

3). Semiotics of violation of the skeletal system in children:

f) rickets;
g) congenital dislocation of hip joint
h) scoliosis
i) arthritis;
j) congenital violation of the skeletal system in children

4). Main syndromes of violation of the muscular system in children:

- muscular hypertonia
- muscular hypotonia

Tests (examples):

1. At examination of the oral cavity in child doctor found 8 teeth. What is dental age of this child?

A. 8 months
B. 10 months
C. 12 months
D. 16 months
E. 20 months

2. At what age replacement of milk teeth by permanent onebegins?

A. 3-4 years
B. 4-5 years
C. 5-6 years
D. 6-7 years
E. 7-8 years

3. Specify the average size of a big fontanel in newborn

A. 1,2 × 1,7 cm.

B. 5,0 × 3,5 cm.

C. 2,0 × 4,0 cm.

D. 3,2 × 4,0 cm.

E. 2,0 × 2,5 cm.

4. Specify,in which age muscular hypotonia can be presentin preterm infants?

A. 2-3 weeks

B. 3-4 weeks

C. 6-8 weeks

D. 3-4 months

E. 5-6 months

5. Indicate, in which age hypertoniaof upper extremities disappearsin healthy children?

A. 2-3 months

B. 1-2 months

C. 6-8 months

D. 3-3,5 months

E. 5-6 months

6. At what age disappears muscular hypertension of lower extrmities?

A. from 1 to 2 months

B. from 2 to 4 months

C. 4 to 6 months

D. from 8 to 10 months

E. from 9 to 10 months

7. What features of the muscular fibersare typical for children during the first months of life?

A. have well-developed interstitial tissue;

B. contain few myofibrils

C. muscles 5 times thinner than in adults;

D. muscular fibers contain fetal myosin;

E. all of the above

8. What features of the skull in newborn?

A. advantage of cerebral part above facial

V. advantage of facial part above cerebral

S. widebridge of nose

D. wide position of eyes

E. open skull sutures

9. The doctor examines the muscular system of newborn. What features takes place in this child?

A. flexor muscle hypertonia;

B. reduced mechanical excitability of muscles;

C. increased contractility of the muscles;

D. extensor muscle hypotonia;

E. all mentioned

10. What symptoms do not meet at scoliosis?

A. asymmetry of the shoulder girdle

B. asymmetry of blades

C. asymmetry of collarbone

D. asymmetry of foot

E. asymmetry of waist triangles

Standards of answers:

1	C	3	E	5	D	7	E	9	E
2	C	4	D	6	B	8	A	10	D

VII. 2. Materials for methodological support for the basic stage of class:

List of practical tasks:

- master the method of collection of complaints and anamnesis
- master the inspection technique
- master the palpation technique
- master the method of evaluating disorders of the musculoskeletal system

- master the method of assessment disorders of the skeletal system in age aspect.

Professional algorithms for training in practical skills.

Task	Directions	Remarks
To capture the methods of gathering complaints, medical history; Master the technique of examination and palpation of the musculoskeletal system; Learn to evaluate muscle tone, muscle strength; Evaluate the clinical manifestations of disorders of the musculoskeletal system; To capture the methods and sequence estimation term teething, method of evaluating the physiological characteristics of the bones in the age aspect, the method of evaluation of clinical disorders of the skeletal system	Consistently collect medical history and assess the musculoskeletal system of the patient describe the symptoms of each syndrome	Pay attention to the set of symptoms

VII. 3. Materials of control for the final stage of the class:

Situational tasks (examples):

Task 1. At clinical examination of 1month old child doctor assess the function of the hip joint. He bents legs of the child in knee and hip joints, then turns them inward and after thatturns them outside and feels the characteristic "click". What does it mean? What symptoms checks the doctor?

Task 2. Full-term5 months old baby has birth weight 3850 g, height 50 cm. He isbottle-fed from2 months old. In child is present increased sweating of forehead, sour smell of sweat, irritability, poor sleep. Body weight is 7200 g. height63 cm. Objective: conditionis satisfactory, skin andmucous membranes are pale. Motor activity is slightly reduced.Frontal and parietal tubers are increased,nape is flat and bald, craniotabes ("felt hat" symptom)

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Standards of answers:

Task 1.

Dislocation of the hip joint. Symptom Ortolani.

Task 2.

Rickets

Task 3.

Scoliosis

T*ask 4.*

Rickets. Pregnancy with nephropathy. Living in the north. Early artificial feeding with excess of cereals. Frequent ARVI.

VII. 4. Materials of methodical support for self-preparation of students:

Indicative chart for independent work of students with educational

literature

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- Features of care for children with disorders of the musculoskeletal system	Specify particular care
- Anatomical and physiological characteristics of skeletonin different ages	Describe
- Number and terms of eruption of milk and permanent teeth	Know
- Semiotics of disorders of the skeletal system	Specify
- Features of care for children with disorders of the skeletal system	Specify particular care

VIII. Literature

Basic:

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4. Nelson textbook of pediatrics. —21st ed./ edited by Robert M. Kliegman. Part XXXI. Bone and Joint Disorders// www.mdconsult.com

Guidelines for students
to practical classes in Propedeutics of Pediatrics

Topic 4: Anatomical and physiological characteristics of the respiratory system in children.
Course: III
Specialty: 222 Medicine
Number of education hours: 2 hours
Training location: classroom in the children's department.

I. Relevance of the topic:

The respiratory pathology, especially the chronic and allergic diseases, in children have been increasing in recent years. The child's respiratory system has a number of morphological and functional characteristics. It's impossible to evaluate results of the examination and correctly diagnosed without taking into account them. During the working day the doctor repeatedly examines the children and diagnoses diseases based on his knowledge of respiratory system disorders. This is especially important for the timely start of treatment.

II. Learning objectives of the lesson:

The student should know:

- embryogenesis of respiratory system;
- anatomical and physiological features of respiratory system in children of different ages;
- main complaints related to respiratory diseases in children.

The student should be able:

- to collect the complaints and anamnesis in children with respiratory diseases

The student should master:

- the collection method of complaints and history of the disease.

III. The objectives of personality development:

- the student should learn to adhere to medical ethics and deontology principles when working with a patient;
- to master the ability to make the psychological contact with the patient and his family;
- to grasp a sense of responsibility for the quality of professional knowledge and correct professional action.

IV. Interdisciplinary integration:

Disciplines	General Competences	Special Competences	Program Learning Outcomes
1. Preceding (Providing) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	-	-
2. Subsequent (Provided) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.3; SC.17	LO.1; LO.2; LO.3; LO.20; LO.21; LO.22 LO.23; LO.24
3.Intradisciplinary integration (between the topics of the discipline)	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.3; SC.17	LO.1; LO.2; LO.3; LO.20; LO.21; LO.22 LO.23; LO.24

V. The content of the topic:

There are three sections of airways: the upper (nose and pharynx), medium (larynx, trachea, bronchi), lower (bronchioles, alveoli). Their morphological structure is imperfect at the time of birth, with which the features of the breathing are associated. Formation of respiratory tract is completed to 7 years age, but their sizes are increased in the future. All respiratory tract in children are much smaller and narrower air gap than in adults. The mucosa is a thin, delicate, easily damaged. The glands are underdeveloped. The synthesis of IgA and surfactant reduced. Submucosa is friable, contains a small amount of elastic and connective tissue elements, highly vascularized. Cartilages of airways are soft and flexible. These morphological features reduce the barrier function of mucosa.

Nose and nasopharyngeal space are small in early age children. The nasal passages are narrow, nasal conchae are thick (lower conchae develop up to 4 years age). So even slight inflammation and swelling of the mucosa can cause the obstruction of the nasal passages that leads to shortness of breath and difficulty sucking. The sinus maxillaris (Highmore's antrum) formed at birth (develops up to 7 years of life). The development of ethmoidal, sphenoidal and frontal sinuses is completed to 12, 15 and 20 years age respectively.

The nasopharyngeal meatus is short, is located close to the corner of the eye. Its valves are underdeveloped, so infection can easily permeate from the nose into the conjunctival sac.

Pharynx is relatively wide and low located. Eustachian (auditory) tube connects the nasopharynx and tympanic cavity. This tube is short, wide, straight and located horizontally, which contributes the penetration of the infection from the nose to the middle ear.

The pharyngeal lymphoid tissue ring (Waldeyer's-Pirogova ring) consists of 6 tonsils: 2 palatine tonsils, 2 tonsils of torus tubaris , 1 pharyngeal tonsil and 1

lingual tonsil. The term "throat" is used during inspection of the oropharynx. “Oropharyngeal cavity” is the anatomical formation which surrounds the base of tongue: on the sides - the tonsils and palatine arch, from above - the soft palate and uvula, the back side - the inferior wall of the oropharynx, in the front of - the oral cavity.

Epiglottis in newborns is relatively short and wide, can be the cause of functional restriction of the entrance to the larynx and the occurrence of stridor.

Larynx in children is higher and longer than in adults. It has a funnel-shaped form with a narrowing into the subglottic space (in newborn - 4 mm), gradually expanded (to 14 years - 1 cm). Its cartilages are tender and pliable. Elastic tissue of larynx is underdeveloped.

The angle of connection of thyroid plates in boys after 3 years becomes acute, and by 10 years larynx in boys on a structure is like in adult man.

The vocal fissure is narrow. It is posed highly, at a level of 4-th cervical vertebra (in adults at a level of C-7). True vocal chords in children are short, from 12 years in boys are longer, than in girls. The vocal cords and mucosa are tender, soft, have plentiful vascularization and rich of lymphoid tissue, can easily lead to swelling of the submucosa in respiratory infections and the occurrence of croup syndrome. In young age laryngitis can develop easy. More often laryngitis is stenotic – a false croup.

Trachea relatively greater length and width, the funnel shape, contains 15-20 cartilaginous rings, very mobile. The walls of the trachea, soft, easy to subside. The top edge is on a level of 4-th cervical vertebra, a bifurcation is on a level of 3-th thoracic vertebra. In adults the top edge is on a level of 7-th cervical vertebra, and a bifurcation is on a level of 4-th thoracic vertebra. The mucosa is thin, tender and dry, well-vascularized. Elastic tissue is undeveloped, cartilaginous skeleton is soft, can be easy squeezed from outside.

The bronchial apparatus is formed by the time of birth. The sizes of the bronchi intensively increase in the 1st year of life and in adolescence. The bronchi are formed by cartilaginous half-rings which does not have locking plates connected by a fibrous membrane in early childhood. Bronchus cartilage is very elastic, soft.

Bronchi in children are relatively wide. The right main bronchus is almost a direct continuation of the trachea. Therefore, foreign objects are likely to fall into it.

The lower airways are characterized by the absolute narrowness, which explains the occurrence of obstructive syndrome in early age children. The mucous membrane of large bronchi is covered with ciliated epithelium, which performs a cleaning function (mucociliary clearance). Incomplete myelination of the vagus nerve and underdevelopment of the respiratory muscles contributes to the absence of a cough reflex in young children. The mucus accumulated in the small bronchi easily clogs them and leads to pulmonary atelectasis and the development of infection in the lungs. Accumulated in small bronchi mucus easily block them and leads to pulmonary atelectasis and tissue infection.

Lungs have segmental structure in children as in adults. The segments are separated by a thin connective septum. The basic structural unit of the lung is acinus, but terminal alveoli in newborns end up by a sac, and not by a brush, as in an adult.

The interstitial tissue of the lungs is loose, rich in blood vessels, contains little connective tissue and elastin fibers. Thus the lung tissue in children in the first years of life is more full of blood, but less airy.

Insufficient development of elastic structures can lead to the development of emphysema and atelectasis. The tendency to atelectasis occurs as a result of deficiency of a surfactant - a surface-active substance, which regulates the alveolar surface tension and stabilizes the number of terminal pneumatic spaces, i.e. alveoli.

The basic functionality of the physiological characteristics of the respiratory system in children are:

- Breathing in children is frequent (which compensates for the small amount of breathing) and superficial.
- The frequency of the breathing is greater the younger the child (physiologic shortness of breath).
- Respiratiry rate in newborn is 40-50 in 1 minute, in infant - 35-30 in 1 minute, in 3 years-old child - 30-26 in 1 minute, 7 years-old child - 20-25 in 1 min, in 12 years-old child - 18-20 in 1 min, after 12 years as an adult - 16-18 in 1 min.
- Acceleration (tachypnea) or deceleration (bradypnea) of breathing ascertain if the respiratory rate is differ from the average on 10% and more.
- Newborn breathing is spastic with short stops (apnea).
- The type of breathing in newborn is diaphragmatic, after 1-2 years – mixed, after 7-8-years-old – in girls - thoracic, in boys - abdominal.
- Lung breathing capacity is smaller then younger the child. The respiratory minute volume also increases with age. However, this figure relative to body weight in newborns is 2-3 times higher than in adults.
- Lung capacity in children is considerably lower than in adults.
- Pulmonary gas exchange is more intense in children thanks to its rich vascularization of the lung, high blood flow speed, high diffuse opportunities.

During respiratory examination of a child should pay particular attention to the following points:

1. Collecting history of the disease - before the beginning of the disease, appearance of the first pathological symptoms and the sequence of their development (rhinitis, dyspnea, cough, sputum, sore throat and chest pain, fever, weakness, loss of appetite, headache etc.) for to clarify the details of the complaints, assess the medical history and life.

2. During inspection - to estimate the position of the sick child, the skin color, presence of cyanosis, the shape of the chest (barrel, flattened, retraction of intercostal spaces, etc.), breath (type, respiratory rate, rhythm, depth), the presence and type of dyspnea (inspiratory, expiratory, mixed), voice (hoarse, nasal, aphonia), cough (character, frequency, depth, rhythm, at what time of day prevails, and others).

VI. The plan and organizational structure of the class:

№	Elements of practical training	Time (min)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3 min.
2.	Initial test control of knowledge.	10 min.
3.	The teacher demonstrates the methodology of anamnesis collection and clinical examination of children with emphasis on age features.	20 min.
4.	Independent work of students: mastering the skills of anamnesis collection in children of different age groups, assessment of the general condition of the sick children.	25 min.
5.	Filling of reports about the results of patient examination.	10 min.
6.	Final control of knowledge: solving of clinical cases.	10 min.
7.	The tasks for independent preparation of students for the next class.	2 min.
	Total	**80 min.**

VII. The materials of methodical provision of classes.

VII. 1. Materials for self-control for the preparatory stage of the class:

List of theoretical questions for self-control:

1. Anatomical and physiological characteristics of the respiratory system in children.

Test tasks (examples):

1. In which of the prenatal period is a development of surfactant:
   A. in embryonic
   B. in embriofetal
   C. in fetal
   D. in early fetal
   E. in late fetal
2. Respiratory rate in 1 year-old child is:
   A. 50-60 in min.
   B. 40-50 in min.
   C. 30-35 in min.

D. 20-25 in min.
E. 18-20 in min.

3. Respiratory rate in 5 year-old child is:
A. 16
B. 20
C. 25
D. 30
E. 40

4. Which of the following is an anatomic and physiological feature of the bronchi in early age children?
A. poor secretion of the bronchial glands
B. relatively large lumen of the bronchi
C. increased development of connective tissue
D. poor blood supply to the mucous membrane
E. poor development of the muscular layer

5. How many segments are there in the right lung?
A. 8
B. 9
C. 10
D. 11
E. 12

6. The prenatal structure of the bronchi is completed:
A. in 4 weeks
B. in 6 weeks
C. in 8-10 weeks
D. in 16 weeks
E. in 32 weeks

7. The reserve physiological mechanism of bronchial cleansing is:
A. the work of the mucociliary epithelium
B. changes in the lumen and length of the bronchi in the inhalation and exhalation phases
C. cough
D. activity of alveolar mastophages
E. all of the above

8. Till what age is physiological hyperplasia of lymphoid tissue observed?
A. up to 1 year
B. up to 3 year
C. up to 10 year
D. up to 5 year
E. up to 2 year

9. The rapid development of laryngeal stenosis in infants with ARVI is due to:
A. narrowness of the nasal passages
B. thin and short vocal cords
C. funnel-shaped larynx
D. narrow passage under the vocal cords and mucous-rich capillaries

E. nerve receptor irritation

10. The lower edge of right lungs on the medio-clavicular line in early age children is located at:

A. III rib
B. IV rib
C. V rib
D. VI rib
E. VII rib

Standards of answers:

1	E	3	B	5	C	7	C	9	D
2	C	4	E	6	D	8	D	10	D

VII. 2. Materials for methodological support for the basic stage of class:

1. The list of practical tasks:

- to master the technique of the complaints and anamnesis collecting.

2. Professional algorithms for training in practical skills.

№	Tasks	Instructions teacher to students	Note
1.	To collect anamnesis in the patient with pathology of respiratory system.	Algorithm of medical history: 1. History of the disease: a) Onset of a disease. b) The first clinical symptoms. c) Whether treatment was carried out? What medicines? g) The dynamics of the disease. d) Complaints of the patient at the time of examination. 2. Patient's life history: a) Course of pregnancy. b) Delivery course. c) The state of child's health in the neonatal and infancy period? d) Morbidity rate of the child. d) Presence of allergic reactions in patient.	Should to ask questions about respiratory system. Should to identify the risk factors of respiratory disease development.

		e) The patient's heredity.	

VII. 3. Materials of control for the final stage of the class:

Situational tasks (examples):

Task 1.

The mother of 3 years 6 months-old girl went to the pediatrician with complaints on the nasal blockage, presence of mucous secretions, fever in the child. The treatment of acute rhinitis was prescribed. Two days later the mother returned to the doctor notice severe ear pain. What causes of possible otitis development are in early age children?

Task 2.

The mother of the newborn complained of periodic difficulty in nasal breathing despite the hygienic measures on a routine examination by a pediatrician. What anatomical and physiological features of the nose in newborn can cause these complaints?

Task 3.

The 2 years-old girl with asphyxiation signs entered to the admission department. The small detail of the toy was discovered during the bronchoscopy. In which of the bronchi could you find toy toy most likely and why?

Standards of answers:

Task 1.

The possibility of rapid development of otitis in early age children is caused by a short auditory tube and therefore the rapid spread of infection.

Task 2.

These complaints may be due to the narrowness of the nasal passages and the absence of the lower nasal passage in a newborn.

Task 3.

In the right bronchus. It is connected with feature of its anatomical structure. The right bronchus is wide and short, it practically is a continuation of trachea.

VII. 4. Materials of methodical support for self-preparation of students:

Indicative chart for independent work of students with educational literature

Learning tasks	Instructions to the task

To study:	
- embryogenesis of respiratory system;	to know
- anatomical and physiological features of respiratory system in children of different ages;	to call
- main complaints related to respiratory diseases in children.	to know

VIII. Literature:

Basic:

5. Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition, updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012. – P. 247-253.

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev – Vinnytsia: Nova Knyha, 2018. – P.247-253.

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013. – P. 61-67.

3. Nelson textbook of pediatrics.—18th ed. / edited by Robert M. Kliegman. Part II. Growth, development and behavior // www.mdconsult.com

Guidelines for students to practical classes in Propedeutics of Pediatrics

Topic: Methods of examination of respiratory system in children.
Course"III
Specialty: 222 Medicine
Number of education hours: 2 hours
Training location: classroom in the children's department.

I. Relevance of the topic:

Respiratory pathology occupies the I-st place in the structure of disease and III- place in the structure of mortalitytoday. Compared to an adult the child is marked by characteristic morphological, physiological and other features according to age. Therefore, it is very important to correctly understand the specifics of the patient examination, to correctly evaluate the results obtained, to recognize the disease in the initial stages. The additional methods of research

(laboratory, functional and instrumental) are important for diagnosis of respiratory pathologyin addition to the collection of complaints, medical history and physical examination.

II. Learning objectives of the lesson:

- Know the main complaints related to respiratory diseases (types and characteristics of cough);
- Know the general rules and techniques of palpation, percussion and auscultation;
- To know laboratory, functional and instrumental methods of research of respiratory organs;
- To master the method of collecting complaints and medical history in children with respiratory system pathology (to assess the nature of cough, to detect the presence of dyspnea and to assess its nature);
- To master the technique of general examination of the child (to evaluate the color of skin and mucous membranes, the shape of the chest in normal and pathology, functional features of the respiratory system);
- To master the technique of palpation, percussion and auscultation in children of different age groups and interpretation of the obtained data.

III. The objectives of personality development:

- The student must learn to follow the principles of medical ethics and deontology at the bedside;
- To master the ability to establish psychological contact with the patient and his family;
- To acquire a sense of responsibility for the quality of professional knowledge and the correct professional actions.

IV. Interdisciplinary integration:

Disciplines	**General Competences**	**Special Competences**	**Program Learning Outcomes**
1. Preceding (Providing) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	-	-
2. Subsequent (Provided) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.3; SC.17	LO.1; LO.2; LO.3; LO.20; LO.21; LO.22 LO.23; LO.24

3.Intradisciplinary integration (between the topics of the discipline)	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.3; SC.17	LO.1; LO.2; LO.3; LO.20; LO.21; LO.22 LO.23; LO.24

V. The content of the topic:

During respiratory examination of a child should pay particular attention to the following points: collecting history of the disease - before the beginning of the disease, appearance of the first pathological symptoms and the sequence of their development (rhinitis, dyspnea, cough, sputum, sore throat and chest pain, fever, weakness, loss of appetite, headache etc.)to clarifythe details of the complaints, assess the medical history and life.

