

**MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS**  
Educational Institution  
**BELARUSIAN STATE MEDICAL UNIVERSITY**

**Контрольный  
экземпляр**

**APPROVED**

by Vice-rector for academic work

Y.A.Sokolov

15.11.2023

Reg. # UD-07-30/2324/edu.



**ENDODONTICS**

**Curriculum of educational institution  
in the academic discipline for the specialty:**

**1-79 01 07 «Dentistry»**

Curriculum is based on the educational program «Endodontics», approved 15.11.2023, registration # \_\_\_\_\_; on the educational plan in the specialty 1-79 01 07 «Dentistry», approved 17.05.2023, registration # 7-07-0911-03/2324/mf.

**COMPILERS:**

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**RECOMMENDED FOR APPROVAL:**

by the Department of Endodontics of the educational institution «Belarusian State Medical University»  
(protocol # 2 of 19.09.2023);

by the Scientific and Methodological Council of the educational institution «Belarusian State Medical University»  
(protocol # 11 of 15.11.2023)

## EXPLANATORY NOTE

«Endodontics» – the academic discipline of the module «Therapeutic Dentistry», which contains systematized scientific knowledge about the structure of pulp and periapical tissues of tooth, mechanisms of development, clinical manifestations of the diseases of pulp and periapical tissues, methods of their diagnosis, treatment and prevention.

The aim of the discipline «Endodontics» is the formation of specialized competences for solving the issues of professional activity in the field of diagnosis, treatment and comprehensive dental care of patients with the diseases of dental pulp and periapical tissues, development of skills and clinical thinking.

The objectives of the discipline «Endodontics» are to form students' scientific knowledge about the structure of dental pulp and periapical tissues, mechanisms of development and clinical manifestations, classification, methods of diagnosis, treatment and prevention of the diseases of pulp and periapical tissues of tooth, skills and abilities necessary for:

- examination of patients with dental pulp and periapical tissues' diseases;
- diagnosis of the diseases of dental pulp and periapical tissues;
- interpretation of the results of clinical, physical, instrumental diagnostic (radiological) and other additional methods of examination;
- planning and implementation of comprehensive treatment for patients with the diseases of dental pulp and periapical tissues;
- evaluation of treatment results in patients with the diseases of dental pulp and periapical tissues during medical observation;
- prevention and elimination of predisposing risk factors for the development of the diseases of pulp and periapical tissues of tooth, leading to impairment of health, function, aesthetics of teeth and surrounding tissues.

The knowledge, skills, and abilities acquired during the study of the academic discipline «Endodontics» are necessary for successful mastering of the following academic disciplines or modules: «Periodontology», «Therapeutic Dentistry», «Prosthetic Dentistry», «Maxillofacial Surgery and Oral Surgery»

Studying the educational discipline «Endodontics» should ensure the formation of students' specialized competency:

SC. Conduct examination, apply diagnostic methods, differential diagnostics, formulate a clinical diagnosis, apply modern technologies for the treatment and prevention of caries and its complications (pulpitis, periodontitis), other diseases of the hard tissues of the teeth, the oral mucosa in adults; define a comprehensive plan of dental treatment.

**As a result of studying the discipline «Endodontics» the student should know:**

- the basic concepts in endodontics;
- structure and functions of pulp and periapical tissues of the tooth in health and disease;
- factors affecting the state of the dental pulp and periapical tissues;

international terminology and classification of the diseases of dental pulp and periapical tissues;

mechanism of development, clinical picture of the diseases of dental pulp and periapical tissues;

methods of clinical examination and planning of treatment of the diseases of dental pulp and periapical tissues;

principles of differential diagnosis and treatment of the diseases of dental pulp and periapical tissues;

clinical protocols for the diagnosis and treatment of dental pulp and periapical tissue diseases;

dental instruments, medicines and filling materials used for the treatment of the diseases of dental pulp and periapical tissues;

methods of evaluating the effectiveness of therapeutic measures in treatment of the diseases of dental pulp and periapical tissues;

methods of prevention and elimination of predisposing risk factors of the diseases of dental pulp and periapical tissues;

medical documentation in dental office, department and clinic;

contemporary directions of scientific research in the field of endodontics in Belarus and abroad;

the rules of medical ethics and deontology;

**be able to:**

create mutual understanding with the patient, respecting medical ethical principles in communication and actions;

organize an ergonomic dental practitioner's workplace for endodontic treatment;

assess the patient's general condition before and during the diagnostic and treatment procedures;

carry out clinical examination of the patient with the diseases of dental pulp and periapical tissues;

interpret the results of clinical, physical, instrumental diagnostic (radiological) and other additional methods of examination in endodontics;

justify the diagnosis of the diseases of dental pulp and periapical tissues;

apply protocols for treatment of patients with the diseases of dental pulp and periapical tissues;

predict the results of treatment of the diseases of dental pulp and periapical tissues;

provide a plan of comprehensive treatment of the diseases of dental pulp and periapical tissues including prosthetic, surgical, physiotherapeutic and other measures;

provide a plan and carry out prevention of the diseases of dental pulp and periapical tissues;

provide medical documentation in dental office, department, clinic;

provide medical assistance in the treatment of the diseases of dental pulp and periapical tissues that pose a threat to human life and (or) health;