Examination, palpation, percussion and auscultation are used for objective examination of the respiratory system.

Inspection*:* the general inspection is started with the face, then the chest is examined.

When examining the face pay attention to the difficulty in nasal breathing, inflating the wings of the nose during breathing, determine the appearance of nasal discharge, if any. It is important to pay attention to the skin color. If cyanosis is detected, it is necessary to characterize its intensity, to determine whether it is constant or only occurs during physical exertion (baby screams, all breasts, etc.). Often children are diagnosed with perioral cyanosis (in the area of the nasolabial triangle). It is especially often seen in young children.

On examination of the chest determine the symmetry of the movements of the blades during breathing, the involvement of the super- and subclavian areas, intercostal spaces in the act of breathing, the lag of one of the halves of the chest during breathing. Attention is also drawn to the involvement of accessory muscles in the act of breathing - the pectoralis or the abdominal muscles.

It is important to characterize the baby's voice, his cry and his cough. Depending on the predominance of the participation of the chest or abdomen in breathing determine its type (chest, abdomen, mixed). Approximately the largest excursions of the chest determine the depth of breath. Respiratory rhythm is determined by the regularity of breathing. It is necessary to calculate the number of respiratory movements (per 1 minute) and the ratio of heart rate to respiratory rate.

The respiratory rate is calculated by the hand placed on the chest or abdomen. In infants and infants, the calculation of respiratory rate can be done by raising the stethoscope to the baby's nose (preferably during sleep). The breathing rate is mandatory for one minute.

Palpation:This method provides an idea of the condition of the skin and subcutaneous tissue in the chest (local sweating, pain, hyperesthesia, edema, etc.). Palpation of the chest is performed with both hands: the arms are placed symmetrically on both sides.

To determine the elasticity of the chest with both hands, squeeze the front back and sides. The reduced elasticity of the chest indicates its rigidity.

Palpation is also used to determine the voice tremor. To do this, both hands are placed on the breast of the child symmetrically on both sides and the child is asked to pronounce loud words like "one-two-three", "forty-three". In young children, research is performed during crying. In this case, the hands of the researcher feel the oscillation of the chest due to voice vibration. Normally, the voice tremor is symmetrical, but is more pronounced in the upper chest, with a predominance to the right.

Percussion:in lung percussion, special attention is paid to the correct position of the baby, which provides a symmetrical position of both halves of the chest. In infants, percussion of the anterior surface of the chest is more convenient to perform in the position of the patient lying on his back. The back surface (back) is punched in the sitting position. Chest percussion in older children is performed in a standing position. With percussion of the anterior surface of the chest, the baby stands quietly with his hands down. At percussion of a back surface of a thorax the shoulders of the child should be lowered, and the head is tilted forward. In the study of the intercapillary space, the child should raise his arms in front to increase the area of the percussion surface. With percussion of the lateral surfaces of the chest, the baby's hands should be pulled away or pulled behind the head.

In severely ill children, percussion of the chest can be performed both in the sitting position and in the supine position, while maintaining the symmetrical arrangement of both halves of the body.

In percussion of the chest in children older than 5 years, indirect percussion (using a pleysimeter) is mainly used, in children of early age, mainly direct.

Distinguish between topographical and comparative percussion.

Topographic percussion:finger - the pleysimeter is placed on the chest in the intercostal spaces in parallel. Establishing the lower boundaries of the lungs begins with the determination of the lower boundary to the right. For this purpose, tapping is performed at the intercostal intervals from top to bottom along the middle clavicle, middle axillary, scapular and paravertebral lines. Then proceed to the determination of the lower boundaries of the lungs to the left, tapping along the same lines. Normally, the lower limits of the lungs to the right are at the level of 6, 8, 10 ribs and 11 thoracic vertebra, respectively, along the lines indicated, to the left - 4, 9, 10 ribs and 11 thoracic vertebra.

The determination of the height of standing of the tops of the lungs by the percussion method begins at the front. The finger-pleysimeter is positioned above the collarbone and tapped, moving the finger-pleysimeter up, until a shortened percussion sound occurs. With the normal location of the tips of the lungs, this area is 2-4 cm up from the middle of the clavicle. The boundary mark is made on the side of the finger-plessimeter facing clear sound. Behind the percussion of the tops lead from the spina scapulae up to the appearance of a shortened percussion sound. Normally, the height of standing apices behind is

determined at the level of the spinous process of the VII cervical vertebra. In pre-school children, the upper limit of the lungs is not determined because the tops of the lungs do not extend beyond the clavicles.

In older children determine the mobility of the pulmonary margin. The mobility of the pulmonary margin is most pronounced along the scapular, or middle or posterior axillary lines, due to the large size at this site of the pleural sinus. The procedure for determining the mobility of the pulmonary margin is carried out in a certain sequence. First, with calm breathing determine the lower limit of the lungs along one of the above lines. They then ask the child to take a deep breath and hold their breath in that position. Continuing the percussion down, a new limit of the location of the lower edge of the lungs is determined. After that, by installing the finger-pleysimeter in the area of the angle of the scapula (for the scapula line) or in the fifth or sixth intercostal space (for the axillary line), they ask the child to exhale completely and also hold his breath. Percussing upwards, determine the boundary of the lower edge of the lung at maximum exhalation. The distance between the borders obtained by inhalation and exhalation, and constitutes the mobility of the lower pulmonary margin. Usually in older children it is 6-8 cm.

Comparative percussion:this type of percussion involves the comparison of percussion sound over anatomically identical areas of the lungs, located to the right and left (front - on the middle-clavicular lines, sides - on the axillary, rear - on the scapular and paravertebral lines), and also compare the percussion sound over the clavicle. under the collarbone. Percussion is not performed above the heart area. When performing comparative percussion, the finger-plessimeter is located parallel to the ribs, but in the case of percussion, it is placed parallel to the spine in the interlobular area.

When tapping the lungs, you can hear the following sounds:

1) *clear pulmonary sound* - sound of healthy lungs containing air;

2) *dull sound*with different shades (depending on the intensity of the muting sound determine short (blunt) or completely dull percussion sound). Shortening of percussion sound occurs in connection with compaction of the lung tissue, blunt - when formed in the lung tissue airless areas and when filling the pleural space with exudate;

3) *tympanic sound* - high, long sound - is determined over cavities that do not contain lung tissue (caverns, cysts, pneumothorax).

4) *box sound* - high, short-lived sound with tympanic tint - is determined by reducing its density (emphysema of the lungs).

Auscultation:You can listen to your baby, as well as percussion, in any position - standing, sitting, lying down. It is difficult for patients to listen better when lying down. Symmetrical areas are listened to: apices, anterior surface of the lungs, axillary regions, posterior - above the shoulder blades, paravertebral areas, under the shoulder blades. When listening, it is first and foremost necessary to determine the nature of the underlying respiratory noise and then to evaluate the side noises.

In newborns and children up to 3-6 months, some weakened breathing (weakness of respiratory muscles) is listened to. From 6 months to 5-7 years old, puerile breathing is heard in children, which is essentially vesicular. Respiratory noise is thus louder and longer, both on inhalation and exhalation. The appearance of puerile breathing in children due to the peculiarities of the structure of the respiratory system. In children older than 7 years of breath gradually acquires the character of vesicular: resembles the soft sound "f", exhalation is one third of the breath. In healthy children, the larynx, also called tracheal or laryngotracheal, is heard over the larynx, the trachea, the large bronchi, in the intercapillary region at level III - IV of the thoracic vertebra. It is reminiscent of the "x" sound, exhaling to hear stronger and longer than inhaling.

Pathologically altered breathing:

1. *hard (broncho-vesicular) breathing* - this is coarse vesicular breathing with prolonged exhalation (exhalation of more than one third of the breath) and approximation of the volume of exhalation to the volume of the breath - indicates narrowing of the bronchi, occurs in bronchitis and bronchopneumonia;
2. *bronchial breathing* (if it is not listened to in the areas not typical for it) - indicates compaction of the lung tissue over the site of listening, occurs in focal and segmental pneumonias, lung abscesses;
3. *weakened breathing* - occurs when the ventilation is weakened in the areas of hearing that is observed in pneumonia, lung defects, significant bronchial obstruction, foreign bodies of the bronchi, neoplasms, loss of pulmonary tissue elasticity in pneumosclerosis, pleurisy;
4. *wheezing*- narrowing of small bronchi (exacerbation is due to exhalation), with compensatory (vicarious) enhancement on the healthy side in case of pathological processes on the other.

When auscultation in children, you can hear such strange sounds as wheezing. Distinguish between dry (whistling and musical, humming) and wet (coarse, medium and fine) wheezing. Auscultation also shows crepitus, the noise of friction of the pleura. It is necessary to distinguish rales that are formed in the bronchi and those that are carried from the upper respiratory tract (leading rales). To distinguish between them, the following properties of conductive wheezing should be used: wheezing is well heard over the nasal and oral cavities, they are well listened to over the shoulder blades and spinous processes and decrease significantly in number or disappear after coughing. When listening to wheezing it is necessary to note their localization, number, character, phase of listening (on inhalation or exhalation).

Crepitation - side noise that occurs when scattered on the breath of a large number of burned alveoli. The sound of crepitation is reminiscent of the sound that occurs when rubbing your fingers with a bundle of hair or a crack of cellophane that rustles near your ear. Unlike wheezing, crepitus is a stable sound phenomenon (does not change after coughing).

Pleural friction noise - side noise that occurs with dry pleurisy. Listened to in both phases of breathing, it can be quiet, gentle, or, conversely, rough, loud, as if something is scraping. It is more often listened to locally in places of

maximal respiratory excursions (lower lateral parts of the chest). Listened to as a sound that occurs in the chest, amplified when pressed with a stethoscope. The noise of pleural friction does not change after coughing, continues to be listened to with minimal breathing. To determine the latter, the researcher asks the child to take a deep breath, close his mouth and nose with his hand, and then perform diaphragm and rib movements, as if breathing. In this case, wheezing and crepitation disappear, and the noise of pleural friction remains.

Auscultation can reveal bronchophony (increased sound conduction, most often associated with tissue compaction).

VI. The plan and organizational structure of the class:

№	Elements of practical training	Time (min)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3 min.
2.	Initial test control of knowledge.	10 min.
3.	Demonstration by the teacher of the methods of anamnesis collection and clinical examination in children of all ages.	20 min.
4.	Independent work of students: mastering the skills of respiratory system examinationin children of different age groups.Assessment of the general state of sick children.	25 min.
5.	Filling of reportsabout the results of patient examination.	10 min.
6.	Final control of knowledge: solving of clinical cases.	10 min.
7.	The task for independent preparation for the next class.	2 min.
	Total	**80 min.**

VII. The materials of methodical provision of classes.
VII. 1. Materials for self-control for the preparatory stage of the class:
List of theoretical questions for self-control:

1. The main complaints are related to diseases of the respiratory system.
2. Types and characteristics of cough.
3. The types of normal and abnormal breathing.
4. Dyspnea and its types.
5. General rules and techniques of palpation, percussion and auscultation.
6. Additional pathological noises (wheezing, crepitation, pleural friction noise).
7. Laboratory, functional and instrumental methodsof research.

Test tasks (examples):

1. For which disease is a symptom of crepitations at auscultation typical?

A. acute obstructive bronchitis
B. pneumonia
C. exudative pleurisy
D. bronchial asthma
E. acute bronchiolitis

2. The bandbox of resonanceis determined in the following diseases, except:
A. emphysema
B. asthma
C. obstructive bronchitis
D. pneumonia
E. pneumothorax

3. Shortened soundof resonance is detected in the following diseases, except:
1. segmental pneumonia
2. atelectasis
3. exudative pleurisy
4. bronchiolitis
5. primary tuberculosis complex

4. What method of percussion is recommended for use in young children?
A. immediate percussion
B. Yanovsky's method
C. Obraztsov method
D. Ebshtein's method
E. all of the above

5. The purpose of comparative percussion is:
– determining the borders of internal organs
– determination the size of internal organs
– determining the shape of internal organs
– definition the pathological changes in organs
– determination the internal organs pain

6. Give auscultative definition of puerile respiration in comparison with vesicular:
A. breathing noise is louder in both phases of breathing
B. breathing noise is louder and longer in inhalation
C. respiratory noise is louder and longer in exhalation
D. respiratory noise is quieter and shorter in both phases of respiration
E. respiratory noise is quieter and longer in inhalation

7. What kind of respiration should we talk about if not only inhalation but also exhalation is heard well over the lungs of a healthy young child?
A. puerile
B. amphoric
C. tracheal
D. bronchial
E. vesicular

8. What kind is the respiration of a healthy child aged 1 year?

A. vesicular
B. puerile
C. hard
D. bronchial
E. weakening

9. What percussion sound is heard over the lungs normal?
F. femoral
G. short, dull
H. clear lung
I. tympanic
J. bandbox

10. The presence of fine moist rales is most possible when:
A. pneumonia
B. rhinitis
C. tracheitis
D. laryngitis
E. pleurisy

Standards of answers:

1	B	3	D	5	D	7	A	9	C
2	D	4	B	6	A	8	B	10	A

VII. 2. Materials for methodological support for the basic stage of class:

1. The list of practical tasks:

- To master the method of collecting complaints and medical history in children with respiratory system pathology (to assess the nature of cough, to detect the presence of dyspneaand to assess its nature);
- To master the technique of general examination of the child (to evaluate the color of skin and mucous membranes, the shape of the chest in normal and pathology, functional features of the respiratory system);
- To master the technique of palpation, percussion and auscultation in children of different age groups and interpretation of the obtained data.

2.Professional algorithms for training in practical skills.

№	Tasks	Instructions teacher to students	Note
1.	To collect anamnesisin patient with respiratory pathology	Anamnesis collection algorithm: 1. Medical history: a) the onset of the disease;	Need to ask the questions, concerning respiratory system.

		b) the first clinical symptoms; c) whether treatment has been carried out?what medicines was treated? d) the dynamics of symptoms disease; e) complaints of the patient at the exam moment; 2. The history of life: a) maternal pregnancy; b) the course of childbirth(delivery); c) the healthstate of the baby in the period of newborn and infant age d) child morbidity; e) the presence of allergic reactions in child; f) heredity of the patient.	Need to identifyrisk factors of respiratory diseases.
2.	To carry out the objectiveexaminatio nof respiratory system.	Algorithm of students practical work: 1)Visual inspection of the patient: a) presence of cyanosis; b) difficulty of nasal breathing; c) shape and symmetry of the thorax; d) participation of the additional respiratory muscles; e) determination of the type of dyspnea; 2) Inspection of the throat, characteristicsof the tonsils, posterior pharyngeal wall. 3) Calculation of respiratory rate. 4) Palpation of the thorax: a) pain; b) chest elasticity; c) definition of voice trembling. 5) Topographic percussion of	Should exam the patient considering age features of the child.

		lung: definition of upper and lower borders. 6) Comparative percussion: determining the nature of percussionsound, symmetry. 7) Auscultation of the lungs: a) determining the nature of respiration; b) rales and their characteristics (localization, amount, type, connection with the phase of respiration); c) crepitation; d) pleural friction rub; e) determination of bronchophonia.	

VII. 3. Materials of control for the final stage of the class:
Situational tasks (examples):

*Task 1.*During the clinical examination of the child, the following changes were observed from the side of the chest: it is short and wide (reduced anterior-posterior and increased transverse size), the ribs are horizontal, limited excursion of the chest. What is the shape of your chest? Can this form be considered normal? If not, what diseases are characterized by such changes of the chest?

*Task 2.*During the clinical examination of the child, the following changes were observed from the side of the chest: reduction of all sizes, atrophy of the respiratory muscles, a sharp inclination of the ribs downwards, acute abdominal angle, lag of the blades. What is the shape of your chest? Can this form be considered normal? If not, what diseases are characterized by such changes in the chest?

*Problem 3.*When performing comparative percussion, loud percussion sound with a tympanic tone of box type was determined in child. Percussion sound is produced equally over symmetrical regions of the chest. What are the causes of box percussion sound? For what diseases is box sound typical?

*Problem 4.*When performing comparative percussion in 7 years-old child there is a shortened, blunt percussion soundbelow the angle of the rightscapula on the back surface of the chest. To the left above the symmetrical section of the chest, the percussion sound is clear, pulmonary.What are the causes of shortened percussion sound? What kind of disease is characterized by such a percussion change?

*Task 5.*A8 years-old girl with complaints of fever, moist cough, dyspnea, arrived to the pulmonology department. At auscultation the sounds are heard in the right axillary region of the chest at the end of the inhalationphase on the background of hard respiration. This sound phenomenon is similar to a crack of dry hair, if it is rubbed between the fingers around the ear. These rales are independent of body change and coughing. What are these respiratory sounds called? What is the reason for their occurrence? In what diseases of the respiratory system can similar sound phenomena be observed?

Standards of answers:

Task 1.

This chest is called "barrel-shaped", which is pathological. These changes are characteristic of the respiratory systemdiseases, for example, bronchial asthma, obstructive bronchitis, emphysema of the lungs.

Task 2.

This chest is called "paralytic". It is pathological. These changes are characteristic of chronic bronchopulmonary diseases with decreased respiratory surface of the lungs.

Problem 3.

Boxed percussion sound appears in children with increased airiness of the lungs. It is characteristic of emphysema, bronchial asthma, obstructive bronchitis.

Problem 4.

The shortened percussion sound indicates the consolidation of the pulmonary tissue and its decrease airinessin the percussion zone. This change is characteristic of pneumonia, atelectasis, tumors, pneumosclerosis, presence theexudate in pleural cavity, etc.

Task 5.

These respiratorynoises are called "crepitations". Crepitation occurs in the presence of exudate in the alveoli. Crepitation is characteristic of pneumonia, especially lobar ones. May be observed in tuberculosis, pulmonary infarction.

VII. 4. Materials of methodical support for self-preparation of students:

Indicative chart for independent work of students with educational literature

Learning tasks	Instructions to the task
To study:	
- The main complaints related to respiratory systemdiseases.	to know
- Types and characteristics of cough.	to know
- The types of normal and abnormal breathing.	to call
- Dyspnea and its types.	to call
- General rules and techniques of palpation, percussion	to know and can to

and auscultation. - Other abnormal noise (rales, crapitation, pleural friction rub). - Laboratory, functional and instrumental methods of respiratory system testing.	show to know to call

VIII. Literature:

Basic:

6. Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition, updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012. – P. 253-290.

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev – Vinnytsia: Nova Knyha, 2018. – P.120-154.

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013. – P. 61-67, 133-140.

3. Nelson textbook of pediatrics.—18th ed./ edited by Robert M. Kliegman. Part II. Growth, development and behavior // www.mdconsult.com

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Methodical developments for students
to practical training in Propaedeutics of Pediatrics

Topic 6: Semiotics of lesions (cough, shortness of breath, etc.) and major respiratory diseases in children. Semiotics of respiratory diseases, syndromes of respiratory disorders and respiratory failure, their main clinical manifestations..

Course: III

Specialty: 222 Medicine

Number of education hours: 2 hours

Training location: classroom in the children's department.

I. Relevance of the topic:

Today the pathology of the respiratory system occupies the 1st place in the structure of the disease and the 3rd place in the structure of child mortality. The

body of the child compared with the body of an adult differs in morphological, physiological and other characteristics in accordance with their age. Therefore, it is very important to correctly understand the symptoms of the disease, the specifics of the patient's examination, correctly evaluate the results obtained in order to recognize the disease in the initial stages and prescribe adequate treatment. For the diagnosis, in addition to collecting complaints, medical history, objective examination, additional research methods play an important role: laboratory, functional and instrumental tests. So, the diagnosis of pneumonia is established only after an X-ray examination of the chest; obstructive bronchitis - after carrying out functional tests (spirometry, peak flowmetry), in the presence of obstructive ventilation failure.

II. Learning objectives of the lesson:

- To know the main complaints related to diseases of the respiratory system (types and characteristics of cough, etc.);
- To know the main symptoms of respiratory diseases in children of different ages;
- To know the general rules and techniques of palpation, percussion and auscultation;
- To know the laboratory, functional and instrumental methods of examination the respiratory system;
- To master the technique of collecting complaints and medical history in children with pathology of the respiratory system (to assess the nature of coughing, to identify the presence of shortness of breath and assess its nature);
- To master the technique of a general examination of the child (assess the color of the skin and mucous membranes, the shape of the chest in normal and pathological conditions, the functional features of the respiratory system);
- To master the technique of palpation, percussion and auscultation in children of different age groups and their interpretation;
- To be able to determine the syndromes of the most common diseases of the respiratory system in children of different ages (stenosing laryngotracheitis, bronchial obstructive syndrome, pleurisy, pneumonia);
- To master the technique of patient care with pathology of the respiratory system.