**master:**

the methods of prevention and elimination of conditions for the occurrence of the diseases of dental pulp and periapical tissues;

the methods of examination of patients with the diseases of dental pulp and periapical tissues, differential diagnosis;

the methods of diagnosis and treatment planning of the diseases of dental pulp and periapical tissues;

the methods of vital pulp therapy;

the methods of endodontic treatment procedures;

the methods of restoring the anatomical and functional integrity of the tooth after endodontic treatment;

the methods of integrating endodontics with other components of the patient's treatment plan (periodontics, prosthetics, surgery, etc.);

diagnostic skills in treatment of the diseases of dental pulp and periapical tissues.

**Total number** of hours for the study of the discipline is 424 academic hours. Classroom hours according to the types of studies: lectures – 20 hours, practical classes – 240 hours, student independent work (self-study) – 164 hours.

Intermediate assessment is carried out according to the syllabus of the specialty in the form of a credit (7, 10 semester), and examination (9 semester).

Form of higher education – full-time.

### ALLOCATION OF ACADEMIC TIME ACCORDING TO SEMESTERS OF STUDY

Code, name of the specialty	semester	Number of academic hours					Form of intermediate assessment
		total	in-class	including		out-of-class self-studies	
				lectures	practical classes		
<b>1-79 01 07 «Dentistry»</b>	6	80	53	8	45	27	–
	7	52	34	4	30	18	credit
	8	58	32	–	32	26	–
	9	138	92	8	84	46	examination
	10	96	49	–	49	47	credit
			<b>424</b>	<b>260</b>	<b>20</b>	<b>240</b>	<b>164</b>

## THEMATIC PLAN

Section (topic) name	Number of class hours	
	lectures	practical
<b>1. Introduction to the discipline «Endodontics». Medical ethics and deontology in endodontics</b>	<b>1,33</b>	<b>6</b>
<b>2. Anatomical, histological and functional features of the dentine-pulp complex and periradicular tissues of tooth in health and disease</b>	–	<b>6</b>
<b>3. Mechanism of development, classification of the diseases of dental pulp and periapical tissues</b>	<b>1,33</b>	<b>3</b>
<b>4. Diagnosis of the diseases of dental pulp and periapical tissues</b>	–	<b>20</b>
<b>5. Diseases of dental pulp and periapical tissues. Differential diagnosis</b>	<b>2,66</b>	<b>24</b>
5.1.Differential diagnosis of the diseases of dental pulp	1,33	12
5.2.Differential diagnosis of the diseases of periapical tissues of tooth	1,33	9
5.3.Differential diagnosis of the diseases of dental pulp and periapical tissues	–	3
<b>6. Planning and implementation of endodontic treatment</b>	<b>14,63</b>	<b>160</b>
6.1.Planning of treatment of dental pulp and periapical tissues' diseases of permanent teeth	1,33	3
6.2.Anesthesia in endodontic dental treatment	1,33	3
6.3.Operating field isolation methods in endodontics	–	3
6.4.Methods of vital pulp therapy	–	3
6.5.Creation of endodontic access to the root canal system	–	3
6.6.Medical assistance in endodontics for conditions that pose a threat to life and (or) health of a person	–	3
6.7.Preparation of the root canal system for obturation	2,66	16
6.8.Methods of obturation the root canal system of teeth	1,33	12
6.9.Methods of treatment of dental pulp diseases	–	6
6.10.Methods of treatment of periapical tissues' diseases of the tooth	–	6
6.11.Indications for endodontic retreatment and tooth-preserving surgery	–	4
6.12.Endodontic treatment in traumatic tooth injuries	1,33	7
6.13.Justification of postendodontic restoration of anatomical and functional integrity of tooth	1,33	7
6.14.Mistakes and complications in endodontic treatment	1,33	28
6.15.Pathological tooth resorption	1,33	14
6.16.Methods of endodontic treatment of pathological tooth resorption	–	7

Section (topic) name	Number of class hours	
	lectures	practical
6.17.Criteria for assessing the quality of endodontic treatment	1,33	7
6.18.Endodontic retreatment of teeth	1,33	7
6.19.Methods for correcting the shade of non-vital tooth	–	7
6.20.Application of physiotherapeutic factors in endodontic treatment steps	–	7
6.21.Odontogenic source of infection and focal disease	–	7
<b>7. Interdisciplinary approach in endodontic treatment</b>	–	<b>21</b>
<b>Total hours</b>	<b>20</b>	<b>240</b>

## CONTENT OF THE EDUCATIONAL MATERIAL

### **1. Introduction to the discipline «Endodontics». Medical ethics and deontology in endodontics**

Goals and objectives of the academic discipline «Endodontics». Basic terms and concepts in endodontics. Challenges of modern endodontic treatment. Normative and legal regulation of patient admission: clinical protocols for the diagnosis and treatment of diseases of the pulp and periapical tissues, approved by the Ministry of Health of the Republic of Belarus, the structure of the clinical protocol. Ethical and deontological aspects of a doctor's work during performing endodontic manipulations. The relationship between doctor and patient, doctor and medical employees. Possession of communication skills when interacting with a patient, adherence to medical ethics and deontology when performing endodontic treatment.

Requirements for organizing a dental appointment during endodontic treatment: ensuring the safety of the doctor, assistant and patient (asepsis and antisepsis during endodontic interventions). Purpose, principles and main objectives of ergonomics in endodontics. Ergonomic features of organizing the workplace of a dentist-therapist when performing endodontic manipulations. Development of practical skills in compliance with ergonomic requirements in the process of performing endodontic manipulations.

### **2. Anatomical, histological and functional features of the dentine-pulp complex and periradicular tissues of tooth in health and disease**

The structure and functioning of the dentine-pulp complex of tooth tissues: morphological zones of the pulp, metabolism, innervation, blood supply system, reparation, calcification. Reaction of the pulp to the carious process and dental interventions. The influence of aging factors and pathological conditions of the organism on the pulp. The structure and functioning of the periradicular complex of tooth tissues. Microbiology of endodontic infections. Biofilm. Types of endodontic infections. Primary intraradicular, secondary persistent intraradicular and extraradicular infections. Biological and biochemical processes occurring normally and during pathology in the pulp and periradicular tissues of the tooth.

### **3. Mechanism of development, classification of the diseases of dental pulp and periapical tissues**

Pathogenesis and pathological anatomy of the diseases of dental pulp and periapical tissues, features of the progress of the inflammatory process. Definition, mechanism of development, epidemiology of the diseases of dental pulp and periapical tissues. Clinic-morphological, clinical, statistical classifications of the diseases of dental pulp and periapical tissues.

#### **4. Diagnosis of the diseases of dental pulp and periapical tissues.**

General principles for diagnosing diseases of dental pulp and periapical tissues. Basic and additional diagnostic methods provided by clinical protocols. Examination of patients with the diseases of dental pulp and periapical tissues: getting of complaints and anamnesis of the disease. Probing, percussion, palpation, physical research methods: thermal pulp test (cold and heat), electric pulp test (EPT). Development of practical skills in conducting and interpreting the results of the cold and heat test, conducting and interpreting the results of EPT. Providing of medical documentation.

X-ray research methods for the diseases of dental pulp and periapical tissues: intraoral (targeted contact intraoral radiography of teeth), extraoral radiography (orthopantomography; computed tomography). Indications for X-ray diagnostic methods in endodontics, provided by clinical protocols. Radiological signs and criteria defining the diseases of dental pulp and periapical tissues. Possibilities and challenges of using cone beam computed tomography in endodontics. Development of practical skills in describing and interpreting data from X-ray research methods (contact dental intraoral radiographs, cone beam computed tomography).

Basic principles and methods of visualization in dentistry. Types and characteristics of modern visualization tools (mouth retractors, mirrors, intraoral cameras, binoculars, microscopes). Methods for expanding the working field and the use of optical systems during endodontic manipulations.

### **5. Diseases of dental pulp and periapical tissues. Differential diagnosis**

#### **5.1. Differential diagnosis of the diseases of dental pulp**

Clinical manifestations of pulp hyperemia. Examination of patients with pulp hyperemia: collection of complaints and anamnesis; clinical examination; Providing a plan for additional examination; interpretation of research results. Differential diagnosis of pulp hyperemia. Possible errors at the stage of diagnostics and differential diagnostics, methods of prevention.

Setting a diagnosis of «pulp hyperemia» in accordance with the classification provided by the clinical protocol. Providing of medical documentation.

Clinical manifestations of acute forms of pulpitis. Examination of patients with acute forms of pulpitis: collection of complaints and anamnesis; clinical examination. Providing a plan for additional examination, interpretation of research results. Differential diagnosis of acute forms of pulpitis, possible errors at the stage of diagnostics and differential diagnostics, methods of prevention.

Setting diagnosis of «acute pulpitis», «purulent pulpitis» in accordance with the classification provided by the clinical protocol. Providing of medical documentation.