III. The objectives of personality development:

- The student must learn to adhere to the principles of medical ethics and deontology at the patient's bedside;
- To master the ability to establish psychological contact with the patient and his family;

– To master the sense of responsibility for the quality of professional knowledge and the correctness of professional actions.

IV. Interdisciplinary integration

Disciplines	General Competences	Special Competences	Program Learning Outcomes
1. Preceding (Providing) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	-	-
2. Subsequent (Provided) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.3; SC.17	LO.1; LO.2; LO.3; LO.20; LO.21; LO.22 LO.23; LO.24
3.Intradisciplinary integration (between the topics of the discipline)	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.3; SC.17	LO.1; LO.2; LO.3; LO.20; LO.21; LO.22 LO.23; LO.24

V. The content of the topic

Semiotics of respiratory system diseases in children

Acute respiratory viral infections (ARVI) are a group of diseases of the upper and middle respiratory tracts of viral etiology. Most often the disease is caused by influenza and parainfluenza viruses, adeno- and rhinoviruses, ECHO viruses. Clinically, ARVI are manifested by rhinitis, pharyngitis, laryngitis, bronchitis. As a rule, all of them are accompanied by characteristic only for them and general symptoms (headache, general weakness, fever, change of appetite, etc.).

Acute rhinitis is an inflammation of the nasal mucosa. It is manifested by sneezing, difficulty in nasal breathing, nasal discharge.

Acute pharyngitis is an inflammation of the mucous membrane of the oropharynx. It is manifested by a sore throat, coughing, pain during swallowing, hyperemia of the mucous membrane of the throat, enlargement of follicles on the back wall of the oropharynx (a symptom of paving stones).

Acute laryngitis is an inflammation of the mucous membrane of the larynx.

Symptoms of false croup (stenotic laryngotracheitis):

- the onset of the disease is acute, sudden on the background of influenza, parainfluenza;
- coarse barking cough;
- breathing is difficult, inspiration is loud, participation in the act of breathing of the auxiliary muscles;

- feelings of fear, insufficiency of air, expressed excitement;
- inspiratory dyspnea;
- skin pallor, acrocyanosis, cold sweat;
- tachycardia;
- signs of respiratory failure 1-4 degree.

Acute bronchitis is an inflammation of the mucous membrane of the bronchi of any caliber. Depending on the localization of the inflammatory process and clinical signs, acute bronchitis is divided into three types:

Simple bronchitis is an inflammatory process in all bronchi of both lungs. Appears dry cough, which after 2-3 days becomes moist.

Symptoms of bronchitis:

- signs of respiratory catarrhal syndrome;
- diffuse nature of physical data: clear pulmonary sound during percussion, with auscultation on the background of hard breathing, dry and moist rales are heard, the amount of which decreases after coughing;
- X-ray of chest - increased lung pattern, expansion of lung roots.

Obstructive bronchitis is an inflammatory process that is accompanied by bronchospasm, excessive mucus secretion, inflammatory infiltration, mucosal edema.

Symptoms of obstructive bronchitis

- barrel-shaped thorax;
- signs of expiratory dyspnea;
- vocal fremitus and bronchophony weakened;
- percussion - bandbox sound above lungs;
- auscultation - hard or evenly weakened breathing, diffuse dry and moist rales against the background of increased long exhalation;
- signs of respiratory failure
- X-ray of chest - increase the transparency of light, root expansion, increased vascular pattern.

Acute bronchiolitis is an inflammatory process in the bronchioles of both lungs. It is manifested by dry, then moist cough, expiratory dyspnea, the presence of prolonged exhalation, hard breathing, a significant amount of small bubbling rale on both sides, bandbox sound, severe respiratory failure.

Acute pneumonia is an acute, often unilateral, inflammatory process of the pulmonary tissue of viral-bacterial etiology. It is characterized by the expressed symptoms of intoxication, cough, dyspnea, pallor of the skin, perioral cyanosis.

Classification of respiratory failure in infants:

1st degree - dyspnea, tachycardia during exercise (for infants physical activity - breastfeeding, crying, excitement). The partial pressure of oxygen in the arterial blood is 80-65 mm Hg.

2 nd degree - dyspnea, tachycardia at rest, which are significantly increased during exercise. Slight lip cyanosis, acrocyanosis. Swelling of the

wings of the nose, retraction of the intercostal spaces during breathing. The child is lethargic, irritable. Partial pressure of oxygen in arterial blood - 65-50 mm Hg.

3rd degree - dyspnea up to 80-100 breaths per minute at rest. General cyanosis of the skin, mucous membranes. Auxiliary muscles are involved in breathing. Hypoxic encephalopathy (impaired consciousness, convulsions) may develop. Partial pressure of oxygen in arterial blood - below 50 mm Hg.

VI. The plan and organizational structure of the class

N	Elements of practical training	Time (minutes)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10
3.	Demonstration of technique of collection anamnesis and clinical examination in children by the teacher.	20
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age sick children.	25
5.	Filling down the protocols of examination of the sick child.	10
6.	Final control of knowledge, solving of clinical cases.	10
7.	The tasks for independent preparation of students for the next class.	2
TOTAL		80

VII. The materials of methodical provision of classes:

VII. 1. Materials for self-control for the preparatory stage of the class:

Tests (examples):

1. Bitonal cough is characteristic for:
   A. enlargement of the intrathoracic lymph nodes
   B. pertussis
   C. stenotic laryngotracheitis
   D. pneumonia
   E. bronchial asthma
2. A distinctive feature of stenotic laryngotracheitis is:
   A. expiratory dyspnea
   B. inspiratory dyspnea
   C. mixed dyspnea
   D. fine moist rales
   E. bitonal cough
3. The peculiarity of percussion changes in pneumonia:
   A. clear vesicular sound
   B. bandbox sound
   C. dullness
   D. tympanic resonance

E. liver dullness

4. Features of the physical data in pneumonia:
   A. wheeze
   B. crepitation
   C. sonorous rhonchi
   D. coarse moist rales
   E. no rales in the lungs
5. The bandbox sound is not typical for:
   A. emphysema
   B. asthma
   C. obstructive bronchitis
   D. bronchopneumonia
   E. acute bronchiolitis
6. The most informative symptoms of obstructive bronchitis are:
   A. wheezing
   B. dry and moist rales
   C. increased transparency of the lungs
   D. intoxication
   E. neutrophilic leukocytosis
7. The nature of dyspnea in pneumonia:
   A. inspiratory
   B. expiratory
   C. mixed
   D. dyspnea only after exercise
   E. dyspnea during a cough attack
8. In which of the following diseases is there no dullness on percussion?
   A. pneumonia
   B. atelectasis
   C. pleurisy
   D. bronchiolitis
   E. primary tuberculosis complex
9. An increase in bronchophony indicates:
   A. lung tissue consolidation
   B. the presence of exudate in the pleural cavity
   C. the presence of an air cavity in the lungs
   D. enlargement of the intrathoracic lymph nodes
   E. pneumothorax
10. Barking cough is characteristic for:
   A. enlargement of the intrathoracic lymph nodes
   B. pertussis
   C. stenotic laryngotracheitis
   D. pneumonia
   E. bronchial asthma

Standards of answers:

1	A	3	C	5	D	7	C	9	A
2	B	4	B	6	B	8	D	10	C

VII. 2. Materials for methodological support for the basic stage of class:

1. The list of practical tasks:

- To master the technique of collecting complaints and medical history in children with pathology of the respiratory system (to assess the nature of coughing, to identify the presence of shortness of breath and assess its nature);
- To master the technique of a general examination of the child (assess the color of the skin and mucous membranes, the shape of the chest in normal and pathological conditions, the functional features of the respiratory system);
- To master the technique of palpation, percussion and auscultation in children of different age groups and their interpretation;
- To be able to determine the syndromes of the most common diseases of the respiratory system in children of different ages (stenosing laryngotracheitis, bronchial obstructive syndrome, pleurisy, pneumonia);
- To master the technique of patient care with pathology of the respiratory system.

2. **Professional algorithms for training in practical skills**.

№	Tasks	Instructions	Notes
1	To master: - method of complaint collection, medical history; - the ability to evaluate the nature of cough; - the technique of general examination of the child (skin and mucous membranes, the shape of the chest in normal and pathological conditions, functional features of the respiratory	To work out the algorithm of collecting complaints and anamnesis, to learn to distinguish the nature of cough, to consistently carry out a general examination of the child.	Pay attention to the specificity of the collection of complaints and anamnesis in children with respiratory pathology, as well as the specificity of the examination of respiratory organs in in infants.

	system); - the technique of palpation, percussion and auscultation.		

VII. 3. Materials of control for the final stage of the class:
Situational tasks (examples):

Task 1.

A child of 4 years old was admitted to the hospital with complaints of fatigue, frequent bitonal cough. Hard breathing is heard over the lungs during auscultation, no wheezing. What pathological syndrome does the patient have?

Task 2.

A child of 2 years is sick for 2 weeks. Body temperature is not elevated. A frequent, deep, wet cough is noted. Over the lungs during auscultation, wet rales of different sizes and dry rales are heard. Mantoux test is 5 mm (papule). What is the syndrome of this child?

Task 3.

A child of 8 months with manifestations of exudative-catarrhal diathesis on the skin and mucous membranes is sick with a respiratory disease. On the 4th day of illness, a barking, rough cough, general anxiety, shortness of breath with the involvement of malleable places of the chest on inspiration, noisy breathing, hoarse voice appeared. What pathological syndrome does this child have?

Task 4.

A 6-month-old baby has a hoarse voice from birth, noisy breathing, which is intensified with anxiety and respiratory infections. The general condition of the child is not broken. What pathological syndrome does the child have?

Task 5.

A 9-year-old child has been ill for 5 days. High fever is noted. Complaints of pain in the right side, painful wet cough. In the lower part of the right lung the breathing is weakened during auscultation. There's also a reduction in percussion sound. What pathological syndrome does the patient have?

Standards of answers:

Task 1.

Bronchoadenitis syndrome.

Task 2.

Bronchitis.

Task 3.

Stenotic laryngotracheitis.

Task 4.

Congenital stridor.

Task 5.

Pneumonia.

VII. 4. Materials of methodical support for self-preparation of students: Indicative chart for independent work of students with educational literature

Educational tasks	Instructions for the task
To study:	
- the main complaints are related to diseases of the respiratory system;	To call.
- types and characteristics of cough;	To know.
- general examination of the child (color of the skin and mucous membranes, the shape of the chest in normal and pathological conditions, functional features of the respiratory system);	To know.
- general rules and techniques of palpation;	To know.
- general rules and techniques of percussion;	To know.
- normal and pathological percussion data;	To call.
- general rules and techniques of auscultation;	To know.
- types of normal and pathological breathing;	To call.
- additional pathological sounds (wheezing, crepitation, pleural friction rub);	To call.
- shortness of breath and its types, degree of respiratory failure;	To know.
- laboratory, functional and instrumental methods of research.	To call.
	To know.

VIII. Literature

Basic:

7. Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition, updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012. – P. __

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev – Vinnytsia: Nova Knyha, 2018. - 504p.

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013. – P. __

8. Nelson textbook of pediatrics.—18th ed./ edited by Robert M. Kliegman. Part II. Growth, development and behavior // www.mdconsult.com

Guidelines forstudents topracticalclassesinPropedeutics of Pediatrics

Topic 7: Anatomicalandphysiologicalfeaturesofthecardiovascularsysteminchildren.
Course:III
Specialty: 222 Medicine
Numberofeducationhours: 2 hours
Training location: classroom in the children's department.

I. Relevance of the topic:

Thecardiovascularsystemisoneofthekeysystemsofthechild, asitprovidesthesupplyofoxygenandnutrientstoallorgansandtissues, aswellastheexcretionofcarbondioxideandothermetabolicproducts. Itisnecessarytoknowthefeaturesofthecardiovascularsystem, asthiswillhelptoavoidmistakesinassessingtheconditionofthechildandwillhelptodiagnoseandchoosetherighttreatmentformanydiseases.

II. Learning objectives of the lesson:

Thestudentshouldknow:

- thefetal developmentofthecardiovascularsystem;
- theanomaliesoftheplacementoftheheartbookmark (ectopia);
- hebloodcirculationofthefetus (scheme);
- thechild'sbloodcirculation, itsfeatures;
- thebasichemodynamiccharacteristicsofnewbornsandchildrenofdifferentages (pressure, heartrate, etc.);
- thefeaturesoftheheartinchildren;
- thefeaturesofthearterialandvenoussystems;
- thespecificelectrocardiographicfeaturesofhealthychildren.

The student should be able:

- tocollect a historyof a patientwithcardiovasculardisease.

III. Objectivesofpersonalitydevelopment:

- Thestudentmusttofollowtheprinciplesofmedicalethicsanddeontologyatthebedsideof a sickchild;
- Mastertheskillsofestablishingpsychologicalcontactwiththepatientandhisfamily;
- Acquire a senseofresponsibilityforthequalityofprofessionalknowledgeandthecorrectnesofprofessionalactions.

IV. Interdisciplinaryintegration:

Disciplines	General Competences	Special Competences	Program Learning Outcomes
1. Preceding (Providing) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	-	-
2. Subsequent (Provided) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.3; SC.17	LO.1; LO.2; LO.3; LO.20; LO.21; LO.22 LO.23; LO.24
3.Intradisciplinary integration (between the topics of the discipline)	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.3; SC.17	LO.1; LO.2; LO.3; LO.20; LO.21; LO.22 LO.23; LO.24

V. The content of the topic:

Embryogenesis and anatomic-and-physiologic features of cardiovascular system in children.

Germs of initial vessels appear on 2nd week of intra-uterine development. By the 8-10 weeks formation of all parts of heart comes to end. All anomalies of heart arise from 3 for 8 week of intra-uterine development.

Circulation in a fetus:

There are 3 vessels in umbilical cord: 2 arteries with venous blood and 1 vine with arterial blood from the mother. The blood from the fetus on 2 umbilical arteries enters to placenta where the gas exchange happens. The blood from placenta gets to umbilical vein. In a fetus's body below the liver umbilical vein separates the most part of a blood to inferior vena cava - IVC through the wide venous Aranzi's duct. Umbilical vein joins with portal vein and then supplies the liver. Thus the liver receives as much oxygenic blood as possible, which dilutes by blood of portal vein only. Passing through a liver, this blood enters to the IVC. Then the mixed blood enters to the right atrium. The blood of superior vena cava - SVC, flowing from cranial parts of a body of fetus, enters to the right atrium also. However these 2 streams of a blood in right atrium are not admixed, the blood from SVC flows into right ventricle, and from IVC - into the left atrium through the oval window. From the right ventricle the blood flows into a pulmonary artery, then its small part enters into the lungs, and the main part through open arterial Botallo's duct enters into aorta. In the left atrium the blood from IVC mixes with venous blood from a pulmonary vein and enters to aorta. Peculiarities of circulation of fetus provide the best oxygenation of brain and the upper half of body. The blood from descending aorta gives Oxygen to the lower part of body of fetus and on umbilical arteries comes back to placenta.

All organs of fetus receive only the mixed blood. The best conditions of an oxygenation are in a liver, then in a brain and the upper extremities. The worst conditions of an oxygenation are in the lungs and lower extremities.

Circulation in newborn:

Reorganization of a circulation includes the following basic moments:

1. The discontinuance of placental circulation and circulation in umbilical vessels - 2 arteries and a vein
2. Closing of the fetal communications – venous duct, arterial duct and an oval window
3. Start of complete pulmonary circulation. With the beginning of pulmonary respiration the flow of blood through the lungs becomes 5 times more

Anatomically the oval window is kept till 5 years in 50% of children and it is present in 25% of adults. However the stream of blood through it is impossible due to rising of pressure in the left half of heart after birth.

Right after the first inspiration occurs the spasm of an arterial duct but anatomic closing of it usually happens by 2 months only

The obliteration of a venous duct occurs right after the discontinuances of fetal circulations

Anatomic and physiological features of cardiovascular system in children:

1. Heart in newborn is relatively large and it occupies relatively large part of the thorax. The mass of heart in newborns is 0.8 % of mass of body (in adults – 0.4 %). Thickness of walls of the right and left ventricles is identical. With the years the right ventricle becomes thicker on 1/3, and the left ventricle becomes 3 times thicker
2. The form of heart in newborns is spherical, heart is posed almost horizontally
3. Borders of relative cardiac dullness:

Age / Borders	Right	Upper	Left
till 2 years	2 cm laterally of the right edge of a breastbone	2nd rib	2 cm laterally from the left medioclavicular line
2-7 years	1 cm laterally of the right edge of a breastbone	2nd intercostal space	1 cm laterally from left medioclavicular line
7-12 years	On the right edge of a breastbone	3rd rib	On the left medioclavicular line
after 12 years	On the right edge of a breastbone	3rd intercostal space	0.5 cm medially of the left medioclavicular

			line

4. Blood vessels have thin walls and badly advanced elastic and muscular tissue. The diameter of arteries and veins are equal (ratio 1:1), and in adults diameter of veins 2 times wider.
5. Pulse is arrhythmic. A pulse rate in newborns 140-160, in 6 months – 130-135, in 1 year 120-125, in 5 years 100, in 7 years 90, in adults 70-80 per 1 minute
6. Systolic arterial pressure in children of the first year of life is 76+2n (n - quantity of months), after 1 year systolic pressure is 90+2n, diastolic pressure is 80+n (n - number of years)
7. By the moment of a birth the pulmonary artery is wider, than aorta, in 10 years their diameters become equal, and in adults aorta is wider, than the pulmonary artery
8. Histologically myocardium in newborns has very thin muscular fibers with a plenty of nucleuses
9. The connecting tissue of heart is weakly developed
10. The blood supply of heart is better, than in adults. Inflammatory diseases occurs frequently, but ischemic heart disease practically does not occur
11. In children at auscultation can by defined 3rd tone, accent and splitting of 2nd tone on pulmonary artery and functional systolic murmur

VI. The plan and organizational structure of the class:

№	Elementsofpracticaltraining	Time (min)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3 min
2.	Initial test control of knowledge.	10 min
3.	Demonstrationbytheteacherofmethodsofcollectinganamnesisinchildrenofdifferentages and their parents.	20 min
4.	Independentworkofstudents: masteringtheskillsofcollectinganamnesisinchildrenofdifferentages.	25 min
5.		10 min
6.	Filling of reportsabouttheresultsofpatient examination.	10 min
7.	Finalcontrolofknowledge: solvingclinicalsituationalproblems. Tasksforindependentpreparationforthenextclass.	2 min
	Together	**80 min**

VII. The materials of methodical provision of classes.

VII. 1. Materials for self-control for the preparatory stage of the class:

List of theoretical questions for self-control:

1.

Anatomicalandphysiologicalcharacteristicsofthecardiovascularsysteminc hildren.

Test tasks (examples):

1. Atwhatageisthereanintensiveincreaseanddifferentiationofthemyocardium?
   A. up to 1 year
   B. in the first 2 years of life
   C. at 5 years
   D. 6-10 years
   E. in the first 6 months
2. Whendoesanatomicalclosureoftheductusarteriosusoccur?
   A. to 6 months
   B. to 1 year
   C. to 3 years
   D. to 2 months
   E. to 6 years
3. Whatistheheartrateof a healthynewborn?
   A. 120 beats / min.
   B. 80 beats / min.
   C.100 beats / min.
   D. 140 beats / min.
   E. 60 beats / min.
4. Themitralvalveoftheheartislistenedto:

   A. attheloweredgeofthesternum
   B. in 2 mezhdupepyontheleft
   C. in 2 mezhdupepyontheright
   D. attheapexoftheheart
   E. intheinterscapulararea

5. Whichcommunicationconnectionperformsthefunctionof 1st orderautomatism?
   A. atrioventricularconnection
   B. sinusnode
   C. Hisbeam
   D. Pupkinierfibers
   E. legsoftheHisbeam
6. Whatistheheartrateof a healthynewborn?
   A. 120 beats / min.
   B. 80 beats / min.
   C.100 beats / min.
   D. 140 beats / min.
   E. 60 beats / min.
7. Whataretheindicatorsofsystolicbloodpressurein a child 3-7 years?
   A. 70-75 mm.пт.ст.
   B. 80-90 mm.пт.ст.
   C. 100-110 mm.пт.ст.

D. 90-100 mm.пт.ст.
E. 60-70 mm.пт.ст.

8. Whatauscultatorychangesarecharacterizedby VSD (ventricularseptaldefect)?

A. mildsystolicmurmurin 3-4 intercostalspacesontheleft
B. systolicmurmurin 2 intercostalspacesontheright
C. grosssystolicmurmurin 2 intercostalspacesontheleft
D. diastolicnoisein 3-4 intercostalspacesontheleft
E. coarse systolic murmur in 3-4 intercostal spaces on the left

9. Whatauscultatorychangescharacterizetheopenductusarteriosus?

A. gross systolic murmur in 3-4 mezhpebipy on the left
B. systolic-diastolic noise of the "machine" in 2 intervertebral left
C. coarse diastolic murmur in 2 intervertebral left
D. systolic murmur in 2 mezhpebipy right
E. systolic murmur in 2 intervertebral left

10. Whatcausesinstabilityofthe rhythmin fetusandnewborn?

A. high sensitivity to acetylcholine
B. high sensitivity to norepinephrine
C. imbalance of the autonomic nervous system
D. low content of mitochondria in the sinus node
E. activity of ectopic foci

Standardsofanswers:

1	B	3	D	5	B	7	D	9	B
2	D	4	D	6	D	8	E	10	C

VII. 2. Materials for methodological support for the basic stage of class:

1. Thelistofpracticaltasks:

- to master the skills of collecting medical history in a child with cardiovascular disease

2.Professional algorithms for training in practical skills.

Task	Instructionsteachert o students	Notes
Master the skills of collecti ng medical history in a child with cardiov	Consistentlycollectlif ehistory, hereditaryhistoryand medicalhistory.	Payattentiontothecourseofpregnancyandthea ctionofharmfulfactorsinutero.

ascular disease		

VII. 3. Materials of control for the final stage of the class:

Situational tasks (examples):

Task 1. A 12-year-old boyhas complainsoffrequentheadachesandnosebleeds. Duringanobjectiveexamination, thedoctordeterminedbloodpressure - 140/85 mm Hg. Assessthebloodpressureofthisboy.

Task 2. Atpalpationofthepulsein a child 5 yearsold, thedoctoridentifiedthefollowingcharacteristics: synchronous, frequency - 108 perminute, satisfactoryfillingandtension. Thealternationofpulseshocksisuneven - ontheinhalationthepulseaccelerates, ontheexhalation - slowsdown. Howtoassesschangesinthechild'sheartrate?

Task 3. An 8-year-old boywithcomplaintsofincreasedfatigueandweaknesswasadmittedtothecardiologydepartmentforexamination. Onexamination: paleskin, weakpulse, 72 beatsperminute, bloodpressure - 80/60 mm Hg. Whatarethenormalbloodpressurereadingsfor a childofthisage?

Standardsofanswers:

Task 1:

Bloodpressureintheexaminedboycanberegardedas a highnormalbloodpressure.

Task 2:

Theheartrateof a 5-year-old childshouldnormallybe 100 beatsperminute. Theassumeddeviationis 10-15%. Thus, thechild'sheartrateiswithinnormallimits. Changesinheartrhythmcanberegardedas a manifestationofrespiratoryarrhythmia, whichatthisageis a physiologicalphenomenon. At a respiratoryarrestsucharrhythmiaofpulseshoulddisappear.

Task 3:

Systolicbloodpressureisbelowthefifthpercentile.
Diastolicbloodpressureiswithinnormallimits
(accordingtothecentilecurvesofbloodpressuredistributioninchildren).

VII. 4. Materials of methodical support for self-preparation of students:

Indicative chart for independent work of students with educational literature

Learningtasks	Instructionstothetask
Tostudythemethodofcollectingan amnesisin a patientwith a diseaseofthecardiovascularsystem	Knowtheschemeofcollectinglifehistory, hereditaryhistoryandmedicalhistory
Tostudythefeaturesofthedevelop	Knowtheanomaliesoftheplacementoftheheart

mentofthecardiovascularsystemin utero	bookmark (ectopia); Toknowtheperiodsofintrauterinedevelopmen tofthecardiovascularsystemandtocharacterize them
Examinethebloodcirculationofthe fetusandbaby	Knowthebloodcirculationofthefetusinthefor mof a diagram; Listthefeaturesofthechild'sbloodcirculation.
Tostudythefeaturesofthecirculator ysystemandheart	Knowtheageofheartrate, bloodpressure; Knowtheanatomicalandphysiologicalfeatures oftheheartinchildren
Tostudyspecificelectrocardiograp hicfeaturesofhealthychildren	Listthem

VIII. Literature:

Basic:

9. Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition, updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012. – P. 454-460.

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev– Vinnytsia: Nova Knyha, 2018. – P.183-190.

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013. – P. 75-79.

3. Nelson textbook of pediatrics.—18th ed./ edited by Robert M. Kliegman. Part II. Growth, development and behavior // www.mdconsult.com

Author – assistant professor, PhD Koreniuk O.

Guidelines forstudents topracticalclassesinPropedeutics of Pediatrics

Topic 8: Methodsofexaminationofthecardiovascularsysteminchildren.

Course:III

Specialty: 222 Medicine

Numberofeducationhours: 2 hours

Training location: classroom in the children's department.

I. Relevance of the topic:

One of the most important sections of medicine as a science is mastering the techniques of clinical examination. The information obtained through a clinical examination is the basis for diagnosis.

II. Learning objectives of the lesson:

Thestudentshouldknow:

- to knowthemethodofcollectinganamnesisinchildrenofdifferentagegroups;
- knowthecriteriaforassessingthegeneralconditionofpatients.

The student should be able:

- tocollect a historyof a patientwithcardiovasculardisease
- toconductanobjectiveexaminationofthecardiovascularsystem
- toassessthegeneralconditionofthechild.

Thestudentshouldmaster:

- the methods of anobjectiveexaminationofthecardiovascularsystem

III. Objectives of personality development:

- The student must follow the principles of medical ethics and deontology at the patient's bedside;
- Master the ability to establish psychological contact with the patient and his family
- Acquire a sense of responsibility for the quality of professional knowledge and the correctness of professional actions

IV. Interdisciplinaryintegration:

Disciplines	**General Competences**	**Special Competences**	**Program Learning Outcomes**
1. Preceding (Providing) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	-	-
2. Subsequent (Provided) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.3; SC.17	LO.1; LO.2; LO.3; LO.20; LO.21; LO.22 LO.23; LO.24
3.Intradisciplinary integration (between the topics of the discipline)	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.3; SC.17	LO.1; LO.2; LO.3; LO.20; LO.21; LO.22 LO.23; LO.24

V. The content of the topic:

Objective examination of cardiovascular system includes inspection, palpation, percussion and auscultation. Definition of arterial pressure and functional tests of cardiovascular system concerns to additional methods also.

Inspection:usually begin from the face and neck of patient, pay attention on the color of skin - presence of cyanosis, pallor. At inspection of neck pay attention to pulsation of carotid arteries (carotid dancing) in standing position, pulsation and swelling of bulbar vein. For elder children swelling of bulbar vein may be in horizontal position without any cardiovascular pathology, but in this case swelling disappears in vertical position of child.

Then it is necessary to examine a chest: pay attention to presence of the asymmetric bulging of a chest in the heart region (*cardiac hump*), note absence or presence of intercostal retraction in the heart region.

Examine *an apex beat* - the periodic rhythmical pulsation of a thorax in the field of heart apex in the moment of the heart systole. Often, especially in obese children, an apex beat can be not visible. It is well seen in children - astenics with badly advanced subcutaneous fat layer. In healthy children depending on age the apex beat may be posed in 4-th (in breast children) or in 5-th intercostals, 1-2 cm lateral to the medioclavicular line (till the age of 7 years), or on it (7-12 years), or little middle from the left mediclavicular line (after 12 years). The area of an apex beat should not exceed 1-2 cm ². A negative apex beat, which is characterized by retraction of intercostal space during a systole in the field of an apex beat, can be observed in pathology.

The cardiac thrust - concussion of a thorax, which is observed in the field of the heart and spreaded on a breastbone and epigastria. It is caused by pulsation of hypertrophic heart and, mainly, adjoining to the thorax right ventricle. In healthy children the cardiac thrust is not observed.

Palpation:pulse can be researched in children in several places: for little children - on carotid, temporal, femoral carotids; for elder children - on radial arteries. Pulse on radial arteries should be felt simultaneously on both arms. At absence of a difference of pulse (pulse is ***synchronous***) the further research is carried out on one arm. The child's arm is placed at the level of his heart in the relaxed state. Doctor takes the hand of child by the right hand in the field of a radiocarpal joint, from the backside, the 1st finger is on the ulnar side of the child's arm, the 2-nd and 3-rd fingers palpate an artery.

Distinguish the following*characteristics of pulse*: rate, rhythm, tension, filling, size and the form.

Pulse rate (PR) is determined by palpating not less than during one minute, simultaneously heart rate (HR) is established by palpating apex beat or by auscultation of heart. The phenomenon, at which there is a difference between HR and PR, has the name *deficiency of pulse*.

Rrhythm of pulse is estimated on uniformity of intervals between the beat of the pulse. There are distinguished a rhythmic (regular) and arrhythmic (irregular) pulse. Sometimes arrhythmia of pulse can be connected with respiration (PR increases on inspiration and decreases on expiration). The

phenomenon is physiological for children from 2 to 10 years, named *a respiratory arrhythmia*. The breath holding excludes this kind of an arrhythmia.

Tension of pulse is determined by force, which is necessary for squeezing a pulse till its disappearance. There are distinguished the normal tension pulse, hard pulse and soft pulse.

Research *of pulse filling* is executed by two fingers: after squeezing an artery the distal located finger is got the feeling of filling of an artery by a blood. On filling there are distinguished the pulse of the satisfactory filling, full pulse(filling more than ordinary) and empty (filling less than ordinary).

Size of pulse – conclusion about this parameter is made by the doctor on the basis of tension and filling of pulse. There are distinguished: *pulse of a normal size, a large pulse* (pulsusmagnus) and *small pulse* (pulsusparvus).

*The form of pulse*is determined by spreed of rise and descent of pulse wave (by moderate squeezing an artery by both fingers). Pulse may be the usual form, swift (fast rise and recession of pulse wave) and slack (slow rise and recession of pulse wave).

The *properties of an apex beat* are specified by palpation. For this purpose the doctor put a palm of right hand to the left edge of a breastbone that fingers covered area of an apex beat. Then doctor continues palpation by slightly bent 4 fingers of right hand**. *Properties of an apex beat:* localization, the area (extension), height (magnitude), force (resistance). In healthy child the area of an apex beat is 1-2cm ². The height is characterized by amplitude of vibrations in the field of apex beat. There are distinguished a high and low apex beat. The force of apex beat is measured by pressure, which it renders on fingers. There are distinguished the moderate, strong and weak force.**

The symptom of «cat's purring» (systolic or diastolic tremor) is determined by palpation. For this purpose it is necessary to put a palm on all region of heart. In the same way sometimes it is possible to palpate of the pericardial friction rub.

Percussionis carried out in the vertical or horizontal position of the patient. There are distinguished immediate and mediate percussion of heart. At mediate percussion the finger-plessimeter is closely put to the chest, parallel to the determined border, on direction from a clear sound to dull one, percussion can be mean force and the most silent. An important point is drawing percussion strictly in a direction in front to back (concerning a body of the child). Marking of the heart border is carried out on the external border of the finger-plessimeter, turned to the clear pulmonary sound. Order of percussion: right, upper, left borders of heart. In absence of pathology it is difficult to determine the borders of absolute dullness of heart for children, therefore they practically are not percussed.

Determination of the right border of relative heart dullness: the finger-plessimeter puts in the second intercostals on the right medioclavicular lines. Moving the plessimeter-finger from top to bottom on ribs and intercostals, by silent percussion one defines the lower border of lung. Then a doctor transfers the finger-plessimeter on one intercostal space above, terns it on 90 degrees,

placing it parallel to right border of cardiac dullness. While making of the percussion impact of average force, one moves the finger-plessimeter on intercostals in the direction of heart before occurrence of dullness. At estimation of the right border the distance from the right border of breastbone must be specified.

Determination of upper border of relative heart dullness: the finger-plessimeteris put in the left parasternal line, starting from the first intercostal space. The doctor moves a finger consistently on ribs and intercostal spaces downward, a percussion step is equal to the width of finger. A mark of the top border make on the top edge of a finger.

Determination of the left border of relative heart dullness: find an apex beat and percuss on according intercostal, starting from a media-axillary line, the plessimeter-finger it is necessary to place parallel to determined border, and impact should make strictly in front to back direction, i.e. in sagittal planes.

Common rules of auscultation:

1. The auscultation of the child should be carried out in a horizontal and vertical position, and also in a position on left to a side and after physical loading.
2. The auscultation of older children should be carried out during a breath holding (after a deep inspiration and the following exhalation) for removing of the respiratory noises, interfering at auscultation of the sound phenomena of heart.
3. The auscultation is carried out in the standard points (places of the best auscultation of the sound phenomena) in the certain sequence.
4. Sometimes auscultation is carried out not only in classical points, but also above all area of heart, vessels of a neck, axillaries, subclavicular areas, epigastria, and area of a back may by useful).

Points and order of auscultation:

1. Area of an apex beat (an auscultation of the sound phenomena from the mitral valve).

2. The second intercostal space on the right edge of a breastbone (auscultation of the sound phenomena from the aortal valve).

3. The second intercostal space on the left edge of a breastbone (an auscultation of the sound phenomena from valves of a pulmonary artery).

4. The lower third of breastbone in a place of attachment of xiphoid process, a little right from middle line (a projection of the tricuspid valve).

5. Botkin-Erb's point – at the level of 3-4-th intercostals space at the left edge of a breastbone (an additional point of an auscultation of the sound phenomena of aortal valves).

Whole heart region should be auscultated for children, as well as the vessels of necks, axillary, subclavicular, epigastric regions and the back.

Some rules of auscultation:

First of all it is necessary to estimate the *tones*, their loudness, rhythmicity, correlation in different points(the first tone corresponds to pulse

impact on the carotid artery or apex beat; besides, usually the pause between the first and the second tone is shorter, than between the second and the first).

Only after this pay attention on presence or absence of *the cardiac murmurs*.At auscultation of murmur it is necessary to note its features: timbre, force, in what phase of heart activity it is heard (systolic or diastolic murmur), what part of the systole or diastole it is occupied, its connection with the heart tone, dependence on the position of a child or a physical loading.

VI. The plan and organizational structure of the class:

№	Elementsofpracticaltraining	Time (min)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3 min
2.	Initial test control of knowledge.	10 min
3.	Demonstrationbytheteacherthe methodsofclinicalexaminationofchildrenofdifferentages.	20 min
4.	Independentworkofstudents:	25 min
5.	masteringtheskillsofcardiovascularsystemexaminationofsickchildren.	10 min
6.	Filling of reportsabouttheresultsofpatient examination.	10 min
7.	Finalcontrolofknowledge: solvingclinicalsituationalproblems. Tasksforindependentpreparationforthenextclass.	2 min
	Together	**80 min**

VII. The materials of methodical provision of classes.

VII. 1. Materials for self-control for the preparatory stage of the class:

List of theoretical questions for self-control:

1. Methodsofexaminationofthecardiovascularsysteminchildren.

Test tasks (examples):

1. Heartrateinnewborns:
   A. 120 beatsperminute
   B. 80 beatsperminute
   C. 100 beatsperminute
   D. 140 beatsperminute
   E. 60 beatsperminute
2. The normal bloodpressureinchildren 3-7 years:
   A. 70-75 mm.pt.st.
   B. 100-90 mm.pt.st.
   C. 100-110 mm.pt.st.
   D. 80-90 mm.pt.st.

E. 60-70 mm.pt.st.

3. Themitralvalveoftheheartislistenedto:
   A. at the lower edge of the sternum
   B. in the second intercostal space on the left
   C. in the second intercostal space on the right
   D. at the apex of the heart
   E. intheinterscapulararea
4. Valvesof a pulmonaryarteryarelistened:
   A. at the lower edge of the sternum
   B. in the second intercostal space on the left
   C. in the second intercostal space on the right
   D. at the apex of the heart
   E. at the upper edge of the sternum
5. Theleftlimitofrelativecardiacdullnessinchildrenaged 2 to 7 years:
   A. 3 cm outward from the left mid-clavicular line
   B. 2 cm outward from the left mid-clavicular line
   C. 1 cm outward from the left mid-clavicular line
   D. alongthemid-clavicularline
   E. 2 cm inward from the left mid-clavicular line
6. Heartratein a child 5 years:
   A. 110-120 beatsperminute
   B. 95-100 beatsperminute
   C. 90-80 beatsperminute
   D. 70-80 beatsperminute
   E. 130 beatsperminute
7. Underembryocardiaunderstand:
   A. arrhythmia
   B. equality of intervals between heart tones
   C. tachycardia
   D. bradycardia
   E. tachyarrhythmia
8. Therightlimitofrelativecardiacdullnessinthenewborn:
   A. rightmid-clavicularline
   B. the middle between the right mid-clavicular and parasternal lines
   C. rightparasternalline
   D. 0.5 cm to the left of the right parasternal line
   E. neartherightparasternalline
9. Nameoneoftheauscultatorypropertiesoforganicnoise:
   A. exacerbated by changes in body position
   B. does not increase when changing body position
   C. exacerbatedbyexercise
   D. intensifiedaftereating
   E. gentle short, audible only at the apex
10. Theleftlimitofrelativecardiacdullnessinchildren 12-14 years:
   A. 2 cm outward from the left mid-clavicular line

B. 1 cm outward from the left mid-clavicular line
C. on the left mid-clavicular line
D. 2 cm outward from the left mid-clavicular line
E. 0.5 cm inward from the left mid-clavicular line

Standardsofanswers:

1	D	3	D	5	C	7	B	9	E
2	B	4	B	6	B	8	C	10	E

VII. 2. Materials for methodological support for the basic stage of class:

1. Thelistofpracticaltasks:

1. To master the method of collecting anamnesis in children of different age groups with cardiovascular disease.
2. Master the methods of examination of the cardiovascular system.

2.Professional algorithms for training in practical skills.

№	***Tasks***	***Instructionsteacherto students***	***Note***
1.	Master the method of collecting medical history in children of different ages with cardiovascular disease	Perform sequentially: collection of life history, hereditary history and medical history	Payattention to: - the presence of congenital malformations of the cardiovascular systemin the family - the influence of harmful factors on the child's body
2.	Master the methods of examination of the cardiovascular system	Perform consistently: complaints collection, history of the child lifeand disease, inspection, palpation, percussion, auscultation of CVS.	Pay attention to the physical development of the child.

VII. 3. Materials of control for the final stage of the class:

Situational tasks (examples):

*Task 1.*A 3-year-old childwassickbyacute respiratory viral infection twoweeksago. He wastreated, therewas a positivetrend. But, thechild'sconditionworsened3 daysago.Therewasweakness, poorappetite. Theexamination date: paleskin, perioralcyanosis;heartrate - 145 perminute, RR - 42 perminute. Percussionleftborderoftheheartisdefinedby 3 cm outwardfromthe

medio-clavicularline. Whatisthenormallocationofleftrelativecardiacdullnessfor a childofthisage?

Task 2. Thedoctornoticedthearrhythmiaofthepulseexamining a 5-year-old child.Pulserate 92 inminute, satisfactoryfillingandtension. Theauscultation date: hearttonesareloud, arrhythmic, anaccelerationofheartbeatoninspirationandslowingdownonexhalation. Therhythmisnormalizedwhileholdinghisbreath. Thechilddoesnotcomplain. Whatcanyouthinkaboutthiscase?

Task 3. A 12-year-old girlwenttothedoctorwithcomplaintsoffrequentheadaches, fatigue, periodicdizzinessandfainting. Onexamination: pulse 90 perminute, rhythmic, lowfillingandtension. AT– 90/60 mm HgWhatheartrateandbloodpressurearenormalforthisage?

Standardsofanswers:

Task 1.

1 cm outsidefromtheleft medio-clavicularline.

Task 2.

Respiratoryarrhythmia.

Task 3.

Pulserate - 75-85 perminute, systolicbloodpressure - from 95 to 135 mm Hg, diastolicbloodpressure - from 58 to 88 mm Hg (accordingtothecentilecurvesofbloodpressuredistributioninchildren).

VII. 4. Materials of methodical support for self-preparation of students:

Indicative chart for independent work of students with educational literature

Learningtasks	Instructionstothetask
Tostudythemethodofcollectinganamnesisinchildrenofdifferentagegroupswithcardiovasculardiseases.	Knowtheschemeofcollectinglifehistory, hereditaryhistoryandmedicalhistory.
Tostudythesequenceofobjectiveexaminationofthecardiovascularsystem.	Knowthesequenceofobjectiveexamination. Payattentiontothetypicalcomplaintsofthe patients with cardiovasculardiseases. Knowthemethodofpalpation. Give the characteristics

	oftheapexbeatandpulse. Knowthemethodsofpercussion, itssignificance. Knowtherulesofauscultation.

VIII. Literature:

Basic:

10. Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition, updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012. – P. 460-494.

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev– Vinnytsia: Nova Knyha, 2018. – P.191-195.

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013. – P. 141-148.

3. Nelson textbook of pediatrics.—18th ed./ edited by Robert M. Kliegman. Part II. Growth, development and behavior // www.mdconsult.com

Author - assistantprofessor, PhD Koreniuk O.

Guidelines for students to practical classes in Propedeutics of pediatrics

Topic 9: The main signs of lesions the cardiovascular system in children (cyanosis, bradycardia, tachycardia, etc.). Semiotics of congenital and acquired heart disease in children and blood vessels.

Course: III

Specialty: 222 Medicine

Number of education hours: 2 hours

Training location: classroom in the children's department

I. Relevance of the topic.

The modern clinic has high requirements for clinical diagnosis. This is a necessary requirement for proper treatment. Clinical diagnosis is a built-up

combination of components, this is a way of constructing a causal relationship between syndromes. Local symptoms allow a physician to suspect lesions of a particular organ or system.

II. Learning objectives of the lesson

- Find the main symptoms of cardiovascular system (CVS) defeat of children.
- To master the semiotics of the most common diseases of the circulatory system of children (congenital and acquired heart defects, cardiomas, CV insufficiency).
- To take measures for the care of patients with pathology of the CVS.

III. The objectives of personality development:

- The student must adhere to the principles of medical ethics and deontology at the patient's bed;
- To master the ability to establish psychological contact with the patient and his family;
- To acquire a sense of responsibility for the quality of professional knowledge and the correctness of professional actions.

IV. Interdisciplinary integration:

Disciplines	General Competencies	Special Competencies	Program Learning Outcomes
1. Preceding (Providing) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	-	-
2. Subsequent (Provided) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.2; SC.17	LO.1; LO.2; LO.20; LO.21; LO.22; LO.23; LO.24
3. Intradisciplinary integration (between the topics of the discipline)	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.2; SC.17	LO.1; LO.2; LO.20; LO.21; LO.22; LO.23; LO.24

V. The content of the topic.

Cardiac insufficiency is a condition in which the functional capacity of the heart is not sufficient to carry out physical activity.

Acute heart failure is an urgent condition with the occurrence of severe circulatory disorders due to the catastrophic growth of the weakness of the heart muscle.

Clinical manifestations:

- heart rate from 150 to 200 beats per minute;
-low filament pulse;
- digestive disorders;
-vomiting

Chronic heart failure is a condition in which heart disease and circulatory disorders develop over several months or years, leading to right or left ventricular heart failure.

Right ventricular chronic heart failure - characterized predominantly by the stagnation of blood in a large circle of blood circulation.

Clinical manifestations:

-increase the size and pain of the liver;
- central venous pressure are increase;
-swelling of the veins of the neck;
-appearance of peripheral edema (arms, legs, face)

Appearance of the vasculature on the chest (widening of the veins)

Left ventricular chronic heart failure - characterized by a delayed blood flow and stagnation in a small circle of blood circulation (in front of the weak left ventricle).

For left ventricular forms, the main symptoms are arrhythmia, fainting, dizziness, darkening in the eyes, pathological enlargement of the cervical vertebrae, edema of the extremities, cyanosis of the skin, enlargement of the liver and accumulation of excess fluid in the peritoneum (ascites). Gradually, the symptoms of the disease only increase, manifesting not only in the stage of activity, but also in the calm stage.

When the left side of the myocardium defeats the blood brightens the vessels of a small circle and gradually passes into the region of the lungs. This condition is often accompanied by increased heart rate, confused breathing, coughing and blue skin. If the timely failure to respond to the problem is not excluded, an unexpected lethal outcome.

Acute vascular insufficiency - a condition that occurs when the vascular tone falls and disturbances in the ratio between the volume of circulating blood and the vascular bed. Manifestations: dizziness, collapse, shock.

Dizziness - a sudden short-term loss of consciousness.

Clinical manifestations:

- a sharp pallor of the skin

- cold sweat
- significant relaxation of breathing and blood circulation
- the expansion of the pupils
- a sharp decrease in blood pressure
- muffled tones of the heart

-Before the appearance of dizziness, prodromal syndromes (noises in the ears, nausea, weakness, "darkening" in the eyes) can be observed.

Collapse - a sudden deterioration of the general condition of the patient without loss of consciousness.

Clinical manifestations:

- pale skin
- tachycardia;
- extrasystole;
- the tones are first loud and then muffled;
- a significant drop in blood pressure;
- Manifestations of coronary insufficiency on an electrocardiogram;
- Cyanosis of the tip of the nose, fingers, lips;

Shock - a steady loss of consciousness as a result of a systemic fall of the vascular tone with impaired cerebral circulation.

Clinical manifestations:

- tachycardia;
- reduction of pulse pressure;
- stupor;
- sweating;
- pronounced pallor;
- anuria;
- cold limbs.

Endocarditis is an inflammatory lesion, the feature of which is the involvement in the pathological process of connective tissue of the inner lining of the heart.

Clinical manifestations:

- high body temperature
- signs of intoxication (pallor of the skin, sweating)
- the dynamics of auscultative picture in the process of disease;
- signs of formation of organic changes from the side of the valve apparatus of the heart;
- the appearance of a muffled I tone, a gross systolic murmur at the apex, an accent of a second tone on the pulmonary artery indicate a defeat of the internal valve;

- mutated first tone, silent diastolic noise between the III and IV ribs to the left of the udder indicates that the aortic valve lesion may be bacteremia;

Pericarditis is an inflammatory defeat of the outer skin of the heart, with effusion in the pericardial cavity and restriction of cardiac output.

- deafness of heart tones;
- heart failure;
- expansion of the limits of the heart; (with pericarditis);
- Noise of pericardial friction (with "dry" pericarditis);
- triangular or spherical form of the cardiac shadow on the radiograph;
- sluggish pulsation of the shadow of the heart with X-rays;
- reduction of the amplitude of ECG teeth.

The inadequacy of the aortic valve is the not tight closure of the valve's valves, which causes the reverse flow of blood from the aorta to the left ventricle.

Clinical manifestations:

- pulsation in the abdominal region and neck;
- movement of the head synchronously with pulsation of blood vessels;
- capillary pulse;
- systolic arterial pressure increased;
- diastolic arterial pressure sharply reduced;
- heart impulse reinforced, extended, shifted to the left and down;
- the left heart border is shifted to the left by increasing the size of the left ventricle;
- X-ray heart is defined in the form of "duck" or "boot"

Aortic valve stenosis is the narrowing of the valve opening, which complicates the flow of blood to the aorta.

Clinical manifestations:

- pale skin and mucous membranes
- decreased systolic blood pressure;
- pulse of weak filling, bradycardia may appear;
- apex beat strengthened, shifted to the left and down;
- a symptom of systolic shivering over the aorta;
- X-ray heart is defined in the form of "duck" or "boot"

Myocarditis - inflammation of the heart muscle

Clinical manifestations:

- fatigue;
- pain in the heart;
- expansion of the borders of the heart;
- muffled tones of the heart;

- functional apical systolic murmur;
- reduction of blood pressure;
- on an ECG - a violation of the function of conduction, excitability, automatism.

Coarctation of the aorta is local or during the narrowing of the aorta, which is most often located at the place of departure of the left subclavian artery to the fall of the arterial duct.

Clinical manifestations:
- signs of arterial hypertension in the upper half of the body;
- high blood pressure on the upper extremities;
- arterial hypotension in the lower extremities;
- headache, tinnitus, dizziness, vision impairment;
- pain in the heart;
- palpitations, dyspnea;
- increased pulsation of carotid arteries;
- expansion of collateral vessels on the lateral surfaces of the chest;
- predisposition to nasal haemorrhage, hemoptysis;
- X-ray - signs of hypertrophy of the left ventricle of the heart.

The inadequacy of the mitral valve is the not tight closure of the mitral valve, which results in the reverse movement of the blood from the left ventricle to the left atrium.

Clinical manifestations:
- apex beat strengthened, extended;
- at the top of the heart I tone of the weakened;
- on the pulmonary artery II tone strengthened;
- organic apical systolic murmur;
- percussion signs of increasing the size of the heart due to its left departments;
- a heart hump may be formed;
- X-ray - Mental configuration of the heart (elongation and rounding of the arc of the left ventricle)

Mitral valve stenosis is the narrowing of the valve opening.

Clinical manifestations:
- heartbeat;
- pain in the heart;
- shortness of breath under physical activity;
- a limited flush on the cheeks;
- at the top of the heart I tone strengthened;
- the sound of the opening of the public valve is heard;

Ventricular Septal Defect(VSD)is the most often congenital heart defect, which is a combination of ventricles that can be located in the muscular or membrane part of the septum.

Clinical manifestations:
- lag in physical development;
- systolic shiver and rude systolic murmur between the ribs III-IV and IV-V to the left of the udder with a wide area of conduction, which increases in the lying position;
- accent II tone on the pulmonary artery;
- a sign of hypertrophy of both ventricles.

Atrial Septal Defect - is a connection between the atriums.
Clinical manifestations:
- respiratory diseases;
- lag in physical development;
Pale skin, sometimes raspberry tint of lips;
- fatigue;
-dyspnea;

Fallot's tetrad is a combined congenital heart defect, which includes pulmonary artery stenosis, VSD, right ventricular hypertrophy and aortic dextraposition.
Clinical manifestations:
- persistent cyanosis from the first days of life;
- shortness of breath, limitation of physical possibilities;
- propensity to collapse;
- systolic shiver and rude systolic murmur between the II-III edges to the left of the edge of the udder, which is better heard in the horizontal position of the body;
- II tone is sharply weakened or not audible;
- According to the ECG - right ventricular hypertrophy;
- the fingers are in the form of drum sticks;
- X-ray - the heart has the form "boot";
- in the blood is an increased amount of hemoglobin, erythrocytosis.

Open Botallo's duct (open arterial) - the clinical picture is determined by the diameter of the duct, one of the most frequent heart defects.
Clinical manifestations:
- respiratory diseases;
- lag in physical development;
- Hypertension in a small circle of blood circulation
Pale skin

- propensity to fainting
- tremor to the left of the udder between the II and III ribs (systolic or systole-diastolic), murmur;
- a sign of hypertrophy and dilatation of the left ventricle;
- elevated systolic and decreased diastolic blood pressure.

VI. The plan and organizational structure of practical classes.

№	Elements of practical classes	Time (minutes)
1.	Announcement of the topic of the class with an emphasis on its relevance. Checking the attendees.	3 minutes.
2.	Input test knowledge control.	10 minutes.
3.	Demonstration by the teacher of anamnesis collection methodology and clinical examination of children of different ages.	20 minutes.
4.	Independent work of students: mastering the history of collecting skills in children of different age groups, assessing the general condition of sick	25 minutes.
5.	children. Registration of protocols on the results of the	10 minutes.
6.	supervision of sick children. The final control of knowledge: the solution of	10 minutes.
7.	clinical situational tasks. Task for self-preparation for the next class.	2 minutes.
	Total	**80 minutes.**

VII. The materials of methodical provision of classes

VII.1. Materials for self-control for the preparatory stage of the class:

Test tasks(examples):

1. What auscultatory changes in ventricular septal defect?
   A. soft systolic murmur 3-4 intercostal space on the left
   B. systolic murmur in 2 intercostal space on the right
   C. rude systolic murmur in the 2nd intercostal space on the left
   D. diastolic murmur 3-4 intercostal space on the left
   E. rude systolic murmur in the 3-4 intercostal space on the left
2. Organic heart sounds differ from functional ones by the following features, except:
   A. intensivity of the murmur
   B. localization of the murmur
   C. timbre change depending on the change in body position
   D. depending on rhythm
   E. depending on holding to the back

3. For what disease of the cardiovascular system are the dyspnea cyanotic attacks characterized?
A. transposition of large vessels
B. ventricular septal defect
C. open aortic duct
D. pulmonary stenosis
E. Fallot's tetrad
4. In case of cardiovascular insufficiency of IIA degree in a school-age child, the liver is determined by:
A. not palpable
B. at the edge of the costal arch
C. 2-3 cm
D. 3-4 cm
E. 4-5 cm
5. What is the forced position in bed for a patient with a pathology of the cardiovascular system in cases of cardiac decompensation?
A. position on the left side
B. with legs tucked up to the belly
C. seated, legs down
D. half-sitting, leaning on the pillows
E. seated, leaning your hands on your hips
6. A series of congenital heart defects leads to a decrease in pulmonary blood flow, excluding:
A. stenosis of the pulmonary artery
B. Fallot's tetrad
C. Fallot's triad
D. common arterial trunk
E. Ventricular septal defect
7. A number of congenital heart defects are accompanied by cyanosis, excluding:
A. Fallot's tetrad
B. transposition of great vessels
C. atresia tricuspid valve
D. Atrioventricular communication
E. arterial septal defect
8. For coarctation of the aorta, characteristic signs, except for:
A. Increased blood pressure in the arms
B. weakening the pulsation of the vessels of the feet
C. left ventricular hypertrophy
D. Accent of the 2nd tone over the pulmonary artery
E. erosion; of the lower edges of the ribs
9. At what pathology does a high rapid pulse appear?
A. coarctation of the aorta
B. open aortic duct
C. aortic insufficiency

D. extrasystole
E. aortic stenosis

10. ECG reflects the following myocardial functions, except:
A. automatism
B. contractility
C. excitability
D. conductivity
E. Exchange processes

Standards of answers:

1.E	6. E
2.D	7. E
3.E	8. D
4.C	9. C
5.C	10.B

VII.2. Materials for methodological support for the basic stage of class: Professional algorithms for training in practical skills.

№	Tasks	Instructions	Notes
1.	To be able to identify the main clinical manifestations of acute and chronic cardiovascular insufficiency	Definition of the concept. Characteristic syndrome: causes, complaints, clinical manifestations, changes in laboratory and instrumental methods of research	Pay attention to the physical development of the child
2	To be able to identify the main clinical manifestations of congenital and acquired heart defects	Definition of the concept. To characterize in the following sequence: complaints, clinical manifestations, changes in laboratory and instrumental methods of research	Pay attention to the physical development of the child and the particular course of pregnancy in the mother

. List of practical tasks:

1. To be able to identify the main clinical manifestations of acute and chronic cardiovascular insufficiency.
2. To be able to identify the main clinical manifestations of congenital and acquired heart defects.

VII.3 Materials of control for the final stage of the class:

Situational tasks (examples):

Task 1.

A child of 3 years two weeks ago, had acute respiratory viral infections, was treated on an outpatient basis, there was a positive trend. But, 3 days ago, the child's condition worsened, weakness, lethargy, and poor appetite appeared. On examination: the skin is pale, perioral cyanosis. HR - 145 per min., BH - 42 per min. Percussion: the left border of the heart is determined 3 cm outward from the mid-clavicular line. Auscultation of moist and finely bubbling rales over the lungs, weakened heart sounds, systolic murmur at the apex and at the 5th point, soft in timbre. The liver is palpable 1.5 cm below the costal arch. On ECG: sinus tachycardia, decreased myocardial contractility. Identify the pathological syndrome.

Task 2.

On examination of a 7-year-old child, doctors discovered the following changes in the cardiovascular system: heart sounds are loud, rhythmic, heart rate is 90 per minute, a short systolic murmur is heard at the apex and at 5 point, soft in timbre, which increases in a horizontal position and after load. The boy often suffers from respiratory diseases, there is an ENT doctor with chronic subcompensated tonsillitis. What pathology of the cardiovascular system can be assumed?

How to evaluate auscultatory changes?

Task 3.

A 13-year-old girl went to the doctor with complaints of frequent headache, fatigue. Examination: pulse 104 per minute, rhythmic, full, hard. BP - 130/90 mm Hg apical impulse is determined in the 5th intercostal space and along the mid-clavicular line, resistant. Auscultation: tones loud, rhythmic. Identify the pathological syndrome.

Task 4.

One year old child has perioral cyanosis since birth, which is enhanced by crying and sucking. Mom notes increased fatigue of the child, shortness of breath during exercise. At present, the child's weight is 8.5 kg, height is 73 cm. In the first year of life, there was an insufficient increase in body weight. Often, respiratory problems. Examination: pale skin, moderate cyanosis of the nasolabial triangle. HR - 132 per min. Borders of the heart: upper - at the level of the 2nd rib, right - 2 cm from the edge of the sternum, left - 3 cm outwards from the nipple line. Auscultation: rhythmic heart sounds, amplification of the 2nd tone above the pulmonary artery, in the second intercostal space, at the left edge of the sternum, a rough, "machine", systolic-diastolic noise is heard. Name and justify the pathological symptom-complex

Task 5.

During the follow-up examination, the cardiologist discovered the following changes in the 10-year-old child in the cardiovascular system: heart sounds are loud, rhythmic, heart rate is 96 per minute. A systolic murmur of medium strength is heard in the 3-4 intercostal space at the left margin of the sternum. The noise is also tapped on the back between the shoulder blades. Borders of the heart: upper - at the level of the 3rd rib, right - 0.5 cm from the right edge of the sternum, left - 1.5 cm outwards from the nipple line. HELL in the arms - 130/90 mm Hg, on the legs - 120/80 mm Hg. The pulse on the radial artery is rhythmic, of increased filling and tension. There is a strong pulsation of the carotid arteries. Attention is drawn to the lag in the development of the lower half of the body compared to the developed shoulder girdle. Lower limbs pale, cold to the touch. The child often complains of tinnitus, dizziness, headache, feeling cold and numbness of the lower extremities. Periodically disturbed nosebleeds. Name and justify the pathological symptom complex.

Standards of answers:

Task 1.

The child has symptoms of myocarditis.

CST for left ventricular type 2B

Task 2.

Doctors discovered functional noise in a child against tonsilogenic myocardial dystrophy.

Task 3.

The girl has symptoms of hypertensive vegetovascular dystonia.

Task 4.

CHD(congenital heart disorder), open arterial duct

Task 5.

CHD, coarctation of the aorta

VII.4. Materials of methodical support for self-preparation of students:

Indicative chart for independent work of students with educational literature

Educational task	Instructions for the assignment
To study the main symptoms of cardiovascular lesions in children	List and characterize them
To study the semiotics of the most common diseases of the circulatory organs in children	To know the clinical manifestations: - congenital and acquired heart defects;

	- cardites; - cardiovascular insufficiency - acute vascular insufficiency
To study care measures for patients with cardiovascular disease	Pay attention to the care of children with acute and chronic pathology of the cardiovascular system

VIII. Literature:

Basic:

11. Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition, updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012. – P. __

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev – Vinnytsia: Nova Knyha, 2018. - 504p.

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013. – P.__

12. Nelson textbook of pediatrics.—18th ed./ edited by Robert M. Kliegman. Part II. Growth, development and behavior // www.mdconsult.com

Guidelines for students to practical classes in Propedeutics of pediatrics

Topic 11: Anatomical and physiological features of the digestive system in children, the method of clinical examination of the digestive system

Course: III

Specialty: 222 Medicine

Number of education hours: 2 hours

Training location: classroom in the children's department

I. Relevance of the topic.

The digestive system plays an important role in the plastic, energy processes and metabolism of the body of the child. It plays a physiological role in the most complex processes that provide adaptation of the child to the environment. The digestive system is involved in determining the homeostasis of the internal environment of the organism. Anatomical and physiological features of the system help to understand the basis of the functioning of the digestive system and the system in general. Knowledge of the research method will help to identify signs and manifestations of changes in the organs of the digestive system.

II. Learning objectives of the lesson

- Be able to collect anamnesis of a sick child with a disease of the digestive system;
- Find anatomical and physiological features of the digestive system in children;
- To be able the methods of examination of the gastrointestinal tract in the children (palpation, examination, percussion, auscultation).
- Be able to evaluate the state of the digestive system and interpret the findings.

III. The objectives of personality development:

- The student must learn to adhere to the principles of medical ethics and deontology at the patient's bed;
- To master the ability to establish psychological contact with the patient and his family
- To learn a sense of responsibility for the quality of professional knowledge and the correctness of professional activities

IV. Interdisciplinary integration:

Disciplines	General Competencies	Special Competencies	Program Learning Outcomes
1. Preceding (Providing) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	-	-
2. Subsequent (Provided) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7;	SC.1; SC.2; SC.17	LO.1; LO.2; LO.20; LO.21;

	GC.8; GC.9; GC.11		LO.22; LO.23; LO.24
3. Intradisciplinary integration (between the topics of the discipline)	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.2; SC.17	LO.1; LO.2; LO.20; LO.21; LO.22; LO.23; LO.24

V. The content of the topic.

Digestive organs of children have certain anatomical and physiological features that determine the characteristics of feeding, as well as the specificity of the pathology of this system, which occupies one of the leading places in the incidence of both infants and older children. Knowledge of these features, as well as the gradual maturation of the system is necessary for the physician when preparing the diet, during diagnosis, treatment and prevention of diseases of the digestive system in children of all ages.

To the digestive system are:

Oral cavity. The mucous membrane of the mouth is relatively dry, as in newborns, there is a slight allocation of saliva, rich in blood vessels. Mucus is quite vulnerable and easily injured. In 4-6 months in infants, an increase in salivation is observed.

The esophagus has a lei-shaped form, its length is equal to half the length of the body of the newborn (10-12 cm); in adolescents reaches 25 cm. Topographically, it starts on 2 vertebrate bodies higher than in adults (newborns are at the level of III-IV cervical vertebrae, until IV years old, IV-V, at the age of 12 years, VI-VII cervical vertebrae). This provides conditions for simultaneously swallowing and breathing.

The peristalsis of the esophagus is not formed, it can pass only liquid food (milk). **The stomach** in a newborn child is round, its capacity is 30-35 ml, at the age of 7-11 years of the stomach is similar in shape to the stomach of an adult, its capacity increases to 1020 ml. The motor function of the stomach consists of peristaltic movements and periodic closures and breakdowns of the goalkeeper. Acidity and enzymatic activity of the glands of the stomach are low, but 1/3 of fat (emulsified with milk lipase) is hydrolyzed in the stomach under the action of gastric lipase. The histologic differentiation of the stomach lasts until the end of the 2nd year of life.

Liver of the newborn's has a relatively large size, 4-4.4% of the body weight, well-vascularized, has poorly developed connective tissue and poorly delimited lobes, functionally immature. Good function of glycogen formation and not enough - detoxification.

The bile in the first months of the child's life is formed in small quantities, contains little bile acids (which sometimes leads to newborns to steatorrhea), lots of water, mucin, pigments; Newborns also have a lot of urea. It also contains more taurocholic acid than glycolic acid, which increases its bactericidal properties, stimulates secretion of the pancreas, enhances peristalsis of the large intestine.

The guts of a child of infancy are relatively longer than an adult, they are 6 times longer than the length of her body. Gut mucosa is tender, rich in villi, blood vessels, cellular elements. The small intestine and the appendix are moving, the lower part of the colon is longer than the ascending.

The rectum is relatively long, has weakly fixed mucous membranes and submucosal membranes. Children's gut performs digestive, motor and suction functions.

Basic methods of digestive system research

Surveys begin with the collection of complaints from the child or her parents, or the person who cares for the child, with clarification of the time of their occurrence, sequence, dynamics and duration. Collect food history, history of the disease, life, hereditary.

The general surveying is carried out in the position of the child standing or lying down.

At inspection determine:

• The position of the child (active, passive in profuse bleeding, forced with acute appendicitis, acute pancreatitis, perforated ulcer of the stomach)

• Skin condition: dryness, pallor (hemorrhagic gastritis, peritonitis), jaundice (viral hepatitis, biliary tract atresia), damage, telangiectasia.

• Tongue state: white layers-candidosis, yellowish - in diseases of the liver and bile ducts, presence of tooth impressions on the lateral surfaces, atrophy of the papillae of the tongue in B12 avitaminosis.

• Abdominal form in horizontal and vertical positions.

• Condition of the anal area.

Palpation. There are two types of palpation: superficial and deep. Deep palpation is performed after a superficial.

Method of surface palpation. With superficial palpation, the whole palm rests on the abdominal surface, and the light pressure is carried out by four fingers, somewhat bent in the joints. Start palpation from the non-limiting area.

The deep is a detailed examination of each organ.

Sigmoid palpation is performed in the left iliac region. The four fingers of the right hand are placed in parallel, but somewhat more medial than the foreseen position of the sigmoid. The skin of the anterior abdominal wall is

displaced towards the navel, then immersed in the abdominal cavity during exhalation, and then the brush moves to the right and top, down and left with the fingers slipping through the intestine. Determine pain, consistency, mobility, size

The cecum is located in the right illiac region, palpation is carried out the same way, however, fingers move to the left and to the top - to the bottom and to the right.

For examination of the ascending and descending sections of the rim, bimanual palpation is performed - the left hand brush is placed under the right, then under the left lumbar area, the right fingers are immersed in the abdominal cavity in the palpation projection, to the touch with the left arm and slide in the lateral direction.

In connection with the inconsistent position of the transverse rim, it is first necessary to determine the large curvature of the stomach by the method of auscultation. The phonograph diaphragm is set lower than the mucous membrane and simultaneously with an auscultation, an index finger on the anterior abdominal wall from the phonendoscope is carried out radially in all directions. When you find your finger above the surface of the stomach, noise is heard which disappears when you exit the stomach. The transverse colon is palpated below the border of the stomach bimanual, plunging easily folded fingers on both sides of the white abdominal line. On exhalation, fingers slip down, trying to feel the gut.

Palpation of the small intestine is difficult due to the resistance of the anterior abdominal wall, but is sometimes possible in children of the first year of life.

Before conducting palpation of the lower edge of the liver it is necessary to roughly determine its position percutaneously on the middle clavicular line. The doctor covers the right arc of the right arm with his left hand (4 fingers - on the lumbar region, the 1st - compresses the edge arch in front). The right arm is placed below the percutaneous border on the middle clavicular line. During exhalation, the fingers deepen into the abdominal cavity. During the inhalation, the liver dips down towards the still fingers and slips out of them. During palpation of the liver is evaluated for pain, consistency (elastic, dense, firm), the edge is even or hilly, sharp or dull. In older children, palpation of the liver can be done.

The gall bladder in healthy children is not palpable. The method of palpation of the gallbladder is similar to the palpation of the liver.

Palpation of the spleen is performed in the same way as the liver (the doctor fixes the edge arch with his left hand). In healthy children, the spleen is not palpable.

Palpation of the pancreas is performed by the Grotto method. The child lies on his back, his legs are bent at his knees, his right hand, squeezed in his fist, is lined up wide. The doctor performs deep palpation between the navel and the left hypochondrium on the edge of the direct muscle of the abdomen towards the spine. The pancreas is palpated in the form of a strand that encircles the vertebral column, but only with a significant increase.

Percussion. With this method, the limits of the liver (older than 5 years) and the spleen are determined.

Percussion of the spleen is conducted in two lines: in the middle of the non-axillary one, the upper and lower limits are determined, 10 rebounds - behind and by its imaginary continuation - in front. Centimeter tape measures longitudinal and transverse dimensions. In a healthy child, the anterior limb of the spleen does not extend beyond the anterior arterial line, the rear does not extend beyond the posterior axillary line, the diameter is between the IX and XI ribs on the left.

Percussion of the borders of the liver is carried out in the middle-axillary, anterior-axillary, middle-clavicular and median lines - from above and below, as well as from the bottom to the top on the left edge arch. The finger-plethmical is located parallel to the border of the liver. In parallel with a centimeter tape, the size of the liver is measured along the same lines and along the lines - between the upper limit of the liver along the median line and the lower boundary on the left rib arch.

Auscultation of the abdomen in healthy children reveals "intestinal noises". They increase with acute inflammation of the mucous membranes of the intestine (enteritis, colitis), with invagination. The disappearance of noise over the entire surface of the abdomen indicates an atony of the intestine with its paresis, peritonitis.

VI. The plan and organizational structure of class

№	Elements of practical classes	Time (minutes)
1.	Announcement of the topic of the class with an emphasis on its relevance. Checking the attendees.	3 minutes.
2.	Input test knowledge control.	10 minutes.
3.	Demonstration by the teacher of anamnesis collection methodology and clinical examination of children of different ages.	20 minutes.
4.	Independent work of students: mastering the history of collecting skills in children of different age groups, assessing the general condition of sick	25 minutes.

5.	children.	10 minutes.
6.	Registration of protocols on the results of the supervision of sick children.	10 minutes.
7.	The final control of knowledge: the solution of clinical situational tasks. Task for self-preparation for the next class.	2 minutes.
	Total	**80 minutes.**

VII. The materials of methodical provision of classes

VII.1. Materials for self-control for the preparatory stage of the class:

Test tasks(examples):

1. What is the volume of the stomach of a child aged 12 months?
   A. 80-100 ml.
   B. 300 ml.
   C. 500 ml.
   D. 800 ml.
   E. 700 ml.
2. The ratio between the length of the intestine and body in newborns:
   A. 2: 1
   B. 5.4: 1
   C. 1: 1
   D. 8.3: 1
   E. 3: 1
3. The liver can protrude from 1 to 2 cm from the edge of the costal arch in children:
   A. up to 1-2 years
   B. up to 10 years
   C. up to 5-7 years
   D. up to 2-3 years
   E. up to 12 years old
4. What are the features of absorption processes in young children in the small intestine?
   A. absorbed water, vitamins, minerals
   B. A small amount of salt, water, glucose is absorbed.
   C. absorbed vitamins and glucose
   D. absorbed the products of hydrolysis of proteins, fats, carbohydrates
   E. absorbed only water and minerals
5. What are the features of intestinal microflora in newborns?
   A. E. coli dominates
   B. Dominant coccal flora
   C. dominated by lactobacilli
   D. fungal flora dominates
   E. dominant bifidumflora
6. Physiological salivation occurs in infants aged:

A. 1-3 months
B. 2-4 months
C. 3-6 months
D. 6-9 months
E. 9-12 months

7. What are the anatomical and physiological features of the oral cavity in children is an adaptation to the act of sucking?
A. big language
B. dry mucous membrane
C. enhanced saliva secretion
D. thin mucosa
E. mucous membrane is well supplied

8. The length of the esophagus in newborns in relation to the length of the body is:
A. ½ + 6.3 cm
B. 1/3 + 6.3 cm
C. ¼ + 6.3 cm
D. 1/5 + 6.3 cm
E. 1/6 + 6.3 cm

9. The shape of the stomach in newborns.
A. rounded
B. oval
C. pear shaped
D. spindle
E. no definite form

10. Causes of regurgitation in healthy newborns:
A. Horizontal position of the stomach
B. Insufficient development of the cardiac department
C. aerophagia
D. All listed in paragraphs A and B
E. Everything listed in paragraphs A, B, C

Standards of answers:

1	B	6	C
2	D	7	A
3	C	8	D
4	D	9	E
5	E	10	E

VII.2. Materials for methodological support for the basic stage of class: Professional algorithms for training in practical skills.

№	Tasks	Instructions	Notes
1.	To master the method of collecting anamnesis in	Consistently collect the history of life, hereditary	Pay attention to the

	children with diseases of the digestive system.	history and history of the disease	collection of food history
	To master the technique of an objective examination of the gastrointestinal tract	Perform successive examinations: complaints, examination, palpation, percussion, auscultation.	Pay attention to the features of the anatomical location of the organs of the gastrointestinal tract.

List of practical tasks:

1. To master the method of collecting anamnesis in children with diseases of the digestive system.
2. To master the technique of an objective examination of the gastrointestinal tract

VII.3 Materials of control for the final stage of the class:

Situational tasks (examples):

Task 1.

The child is 1 month old. Periodically after feeding, regurgitating with a small amount of food is noted. It is breastfed. In the body mass gained 650 grams in the first month. What are the possible causes of regurgitation? What measures are needed to prevent regurgitation in this child?

Task 2.

The mother of a child of 3 months turned to the pediatrician with complaints of the child's weakness, anxiety, and loose stools up to 6 times a day of yellow color with a small amount of mucus and white lumps. From the anamnesis, it is known that the mother independently transferred the child to artificial feeding with cow's milk of 165 ml every 3 hours. What reasons led to these occurrence?

Task 3.

The mother of the child 3 months turned to the pediatrician with complaints of increased drooling in the child. No teeth. What causes this symptom?

Task 4.

What are the possible causes of jaundice in a newborn baby?

Task 5.

The mother went to the doctor with complaints of icteric staining of the skin of her 4-year-old child. When viewed from the general condition is not broken, the sclera of the usual color, attention is drawn to the great intensity of jaundice on the palms and soles. The liver stands out from under the rib 1 cm, painless. Feces and urine of the usual color. The level of bilirubin in the normal range. What kind of jaundice is this? What are the causes of jaundice.

Standards of answers:

Task 1:

Anatomical and physiological features - insufficient development of the cardinal sphincter of the stomach, aerophagia. Duration of feeding is not more than 20 minutes, after feeding it is necessary to hold the child vertically for 5-7 minutes, so that air from the stomach can escape.

Task 2:

The child has simple dyspepsia caused by a sudden transfer to artificial feeding with an unadapted product.

Task 3:

In a child, physiological salivation is caused by the opening of the ducts of the salivary glands, irritation of the trigeminal nerve by the teeth, which will begin to erupt from 6 months and the inability of children to swallow saliva.

Task 4.

Physiological jaundice, fetal hepatitis, biliary tract atresia, Crigler-Nayar syndrome, hemolytic disease of the newborn.

Task 5.

Exogenous jaundice. A large amount of carotene in food, slow elimination of dyes in children under 5 years.

VII.4. Materials of methodical supportfor self-preparation of students:

Indicative chart for independent work of students with educational literature

Educational task	Instructions for the assignment
To study the method of collecting anamnesis in children with a disease of the digestive system	To know the scheme for collecting the history of life, hereditary history and history of the disease.
To study the anatomical and physiological characteristics of the digestive system in children	To know the features: oral cavity, esophagus, stomach, liver and intestines.
To study the methodology for conducting an objective examination of the gastrointestinal tract in a child	To know the sequence of objective examination. To know: - typical complaints of diseases of the digestive system - types of palpation and its methodology; - percussion and auscultation technique

VIII. Literature:

Basic:

13. Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition, updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012. – P. __

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev – Vinnytsia: Nova Knyha, 2018. - 504p.
2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013. – P.__
14. Nelson textbook of pediatrics.—18th ed./ edited by Robert M. Kliegman. Part II. Growth, development and behavior // www.mdconsult.com

Guidelines for students to practical classes in Propedeutics of pediatrics

Topic 11: Semiotics of lesions of the digestive system.
Course: III
Specialty: 222 Medicine
Number of education hours: 2 hours
Training location: classroom in the children's department

I. Relevance of the topic.

The digestive system plays an important role in the plastic, energy processes and metabolism of the body of the child. It plays a physiological role in the most complex processes that provide adaptation of the child to the environment. The digestive system is involved in determining the homeostasis of the internal environment of the organism. Anatomical and physiological features of the system help to understand the basis of the functioning of the digestive system and the system in general. Knowledge of the research method will help to identify signs and manifestations of changes in the organs of the digestive system. The ability to detect symptoms of damage to the digestive system, improvement and reduction in the syndrome of the complex will help doctors pediatricians and other specialties to timely and qualitatively diagnose and provide assistance to the patient.

II. Learning objectives of the lesson

- To know signs of defeat of the digestive system;
- To be able to detect signs of defeat of the digestive system;
- To be able to assess the state of the digestive system;
- To be able to assess the general condition of the child;
- To be able to determine the symptoms of lesions and syndrome from the digestive system.

III. The objectives of personality development:

- The student must learn to adhere to the principles of medical ethics and deontology at the bed of a sick child;
- To master the ability to establish psychological contact with the patient and his family;
- To learn a sense of responsibility for the quality of professional knowledge and the correctness of professional actions.

IV. Interdisciplinary integration:

Disciplines	General Competencies	Special Competencies	Program Learning Outcomes
1. Preceding (Providing) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	-	-
2. Subsequent (Provided) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.2; SC.3; SC.7; SC.17	LO.1; LO.2; LO.3; LO.5; LO.20; LO.21; LO.22; LO.23; LO.24
3. Intradisciplinary integration (between the topics of the discipline)	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.2; SC.3; SC.7; SC.17	LO.1; LO.2; LO.3; LO.5; LO.20; LO.21; LO.22; LO.23; LO.24

V. The content of the topic.

The syndrome of an acute abdomen is a condition requiring immediate surgical care due to intoxication as a result of inflammation in the abdominal cavity with the involvement of the abdomen in the pathological process.

Clinical manifestations are:

1) acute abdominal pain,

2) the possibility of pain shock;

3) the position of the patient is sedentary, with the legs tucked up to the abdomen;

4) expression of the face of the martyr (the face of the Hippocrates);

5) tension of the muscles of the anterior abdominal wall;

6) flat stomach, painful palpation;

7) a positive symptom of Shchotkina-Blumberg (with palpation of the abdomen)- local pain is greatly increased if the patient's arm is removed from the abdominal wall of the patient);

8) expressed signs of intoxication, sometimes signs of dehydration;

9) nausea, vomiting;

10) delay of emptying and gases, less frequent diarrhea.

Syndromes of violations of dynamic patency of the pyloric stomach. These syndromes include organic (pylorostenosis) or functional (pylorospatic) lesions of the pyloric stomach in children in the first months of life.

Pilorospasm is a functional spasm of the pyloric part of the stomach.

Clinical manifestations are:

1) manifests itself in the first days of life;

2) vomiting is not permanent, not strong;

3) slight loss of body weight;

4) gastric peristalsis is rare;

5) the pyloric part of the stomach is not palpable;

6) X-ray diffraction of the stomach is not disturbed;

7) indicators of the content of blood serum K +, sodium chlorine at normal levels;

8) the acid-alkaline state is not disturbed

Pylorostenosis is a congenital pathology, which is based on the hypertrophy of the muscles of the pyloric part of the stomach requiring surgical intervention.

Clinical manifestations are:

1) manifests for 2-3 weeks of life;

2) strong vomiting, "fountain";

3) pronounced loss of body weight;

4) gastric motility in the form of "sand clock";

5) in 80-90% of cases, palpation of the pyloric part of the stomach will be possible;

6) contrast in the stomach is delayed very long (up to 24 hours);

7) Indices of potassium, sodium, chlorine in serum are lowered;

8) metabolic alkalosis is characteristic.

Gastroenterocolitis - is a severe disease of the gastrointestinal tract that occurs as a result of infection (dysentery, typhoid, salmonella, coli infection, food poisoning, etc.) or gross malformations and is characterized by involvement in and pathological process of the stomach, small and large intestines.

Clinical manifestations are:

1) abdominal pain (with gastritis - in the epigastric region, in the enteritis - anterolateral region, with colitis - in the course of the colon);

2) nausea;

3) multiple vomiting (mainly with gastritis);

4) diarrhea: in the case of enteritis - frequent emptying, fecal masses are rare, homogeneous, yellow or greenish, often without pathological house shock, or contain white lumps and insignificant amounts of mucus; with colitis - fecal masses are liquid, not recaptured, contain a lot of mucus, impurities blood);

5) signs of dehydration and intoxication.

Malabsorption syndrome is a persistent violation of the absorption process of food intestinal food ingredients as a result of enzymatic pancreatic insufficiency, allergic inflammation of the gastrointestinal tract in response to isolated foods, massive worm infections or protozoa, tumor lesions, and the like.

Clinical manifestations are:

1) polyphagia;

2) a significant increase in the abdomen;

3) fatigue, weakness;

4) decreased appetite;

5) progressive dystrophy;

6) feces are liquid, not recaptured;

7) flatulence;

8) dry skin;

9) the fragility of hair and nails;

10) glossitis, angular stomatitis, gingival bleeding from the crack of the gums in the corners of the mouth, around the anus;

11) Field of hypovitaminosis.

Syndrome of non-ulcer dyspepsia - is a condition in which the disorder from the gastrointestinal tract cannot be confirmed by organic causes.

Clinical manifestations are:

1) Early pain - discomfort or pain of the epigastric region in the first half-hour after meals (characteristic of stomach);

2) Late pain - discomfort or pain in the pyloroduodenal zone after 30-45 minutes of the intake of the eater (occurs during disorders in the work of the duodenum);

3) the biliary tract, the pancreas);
4) feeling of early saturation (equivalent to early pain);
5) loss of appetite;
6) nausea, vomiting
7) heartburn;
8) bloating with air, sour or bitter;
9) pain in palpation in the epigastric zone and localization of the abdominal wall;
10) acid-forming function of the stomach is normal or elevated, very often reduced;

Constipation syndrome *- is a delay in excretory more than 48 hours, the difficulty of the act of defecation, the selection of feces of increased density and a feeling of incomplete emptying of the intestine. Causes of constipation in children may be malformations (Hirschsprung's disease, dolichokolon, dolichosigma, etc.), slowed the progress of chyme and feces in the intestine with reduced function of the thyroid gland, neurological diseases, when taking medications, imbalance of water regime and diet with insufficient content of ballast substances.*

Clinical manifestations are:
1) sensation of pressure in the rectum;
2) migratory pain, transfusion, rumbling in the abdomen and its swelling;
3) hemorrhoids;
4) fractures and ulcers of the anus;
5) pain in the area of the anus, buttocks, hips;
6) loss of appetite;
7) unpleasant taste in the mouth;
8) nausea;
9) headache;
10) low-grade temperature.

Peptic ulcer – *is a chronic disease with periods of exacerbation, the main local manifestation of which is ulcerative defects in the mucous membrane of the stomach or duodenum.*

Clinical manifestations are:
1) pain in the epigastrium or pyloroduodenal zone;
2) early pain (appears in the first minutes after meals after eating and is typical for lesion of the stomach);
3) Late pain (occurs 30-45 minutes after taking food);
4) hunger and night pain ("Moinigan's" rhythm);
5) feeling of early saturation;
6) loss of appetite;
7) nausea, vomiting;

8) heartburn;
9) signs of chronic intoxication and hypovitaminosis;
10) expressed pain in palpation in the epigastric zone;
11) local tension of the abdominal wall;
12) elevated pH of the stomach;

Jaundice - *is a pathological condition where due to hyperbilirubinemia skin, mucous membranes and sclera stained yellow. By peculiarities of pathogenesis, jaundices are distinguished parenchymatous, hemolytic, mechanical, conjugate.*

Parenchymal jaundice *– is a pathological condition in which hyperbilirubinemia is a result of falling functional capacity of hepatocytes convert indirect bilirubin into direct and intensive penetration of the blood direct bilirubin resulting in swelling of the liver and bile leakage violations.*
Clinical manifestations are:
1) reddish yellow color of the skin and mucous;
2) dark urine;
3) increase in blood serum of the level of direct and indirect bilirubin;

Hemolytic jaundice - *is pathological "condition in which hyperbilirubinemia is the result of intensive disintegration of red blood cells.*
Clinical manifestations are:
1) lemon-yellow skin color;
2) hyperbilirubinemia due to indirect bilirubin;
3) urobilinuria;
4) reduction of osmotic resistance of erythrocytes;
5) ordinary color of feces;
6) hepatomegaly is not characteristic.

Obstructive jaundice - *yellow staining of the skin, sclera and mucous membranes due to hyperbilirubinemia due to obstruction of the bile duct*

Clinical manifestations are:
1) greenish tint of the skin;
2) itchy skin;
3) liver enlargement;
4) acholic stool*;*
5) urine of a rich yellow color;
6) in the blood increased the content of direct bilirubin.

Conjugational jaundice *is a physiological condition due to peak immaturity of the glucuronyltransferase liver system. Inherited insufficiency of the glucuronyltransferase system is considered as a pathology.*
Clinical manifestations are:

1) characteristic for newborns;
2) there are no signs of increased hemolysis;
3) erythrocytes, hemoglobin, free iron;
4) high content of bilirubin at the expense of an indirect fraction;
5) the liver, the spleen is not enlarged;
6) the general condition is not violated;

***Hepatic insufficiency** – is deep dysfunction and protein synthesis, pigment, detoxification and other lesions of the liver at 75-80% of its parenchyma.*

Clinical manifestations are:
1) change in the patient's behavior (adynamia, apathy, drowsiness, agitation, irritability);
2) violations of consciousness with the gradual development of a coma state;
3) the appearance of pathological types of respiration (Kussmaul, Cheyna-Stokes);
4) increased hyperbilirubinemia, mainly due to an indirect fraction;
5) increased jaundice;
6) sweetish "liver" smell of methyl mercaptan at breath, sweat and urine;
7) hemorrhagic syndrome in the form of bleeding from the mucous membranes;
8) hemorrhages in the skin;
9) reduction of liver size;
10) biochemical markers of the functional state of the liver are sharply disturbed.

VI. The plan and organizational structure of the class

№	Elements of practical classes	Time (minutes)
1.	Announcement of the topic of the class with an emphasis on its relevance. Checking the attendees.	3 minutes.
2.	Input test knowledge control.	10 minutes.
3.	Demonstration by the teacher of anamnesis collection methodology and clinical examination of children of different ages.	20 minutes.
4.	Independent work of students: mastering the history of collecting skills in children of different age groups, assessing the general condition of sick children.	25 minutes.
5.	Registration of protocols on the results of the supervision of sick children.	10 minutes.
6.	The final control of knowledge: the solution of clinical situational tasks.	10 minutes.
7.		2 minutes.

	Task for self-preparation for the next class.	
	Total	**80 minutes.**

VII. The materials of methodical provision of classes

VII.1. Materials for self-control for the preparatory stage of the class:

Test tasks(examples):

1. When examining the mouth of a child aged 2 years, white islands on the mucous membrane of the tongue and gums attract attention. They are easily removed with a spatula, no bleeding from the mucous membrane is noted. What pathology should one think about first?
   A. thrush
   B. diphtheria oropharynx
   C. polyhypovitaminosis
   D. catarrhal stomatitis
   E. stomatitis
2. If a child has 1 year of liquid feces, green-yellow in color, with white lumps and mucus, with a sour odor, you should think about:
   A. dysentery
   B. salmonellosis
   C. colianteritis
   D. dyspepsia
   E. fasting
3. During the examination of the digestive system in a 2-year-old boy, pronounced tympanitis was found over the entire surface of the abdomen. What is the possible cause of this tympanic?
   A. peritonitis
   B. colitis
   C. enteritis
   D. ascites
   E. meteorism
4. A boy of 10 years old for 2 years has pain in the epigastric region immediately after a meal or after 1-1.5 hours; heartburn, belching sour. Appetite saved. What is the possible cause of these symptoms?
   A. chronic cholecystitis
   B. chronic hepatitis
   C. chronic pancreatitis
   D. biliary dyskinesia
   E. chronic gastroduodenitis
5. The child is treated in a children's hospital. The boy has complaints of fatigue, headache. On examination, the presence of "spider veins" on the skin, pallor of the nasolabial triangle, ikterichnost sclera, skin, enlarged liver and spleen. What disease can cause these symptoms in a child?
   A. chronic gastroduodenitis
   B. chronic cholecystitis

C. biliary dyskinesia
D. chronic hepatitis
E. hemolytic jaundice

6. What damage to the digestive system in a newborn baby can be accompanied by a vomit fountain after each feeding, lack of weight gain?
A. tracheoesophageal fistula
B. esophageal atresia
C. pilorospasm
D. aerophagia
E. pylorostenosis

7. Syndrome malabsorption manifests itself:
A. diarrhea with polyphaecal
B. polyphagia
C. Moinigan rhythm of pain
D. icteric sclera
E. nausea

8. A 8-year-old child has a reddish-yellow color of the skin and mucous membranes, an enlarged liver, dark urine, periodically unstained stools, an increase in direct and indirect bilirubin in the blood. What kind of jaundice does this baby have?
A. *obstructive*
B. hemolytic
C. *conjugational*
D. parenchymal
E. exogenous

9. The position of the sick child in the bed is sedentary, with the legs brought to the stomach, the expression of the person suffering (Hippocrates face), vomiting, delayed stool and gas; the abdomen is flat as a board, painful on palpation, the muscles of the anterior abdominal wall are tense; noted positive symptom Shchetkina-Blumberg. What is the syndrome?
A. gastroenterocolitis
B. acute abdomen
C. malabsorption
D. peptic ulcer
E. pylorostenosis

10. Late pains in the epigastric region in children are observed with:
A. gastritis
B. duodenitis
C. esophagitis
D. cholecystitis
E. pancreatitis

Standards of answers:

1	A	6	E
2	D	7	A
3	E	8	D

4	E	9	B
5	D	10	A

VII.2. Materials for methodological support for the basic stage of class: Professional algorithms for training in practical skills.

№	Tasks	Instructions	Notes
1.	To be able to identify signs of damage to the digestive system	To analyze the child's complaints, general examination data	To pay attention to the hereditary history, factors contributing to the occurrence of the disease
	To master the method of assessing the general condition of the child	To rate position in bed, consciousness, reaction to others	The survey is conducted taking into account the age of the child
	To be able to identify the symptoms of lesions and the symptom complex of the digestive system	To characterize the main syndromes	To pay attention to the need to correct the diet in pathology.

List of practical tasks:

1. To be able to identify signs of damage to the digestive system
2. To master the method of assessing the general condition of the child
3. To be able to identify the symptoms of lesions and the symptom complex of the digestive system

VII.3 Materials of control for the final stage of the class:

Situational tasks (examples):

Task 1.

A child of 14 years old is worried about nausea, repeated vomiting, loose stools up to 5-6 times a day, pain throughout the abdomen, headache. On examination: the tongue is thickly coated with white bloom, abdominal palpation reveals a gnawing pain along the small intestine, the sigmoid colon is spasmodic, painful upon palpation, the liver and spleen are not enlarged. Feces miserable, mushy, with an admixture of mucus and blood. What is the pathological syndrome in a child?

Task 2.

A child is 1 year old. Sick for several months. Pallor of skin, lag in physical development, signs of polyhypovitaminosis are noted. Appetite is reduced, occasionally - vomiting, abdominal distension, flatulence, diarrhea, polyfecalia. What syndrome can be suspected in a child?

Task 3.

Patient 12 years. Complains of periodic acute pain in the epigastric region, often on an empty stomach or after eating in 30-40 minutes, heartburn, constipation. Sometimes there is vomiting, which brings relief. It feeds irregularly. Father has a peptic ulcer. On palpation, severe pain is observed in the epigastrium and pyloroduodenal zone. What disease can be suspected? What factors led to his appearance?

Task 4.

A child has 6 months fever up to 38ºC, repeated vomiting, diarrhea. The skin is pale, dry, lips are dry, the fontanel falls. The tongue is thickly coated with white bloom. Abdominal palpation painful. Stool up to 8 times a day, feces watery, undigested, with admixtures of greenery and mucus. What syndrome does a baby have? What symptoms determine the severity of the child's general condition?

Task 5.

A child of 8 years old has a stool that is irregular for a long time; after 2-3 days, there is nausea, decreased performance, and recurrent pain in the rectum. The skin is pale, the tongue is thickly coated with white bloom. The abdomen is enlarged, with palpation moderate pain along the large intestine. What syndrome does a baby have? What are the possible causes of its occurrence?

Standards of answers:

Task 1:

Gastroenterocolitic syndrome caused by an infectious factor (dysentery).

Task 2:

Syndrome of disturbed intestinal absorption - malabsorption.

Task 3:

Peptic ulcer disease. Burdened heredity, close contact with a possible carrier of helicobacteria, irregular nutrition.

Task 4.

Gastroenterocolitis. Intoxication and dehydration.

Task 5.

Constipation. Intestinal anomalies (dolichosigma, dolichocolon), unbalanced diet (insufficient amount of ballast substances).

VII.4. Materials of methodical supportfor self-preparation of students:

Indicative chart for independent work of students with educational literature

Educational task	Instructions for the assignment
Examine signs of digestive damage	characterize signs of digestive damage

Examine the criteria for assessing the general condition of the patient and in particular the state of the digestive system	Assess the general condition of the sick child
Examine the symptoms and syndromes of the digestive system	Define and know the clinical manifestations: -acute abdomen syndrome - pylorospasm and pyloric stenosis - gastroenterocolitis malabsorption syndrome - syndrome of non-ulcerative dyspepsia - constipation syndrome peptic ulcer - jaundice (know the types of jaundice) -peptic deficiency

VIII. Literature:

Basic:

15. Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition, updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012. – P. __

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev – Vinnytsia: Nova Knyha, 2018. - 504p.

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013. – P.__

16. Nelson textbook of pediatrics.—18th ed./ edited by Robert M. Kliegman. Part II. Growth, development and behavior // www.mdconsult.com

Guidelines for students to practical classes in Propedeutics of pediatrics

Topic 12: Anatomical and physiological features and methods of examination of the urinary system

Course: III
Specialty: 222 Medicine
Number of education hours: 2 hours
Training location: classroom in the children's department

I. Relevance of the topic.

The urinary system provides a number of vital functions aimed at supporting homeostasis, maintains a constant concentration of osmotic-active substances, regulates the volume of blood and extracellular fluids, the acid-base state, excretion of end products of nitrogen exchange of foreign substances, and others. For understand the diseases of the urinary system, it is important to know the anatomical and structural-morphological features of the structure of the kidneys and other organs of this system, mastering the methods of clinical examination and obtaining information in the process of examination allows to reveal symptoms, that is signs of illness, which are the basis for establishing the diagnosis, which should be correct and reflect morphological changes in the patient's body. This is a prerequisite for proper treatment.

II. Learning objectives of the lesson

- to know the anatomical and physiological features of the organs of urination;
- to know the features of kidney functions of children;
- to know the method of examination of the urinary system
- be able to conduct an objective examination of the patient and interpret the state of the urinary system;
- be able to interpret the changes that have been identified as a result of a child's examination.

III. The objectives of personality development:

- The student must adhere to the principles of medical ethics and deontology at the patient's bed;
- To master the ability to establish psychological contact with the patient and his family;
- To learn a sense of responsibility for the quality of professional knowledge and the correctness of professional actions.

IV. Interdisciplinary integration:

Disciplines	General Competencies	Special Competencies	Program Learning Outcomes

1. Preceding (Providing) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	-	-
2. Subsequent (Provided) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.2; SC.17	LO.1; LO.11; LO.20; LO.21; LO.22; LO.23; LO.24
3. Intradisciplinary integration (between the topics of the discipline)	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.2; SC.17	LO.1; LO.11; LO.20; LO.21; LO.22; LO.23; LO.24

V. The content of the topic.

Renal pelvis in newborns and infants are relatively large, their walls are poorly developed, hypotonic (weak development of muscle and elastic fibers). The final formation of the renal pelvis takes place until the 12th month of the child's life. The weak development of muscle and elastic fibers, relatively large size of renal pelvis, hypotonia of the walls cause stagnation of urine and the development of inflammatory process.

In children under the age of 5 years predominantly intracranial placement of renal pelvis, they are located inside the renal sinus. In subsequent years, as the opening of the renal sinus lobules are placed out of lung.

Ureter of children is relatively wider and longer than in adults. The length of the ureter in the newborn is 6-7 cm, in the 1-year-old child - 10 cm, up to 4 years - 15 cm, in the adult - 20 - 28 cm. Ureters in newborn twists, with folded mucous membrane, which until the 1st year is aligned The elastic layer of the ureter is absent, which causes the atony of the walls of the ureter. These features, in combination with hyperplasia of the ureter at the level of the unnamed line, are affected by the stagnation of urine and the occurrence of microbial-inflammatory processes in the pelvis.

The distal section of the ureter in newborn babies is very short and the length of the intravascular segment does not exceed 0.5 cm. Up to 10-12 years old, it increases to 1.5 cm. Such a short intravaginal segment of the ureter causes the development of bladder and ureter reflux, that is, leads to a reversal of urinary content Although the ureter in young children is relatively wider than in adults, they are more volatile, hypotonic due to the weak development of muscle and elastic fibers, which leads to urine stagnation and the development of microbial inflammatory process in the kidneys. The bladder in young children is higher than in adults, so it can be easily palpated over the pubis, which, in the

long absence of urination, makes it possible to differentiate its reflexive delay from stopping urine formation. The bladder has a well developed mucous membrane, weakly elastic and muscle tissue. Capacity of the newborn's bladder - up to 50 ml, in one year old child - up to 100-150 ml. The urinary channel in newborn boys is equal to 5-6 cm in length. Its growth is uneven: it slows down in early childhood and dramatically accelerates during puberty (increases to 14-18 cm). In newborn girls, its length is 1-1.5 cm, and 16 years old - 3-3.3 cm, its diameter is wider than that of boys. In girls, due to these features of the urethra canal and proximity to the anus, it may be easier to get infected, which should be taken into account when organizing care for them (to wipe and wash the girl should be back in front to prevent infection from the anus to the urethra). The mucous membrane of the urethra in children is thin, tender, easily vulnerable, and its foldiness is poorly expressed.

The bladder in infants is higher than in school-age children, partly in a small pelvis, with age decreases gradually in the small pelvic cavity, which allows it to palpate in young children, in the filled state, palpable at the level of the navel and even higher. Urine-free urine is spindle-shaped or pear-shaped. In girls of school age, it acquires a round, the boys retain an oval-tufted form. The muscular layer and elastic fibers are poorly developed, the pronounced longitudinal muscle wall of the bladder wall is more pronounced, the circular layer is weaker. Active development of muscle layer is observed from 6 years. The mucous membrane of the bladder, represented by the connective-mucous membrane, is relatively thick and developed better than in adults. However, it is loose, tender, well-vascularized, which causes frequent development of the inflammatory process.

Capacity of the bladder is: in the newborn approximately 50 ml; in an annual child up to 200 ml, at the age of 9-10 years - 600-900 ml.

Morphological features of nephrons in young children.

Blubs of nephrons are not completely differentiated and have a large size. The epithelium, which covers the stomach, is not flat but cylindrical. These features cause significantly less filtration surface and permeability of renal glomeruli in young children.

Functions of a nurser

Glomerular filtration: the newborns are poorly expressed, due to the immaturity of the glomerulus and low blood pressure (it is even more immature in the fetus). The total filtering surface is lower than that of older children, and the size of glomerular filtration is reduced. Thus, glomerular filtration at 1m body surface in the newborn is 1/3 - 1/2 of an adult. The size of the glomerular filtration reaches the adult level only by the end of the 1st beginning of the 2nd

year of life. Low levels of glomerular filtration in newborns and children of the first year of life are due to low blood pressure, lower diameters of the vessel (1/3 less than the diameter of the vessel), less permeability of the glomeruli and a relatively small total filtering surface of the glomeruli, which is 5 times less than that of adults .

The amount of glomerular filtration in an annual child is 50-60 ml / min., In older children and in adults -80-120 ml / min. Until now, there is no way to directly study the glomerular filtration, and therefore, for the determination of the size of glomerular filtration, the indicators of purification (clearance) of those substances that, digging into the primary urine, in the subsequent are not subject to reabsorption and are not secreted (inulin, creatinine) are used. Under clearance is the amount of plasma (in ml), which is completely cleared of this substance in 1 min. The study of glomerular filtration on the clearance of inulin and endogenous creatinine allowed to reveal a significant decrease in the indicators of the filtration function of the kidneys in children of the first year of life compared with adults.

Imperfection of the visual function explains high diuresis (urine output per unit time). In the first days of life, the minute diuresis is 2 ml / min per 1 sq. M of body surface, at an adult - 0.6 ml / min. The daily amount of urine increases with age. By the end of the first month of life, daily diuresis is 200-300 ml, by the end of the year - 600 ml. In children older than 10 years of age, diuresis can be determined with the help of an empirical formula:

$$600 + 100(n - 1),$$ n- age of a child in years.

Children older than 10 years of age have the same amount of urine as adults and adults (1700-2000 ml). However, kidneys of a child are capable of water withdrawal, if it is introduced not simultaneously, but fractionally during the day. Due to such a large diuresis, the intensity of metabolism, rapid water metabolism, children require more water per 1 kg of mass. So, the newborn's need for water is 180-200 ml / kg, in 6 months 150 ml / kg, in 1 year - 120-130 ml / kg, 2-3 years - 90 ml / kg, in adults 40-50 ml / kg

It should be noted that the water content in the body of the newborn is 75-80% of its mass, in adults 60%. The relative volume of extracellular fluid in adults is 2 times less than in newborns (correspondingly 20% and 40%), which causes the body to mildly dehydrate an early child. On the other hand, a large volume of extracellular fluid and a delayed excretory ability of the kidneys can lead to a water load to hyperglycemia, which is manifested by edema. These features should be considered in clinical practice when establishing optimal water regime. In the first days of a child's life, the frequency of urination is 5-6 times a day (oliguria or anuria). On the 3-4th day of life, the number of

urination increases and from the 2nd week is 20-25 times a day. This amount of urination is stored for up to 6 months, then decreases to 15-20 times, up to 10-15 times a day, in preschool and school age - up to 6-8 times a day. Children up to 6 months old. the frequency of urination is defined as a physiological polakiuuria. On average, each secretion the children emit:
newborns - 10-15 ml;
in 6 months - 30 ml;
in 1 year - 60 ml;
in 3-5 years - 90-100 ml;
in 7-8 years - 150 ml;
in 10-12 years -250 ml.

Clinical and laboratory methods of the urinary system

- General urinalysis
- Nechiporenko's tset.
- Zimnitsky's test
- Addis-Kakovsky test
- Urinalysis for Ambulance.
- Bacteriological urine culture with the determination of the sensitivity of flora to antibiotics.

Instrumental methods of the urinary system research

1. Ultrasound examination of the kidneys.
2. Review X-ray without the introduction of contrasting substance.
3. Excretory (intravenous) urography.
4. Kidneys angiography
5. Retrograde pyelography, cystography.
6. Tomography.
7. Pneumopyelography.
8. Radionuclide renography, scan of the kidneys.
9. Cystoscopy.
10. Pneumoperetoneum.

Indications for excretory (intravenous) urography are long-term changes in urine tests (over 3 months); pain in the abdominal cavity when there is a suspicion of nephroptosis; abnormalities of kidney development, urolithiasis, pyelonephritis, tumor process (hydronephrosis, polycystosis); persistent hypertension (anomalies of kidney and renal vascular development, pyelonephritis, congenital nephropathy); enuresis, closed trauma of the abdominal cavity with subsequent hematuria of stones detection in the review

radiography; congenital anomalies of development of external genital organs, etc.

Preparation of the patient for extrtoral (intravenous) urography

1. High cleansing enema in the evening on the eve of the study and in the morning on the day of the study.
2. On the eve of the study and in the afternoon a study of the abolition of drugs, physiotherapy procedures.
3. Determination of sensitivity to X-ray contrast agents 1 day prior to the study.
4. Immediately before entering the contrast, completely empty the bladder.

Method of conducting intravenous urography.

1. X-rays - contrast agent is administered intravenously in warm-up form for 1-2 minutes at a rate of 1.5-2 ml / kg body weight of the child - up to 3 years; 1ml / kg body weight - for children older than 3 years.

2. After the introduction of X-rays -contrasted substance on the 5th; 10th; At the 15th minute, X-rays are made.

3. The first photograph is made in an upright position, the rest is in the horizontal.

4. With the impossibility of intravenous contrast, the substance is administered rectally, intramuscularly, subcutaneously.

Intravenous urography gives an idea of:

- Function of the kidneys
- kidney mobility
- Signs of kidney damage
- Condition of the calices-pelvis system
- The presence of congenital anomalies

Contrast substances used for intravenous urography: 60% verrigan solution, 76% solution of urograngine, 50% solution of triiodstrast.

VI. The plan and organizational structure of the classes.

№	Elements of practical classes	Time (minutes)
1.	Announcement of the topic of the class with an emphasis on its relevance. Checking the attendees.	3 minutes.
2.	Input test knowledge control.	10 minutes.
3.	Demonstration by the teacher of anamnesis collection methodology and clinical examination of children of different ages.	20 minutes.
4.	Independent work of students: mastering the history of collecting skills in children of different age	25 minutes.

5.	groups, assessing the general condition of sick children.	10 minutes.
6.	Registration of protocols on the results of the supervision of sick children.	10 minutes.
7.	The final control of knowledge: the solution of clinical situational tasks. Task for self-preparation for the next class.	2 minutes.
	Total	**80 minutes.**

VII. The materials of methodical provision of classes

VII.1. Materials for self-control for the preparatory stage of the class:

Test tasks(examples):

1. What indicators characterize the glomerular filtration of the kidneys?
   A. urine osmolarity
   B. clearance by endogenous kreatinine
   C. proteins and protein fractions of blood
   D. blood urea
   E. residual blood nitrogen
2. Daily amount of urine in a child 1 year:
   A. 600 ml
   B. 1000 ml
   C. 1200 ml
   D. 300 ml
   E. 100 ml
3. Low rates of glomerular filtration in newborns are due to:
   A. small size of the glomeruli
   B. relatively low hydrostatic pressure
   C. structure of the visceral layer of the capsule from the cubic epithelium
   D. additional load after cessation of placental function.
   E. to all of the above
4. In which part of the nephron is the absorption of amino acids and proteins from the primary urine?
   A. in the balls
   B. in proximal tubule
   C. in the distal tubule
   D. in the thin segment of the nephron loop (Henle's loop)
   E. in the pelvis and bladder
5. In which part of the nephron is the excretion of antibiotics and dyes?
   A. in the glomeruli
   B. in proximal tubule
   C. in the distal tubule
   D. in the thin segment of the nephron loop (Henle's loop)
   E. in pelvis and bladder
6. The concept of "diuresis" is:

A. the amount of urine released during the day
B. amount of urine released at night
C. amount of urine excreted per full day
D. amount of urine released after water load
E. the ratio of the amount of urine to the fluid you drink during the day, expressed as a percentage (water balance)

7. Macclura - Aldrich Sample is used for:
A. diagnosis of hidden edema
B. diagnosis of hemoglobinuria
C. Diagnosis of phenylcutonuria
D. diagnostics alkaptonurii
E. diagnosis of latent hematuria

8. Polyuria syndrome is observed with:
A. drinking excessive amounts of fluid
B. in children with diabetes
C in patients with diabetes insipidus
D. with the rise of heart and kidney edema
E. under all conditions that are listed above

9. What are the features of the structure of the kidneys in the infant?
A. different nephrons
B. well developed cortical layer
C. with the proposalwoven fabrics aligned well
D. the kidneys are lobed
E. the Henle's loop works well

10.B ladder volume in a child 10 years in ml:
A. 50
B. 100
C. 300
D. 400
E. 500

Standards of answers:

1	B	6	E
2	A	7	A
3	E	8	E
4	B	9	D
5	C	10	C

VII.2. Materials for methodological support for the basic stage of class: Professional algorithms for training in practical skills.

№	Tasks	Instructions	Notes
1.	To master the methods of objective examination of the	Perform successively.	Pay attention to the physiological features of

	urinary system		urination.
	To be able to interpret the changes identified in the result of the child's examination	Use in the examination of laboratory research methods	Assess the surveys.

List of practical tasks:

1. To master the methods of objective examination of the urinary system
2. To be able to interpret the changes identified in the result of the child's examination

VII.3 Materials of control for the final stage of the class:

Situational tasks (examples):

Task 1.

A girl at the age of 1 month, was admitted to the children's clinic with mother's complaints about the expressed anxiety of the child, especially when urinating, increased body temperature to 38 ° C, weakness, lethargy, changes in general urine tests in the form of increasing the amount of protein to 0.5 g l, leukocyte to 60-80 in sight.

Entitle the appropriate change in the urine.

Task 2.

A 5-day-old baby during the day each urination leaves red-brown spots on the diapers. In the collected urine, a reddish-brown sediment is observed upon settling, while in the urine analysis of erythrocytes 0-1 p / 3. Name the reason.

Task 3.

The patient is 6 years old, was hospitalized with complaints of weakness, fatigue, headache, and pastoznost face. 2 weeks before, he had a sore throat: pale skin, blood pressure - 160/90 mm. Hg Art., the daily amount of urine - 500 ml, urine red color , density - 1009-1015, protein - 1.2 g / l, in the sediment: L - 3-5 p / s, er. - cover the whole field view. Entitle the appropriate change in the urine.

Standards of answers:

Task 1.

Weak proteinuria, leukocyturia

Task 2.

Uric acid kidney infarction

Task 3.

Macrohematuria, microhematuria, proteinuria, oliguria

VII.4. Materials of methodical support for self-preparation of students:

Indicative chart for independent work of students with educational literature

Educational task	Instructions for the assignment
To study the anatomical and physiological characteristics of the urinary organs	To know the features: renal pelvis, ureter, bladder, nephrological features of nephrons.
To study the functional features of the kidneys in children	Specify the features: glomerular filtration in children, the concept of creatinine clearance, the characteristics of diuresis in children and the formula for determining it
To study the methods of conducting an objective examination of the urinary system	To know the sequence of the survey. Pay attention to typical complaints of diseases of the urinary system.
Examine laboratory and instrumental methods for examining the urinary system	To know the rules of collection and the clinical significance of the following tests: urinalysis, urine analysis according Nechiporenko's tset, Zimnitsky's test, Addis-Kakovsky test, bacteriological urine culture with determination of the sensitivity of flora to antibiotics. List the main instrumental methods of examination of the urinary system. Know the indications and methods of their conduct

VIII. Literature:

Basic:

17. Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition,

updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012. – P. __

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev – Vinnytsia: Nova Knyha, 2018. - 504p.

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013. – P.__

18. Nelson textbook of pediatrics.—18th ed./ edited by Robert M. Kliegman. Part II. Growth, development and behavior // www.mdconsult.com

Topic: Semioticsofmicroscopicchangesinurinarysediment (protein-, erythrocyt-, leukocyt- andcylindruria, etc.). Syndromeofacuteandchronicrenalfailure. Careforpatientswithurinarytractpathology.

Course:III

Specialty: 222 Medicine

Numberofeducationhours: 2 hours

Traininglocation:classroom in the children's department

I. Relevanceofthetopic:

Pathologyoftheurinarysystemisquitecommoninchildhood.

Amongthediseasesoftheurinarysystemarethemostcommonmicrobial-inflammatorylesionsofthekidneysandurinarytract.

Thisgroupofdiseasesisthefirstinthestructureofnephropathyinchildren. Infectious-allergicdiseasesoftheurinarysystemoccupy 3-4 places. Prevalenceandfrequencyofglomerulonephritisdependsonage, season, climaticandgeographicalfeatures, thedegreeof "readiness (sensitization) oftheorganismtothedisease.

Inrecentdecades, therehasbeenanincreaseintheincidenceofcongenitalandhereditarykidneydiseasesin childrenwhohave a progressivecoursewiththedevelopmentofchronickidneydisease.

Knowledgeofriskfactors,
symptomsofearlydiagnosispreventtheprogressionofdiseasesoftheurinarysystem.

II. Learningobjectivesofthelesson:

- To knowthe microscopicchangesinurinarysediment (protein-, erythrocyt-, leukocyturia- etc.).
- Tolearnthe symptomsofpyelonephritisandglomerulonephritis
- To know the syndrome of acute and chronic renal failure
- To master the skills of caring for patients with pathology of the urinary system

III. The objectives of personality development

- Thestudentmustlearntoadheretotheprinciplesofmedicalethicsanddeontology atthepatient'sbedside;
- Tomastertheabilitytoestablishpsychologicalcontactwiththepatientandhisfamily;
- Tomasterthesenseofresponsibilityforthequalityofprofessionalknowledgeandthecorrectnessofprofessionalactions.

IV. Interdisciplinary integration

Disciplines	**General Competences**	**Special Competences**	**Program Learning Outcomes**
1. Preceding (Providing) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	-	-
2. Subsequent (Provided) disciplines	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9; GC.11	SC.1; SC.3; SC.17	LO.1; LO.2; LO.3; LO.20; LO.21; LO.22 LO.23; LO.24
3.Intradisciplinary integration (between the topics of the	GC.1; GC.2; GC.3; GC.4; GC.6; GC.7; GC.8; GC.9;	SC.1; SC.3; SC.17	LO.1; LO.2; LO.3; LO.20; LO.21; LO.22

discipline)	GC.11		LO.23; LO.24

V. Thecontentofthetopic

Microscopic examination of urinary sediment is of great diagnostic importance, despite significant progress in laboratory diagnosis of urinary pathology. In urinary sediment microscopy, various forms of epithelial cells, leukocytes, erythrocytes, cylinders, salts, bacteria, fungi, parasites and other inclusions can be detected.

In healthy children, the urinary tract creates conditions for the desquamation of epithelial cells of the mucous membrane of the urinary tract, so single epithelial cells are always present in the precipitate of normal urine.

In pathological conditions, the process of desquamation of the epithelium increases dramatically and the number of epithelial cells in the urinary sediment increases. Such phenomena are observed in inflammation and degenerative processes in the urinary system, trauma of the mucous membranes by concrements, in tumors. Renal epithelium is found in nephritis and pyelonephritis. Epithelial cellsof urinary bladderappear in cystitis.

In the normalurinary sediment in girls can be up to 10 leukocytes in the microscopic field, in boys – up to 6.Moderate increase in the number of leukocytes is leukocyturia; a sharp increase when leukocytes cover the entire microscopicfield - pyuria. Leukocyturia is a sign of bacterial-inflammatory process in the kidneys and inflammatory processes in the external genitalia, and a short time appears in glomerulonephritis.

Hematuria. In norm, red blood cells in the urine are up to 1-2 in sight. The detection of a small amount of red blood cells in the urine is a microhematuria, significant number of red blood cells and urine becomes red or brown it is a macrohematuria. Hematuria is characteristic of glomerulonephritis, hereditary nephritis, kidney stone disease.

Proteinuria. During the day the baby's body releases up to 50 mg of protein and this amount of protein is not detected. Normally, the amount of protein does not exceed 0.033 g/l.High urine protein is proteinuria. Proteinuria is observed at glomerulonephritis, nephrotic syndrome, and to a lesser extent at hereditary nephritis and pyelonephritis.

Cylinders are folded protein in the tubules and cellular elements of various shapes and sizes. Hyaline, granular and waxy cylinders are observed in case of nephrotic syndrome, glomerulo- and pyelonephritis, sometimes red

blood cells are secreted with macrohematuria, and leukocyte cylinders with pyuria.

Salts and crystals of uric and oxalic acids, as well as phosphates, are excreted in the urine at dysmetabolic nephropathies. An increased amount of slime appears in the urine at inflammation of the urinary tract and vulva.

Bacteria in the urinary sediment are observed at microbial inflammatory processes in the organs of the urinary system and at insufficient sanitary and hygienic care for children.

Glomerulonephritis

Glomerulonephritis – infection-allergicdiseasesofthekidneywhicharecharacterizedbyedema, hypertension.

Clinicalsigns:

- oliguria
- headache;
- increase inbody temperature;
- lossofappetite;
- palloroftheskin;
- increase inbloodpressure;
- abdominalpain, pain in lumbararea;
- swelling;
- hematuria;
- cilindruria;
- proteinuria;
- hyperholesterinemia;
- hypo-anddisproteinemia;
- increaseofureainblood;
- increasedERS.

Pyelonephritis

Pyelonephritisis a microbial-inflammatorydiseaseofthekidneyswiththe primary affection of renal pelvis, calyces and renalparenchyma.

Clinicalsigns:

- symptomsofintoxication (headache, lossofappetite);
- intense pain in the abdomen and the lumbar area on the affected side;
- positive Pasternatsky'ssymptom on the affectedside;
- frequent and painful urination;
- possible enuresis (day and night);
- increase in body temperature;
- leukocyturia;

– bacteriuria;
– moderate proteinuria;
– neutrophilic leukocytosis with a shift of the formula to the left;
– increased ERS.

Cystitis

Cystitis- inflammationofthemucous membraneoftheurinarybladder, whichmanifestedbydysuric, urinaryandpainsyndromes.

Clinicalsigns:

Disuric syndrome:
– urinaryincontinence (inabilitytoretainurineduring a calltourinate)
– enuresis;
– frequenturination (pollakiuria).

Urinarysyndrome:
– cloudyurine;
– microhematuriaormacrohematuria;
– traceproteinuria;
– epitheliuria;
– leukocyturia;
– bacteriuria.

Painsyndrome:
– sharppainofanunbearablenatureduringurinaryretention,
– paininthelowerpart of abdomen, inthesuprapubicregionwithirradiationtotheperineum;
– painattheendofurination,
– persistentpaininthelowerpart of abdomen, inthesuprapubicregion**.**

Acuterenalfailure

Acuterenalfailure - clinicalsyndromecausedby a sharpdecreaseinglomerularfiltrationrate, delayedexcretionoftoxicproductsofmetabolismofnitrogenoussubstances, disturbancesofwater-electrolytebalanceandacid-alkalinestate.

Clinicalsigns:
– moderateproteinuria;
– headache;
– weakness;
– palloroftheskin;
– anorexia;
– nausea, vomiting, diarrhea;
– thirst;

– paininabdomen;
– itchingofskin;
– pathologicaltypesofbreathing;
– convulsions;
– swelling;
– tachycardia;
– decreasedandthenincreasedblood (diastolic) pressure;
– oliguria, anuria;
– metabolicdisorders (acidosis, azotemia, hyperkalemia, hyponatremia);
– violationofrenalfiltrationandconcentrationfunction.

Chronicrenalfailure

Chronicrenalfailure – clinicalsyndromedueto a significantdecreaseinthenumberofactivenephrons (lessthan 5%), whichsignificantlyreducesthefunctionalcapacityofthekidneysandleadstodisorders ofhomeostasis.

Clinicalsigns:

– polyuria in the compensationstage, oliguria and anuria in the decompensationstage;
– thirst;
– apathy;
– headache;
– increaseofbloodpressure;
– nocturia;
– hypostenuria;
– acidosis;
– increaseinserumcreatinine;
– hyperkalemia;
– hyponatremia;
– hypocalcaemia;
– anemia.

VI. The plan and organizational structure of the class

N	Elements of practical training	Time (minutes)
1.	Announcements the theme of class with explanation for its relevance. Control of attendance.	3
2.	Initial test control of knowledge.	10
3.	Demonstration of technique of collection anamnesis	20

	and clinical examination in children by the teacher.	
4.	Independent work of students: collection of anamnesis, assessment of the general condition and physical examination of different age sick children.	25
5.	Filling down the protocols of examination of the sick child.	10
6.	Final control of knowledge, solving of clinical cases.	10
7.	The tasks for independent preparation of students for the next class.	2
TOTAL		80

VII. The materials of methodical provision of classes:

VII.1. Materials for self-control for the preparatory stage of the class:

Tests(Examples):

1. Inglomerulonephritisobserved:

A. increaseinsystolicbloodpressure

B. increaseof the centralvenouspressure

C. increase inpulsepressure

D. increase in diastolic blood pressure

E. decrease of central venous pressure

2. Uricacidinfarct of kidneysobserved:

A. inglomerulonephritis

B. in pyelonephritis

C. in congenitaldefectsoftheurinarytract

D. in healthy adolescents

E. in healthy newborns

3. Whatdiseaseisaccompaniedbypolyuria?

A. uricacidrenalinfarct

B. glomerulonephritis

C. pyelonephritis
D. diabetesinsipidus
E. cystitis

4. Atglomerulonephritisitisobserved:

A. increaseinsystolicbloodpressure
B. increase incentralvenouspressure
C. increaseinpulsepressure
D. increaseindiastolicbloodpressure
E. decreaseofcentralvenouspressure

5. Reductionofglomerularfiltrationischaracteristicfor:

A. cystitis
B. pyelonephritis
C. glomerulonephritis
D. urethritis
E. urinarytractinfection

6. The syndromeof glomerulonephritisaccordingurinalysisis characterizedbythefollowingsymptoms, except for:

A. macrohematuria
B. significantproteinuria
C. cylindruria
D. significantpyuria
E. epiteliuria

7. The syndromeofpyelonephritisaccordingurinalysisis characterizedbythefollowingsymptoms, except for:

A. macrohematuria
B. bacteriuria
C. reduceof transparency
D. pyuria
E. epiteliuria

8. Clinicalmanifestationsofacutekidneyinjuryare:

A. oliguriawiththetransitiontoanuria
B. convulsions
C. nauseaandvomiting
D. thirst
E. alloftheabove

9. The manifestationsofchronickidneydiseaseare:

A. polyuria
B. nocturia
C. hypostenuria
D. hypokalemia
E. alloftheabove

10. Clinicalmanifestationsofchronickidneydiseaseare:

A. muscleweakness
B. drymouth
C. headache, lossofappetite
D. thesmellofurinewhilebreathing
E. alloftheabove

Standardsofanswers:

1	A	3	D	5	C	7	A	9	E
2	E	4	A	6	D	8	E	10	E

VII.2. Materials for methodological support for the basic stage of class:

1. List of practical tasks:

1. To master the technique of assessment urinalysis.

2. To study the main clinical symptoms of urinary tract lesions.

2. Professional algorithms for training in practical skills.

№	Tasks	Instructions	
1.	To master the technique of assessment urinalysis	Microscopic changes in urinary sediment: protein-, hemat-,	P t n

		leukocyte-, cylinder-, crystal-, bacteriuria.	o n p
2.	Tostudythemainclinicalsymptomsofurinarytractlesions	Characterize in the following order: 1. Complaints 2. Changes in the objective examination 3. Changes in urinalysis,Zimnitskiy'stest	P c n i

VII.3. Materials of control for the final stage of the class:

Situational tasks (examples):

*Task 1.*Thechildis 10 yearsold, sickedsince 6 years.theconditionworsenedinrecentweeks; complainsoffatigue, lossofappetite, lowmobility, weightloss, headache, nausea, muscleweakness, convulsions. Theskinisdry, pastyface, edamaon thelegs, itchingskin. Bloodpressureis 180/100 mm. Hg, excretesurineupto 500 ml perday, therelativedensityofurine is 1010-1012, protein – 2,17 g/l; L-5-8, in m/f, leacheder.– 40-50 in m/f,bloodcreatinine - 177 mmol/l, 17 ketosteroids ofurine – 10.1 mmol/day. Whatistheclinicalsyndromeismostlikelyinthischild?

*Task 2.*Patient 6 yearsold, wasadmittedtothehospitalwithcomplaintsofweakness, fatigue, headache,pastyface. Twoweeks agohehadacute tonsillitis.Skinis pale, bloodpressure - 160/90 mm Hg,dailyamountofurine – 500 ml,colorof urineis "meatwashes", therelativedensityofurineis1009-1015, protein – 1.2 g/l,inthesediment: L - 3.5 in m/f, er - coverallfields. Whichdiseaseismostlikelyinthischild?

*Task 3.*Patient10 yearsold, wasadmittedtothehospitalwithcomplaintsof a dullpaininthelumbarregion, thebodytemperature - 38°C, paleskin, edamadoesnotoccur. Bloodpressure is 100/70mm Hg, ESR - 22 mm/h. Dailyamountofurineis 1300 ml, theurineismuddy, the relative density is 1009-1020,protein - 0,099 g/l, sediment: L- 50-80 in m/f, er. - 5.7 in m/f. Whichdiseaseismostlikelyinthischild?

Standardsofanswers:

Task 1.

1. Thesyndromeofchronicrenalfailure

Task 2.

1. Glomerulonephritis

Task 3.

1. Pyelonephritis

VII.4. Materials of methodical support for self-preparation of students:

Indicative chart for independent work of students with educational literature

Educationaltasks	Instructionsforthetask
To know the normative indicators of general urine analysis and Nechiporenko's test	Tobeabletoassessthephysicalandchemicalproperties andmicroscopyurinarysediment.
Toknowthenormativeindicatorsof Zymnitsky's test	Tobeabletoassesstheconcentrationandexcretoryfunctionofthekidneys.
Tostudythemainclinicalmanifestationsofurinarytractlesions	To knowtheclinicalmanifestationsandchangesinurine

VIII. Literature

Basic:

19. Kapitan T. Propaedeutics of children's diseases and nursing of the child: [Textbook for students of higher medical educational institutions]; 4th edition, updated and translated in English / T. Kapitan – Vinnitsa: The State Cartographical Factory, 2012. – P. __

Additional:

1. Pediatric physical examination: textbook for students of higher educational institutions/ O.V. Katilov, D.V. Dmytriiev – Vinnytsia: Nova Knyha, 2018. – 504p.

2. Introduction to pediatrics: Methods of examination of the child and semiotics of childhood diseased /S. Ilchenko, K. Duka, T. Yaroshevska, O. Koreniuk, N. Mishina, V. Cherginets. – Dnepropetrovsk, 2013. – P. __

3. Nelson textbook of pediatrics. – 18th ed./ edited by Robert M. Kliegman. Part II. Growth, development and behavior // www.mdconsult.com

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5	Neonatal examination (EPC) Neonatal reflexes	41
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