Clinical manifestations of chronic forms of pulpitis. Examination of patients with chronic forms of pulpitis: collection of complaints and anamnesis; clinical examination; Providing a plan for additional examination; interpretation of research results. Differential diagnosis of chronic forms of pulpitis, possible errors at the stage of diagnostics and differential diagnostics, methods of prevention.

Setting a diagnosis of «chronic pulpitis», «chronic ulcerative pulpitis», «chronic hyperplastic pulpitis» in accordance with the classification provided by the clinical protocol. Providing of medical documentation.

Clinical manifestations of pulp necrosis. Examination of patients with pulp necrosis: collection of complaints and anamnesis; clinical examination; Providing a plan for additional examination; interpretation of research results. Differential diagnosis, possible errors at the stage of diagnostics and differential diagnostics of pulp necrosis, methods of prevention.

Setting a diagnosis of «pulp necrosis» in accordance with the classification provided by the clinical protocol. Providing of medical documentation.

Clinical manifestations of pulp degeneration. Examination of patients with pulp degeneration: collection of complaints and anamnesis; clinical examination; Providing a plan for additional examination; interpretation of research results. Differential diagnosis, possible errors at the stage of diagnostics and differential diagnostics of pulp degeneration, methods of prevention.

Setting a diagnosis of «pulp degeneration» in accordance with the classification provided by the clinical protocol. Providing of medical documentation.

## **5.2. Differential diagnosis of the diseases of periapical tissues of tooth**

Clinical manifestations of acute forms of diseases of periapical tissues. Examination of patients with acute apical periodontitis: collection of complaints and anamnesis; clinical examination; Providing a plan for additional examination; interpretation of research results. Differential diagnosis, possible errors at the stage of diagnostics and differential diagnostics of acute apical periodontitis, methods of prevention.

Setting a diagnosis of «acute apical periodontitis» in accordance with the classification provided by the clinical protocol. Providing of medical documentation.

Clinical manifestations of chronic apical periodontitis. Examination of patients with chronic apical periodontitis: collection of complaints and anamnesis; clinical examination; Providing a plan for additional examination; interpretation of research results. Differential diagnosis, possible errors at the stage of diagnostics and differential diagnostics of chronic apical periodontitis, methods of prevention.

Setting a diagnosis of «chronic apical periodontitis» in accordance with the classification provided by the clinical protocol. Providing of medical documentation.

Examination of patients with periapical abscess without sinus and periapical abscess with sinus: collection of complaints and anamnesis; clinical examination; providing a plan for additional examination; interpretation of research results. Differential diagnosis, possible errors at the stage of diagnostics and differential diagnostics of periapical abscess without sinus and periapical abscess with sinus, methods of prevention.

Setting a diagnosis of «periapical abscess without sinus», «periapical abscess with sinus» in accordance with the classification provided by the clinical protocol. Providing of medical documentation.

### **5.3. Differential diagnosis of the diseases of dental pulp and periapical tissues**

Diagnostic criteria for diagnosing the diseases of dental pulp and periapical tissues of permanent teeth. Signs and criteria that define pulp diseases, an algorithm for the differential diagnostics of acute and chronic forms of pulp diseases. Signs and criteria that determine the diseases of periapical tissues of permanent teeth, an algorithm for the differential diagnostics of acute and chronic forms of the diseases of periapical tissues. Basic and additional methods of differential diagnostics provided by clinical protocols. Possible errors in the diagnostics of the diseases of dental pulp and periapical tissues, methods of prevention.

## **6. Planning and implementation of endodontic treatment**

### **6.1. Planning of treatment of dental pulp and periapical tissues' diseases of permanent teeth**

Basic principles, goals and objectives of endodontic treatment. Principles of treatment of the diseases of dental pulp and periapical tissues of permanent teeth. Justification of therapeutic manipulations aimed at preserving the vitality of pulp. Planning of endodontic treatment of patients with the diseases of dental pulp and periapical tissues. The influence of physical status, general somatic pathology and certain medical conditions on the planning and prognosis of endodontic treatment. Planning of endodontic treatment during pregnancy. Interdisciplinary treatment planning. Development of practical skills in providing a treatment plan for a patient with the diseases of dental pulp and periapical tissues of permanent teeth.

### **6.2. Anesthesia in endodontic dental treatment**

Anesthesia methods used during endodontic dental treatment. General rules for local anesthesia. Medical indications and contraindications, criteria for choosing local anesthetics. Choosing a method of local anesthesia during endodontic manipulations. Features of the methods of injection anesthesia at the stages of endodontic treatment, technique of implementation.

Emergency conditions. Prevention of the development of emergency conditions at a dental appointment during the treatment of the diseases of dental pulp and periapical tissues of the tooth. Diagnostics and provision of medical care in emergency conditions: acute vascular failure (fainting, collapse, shock), acute respiratory failure, bronchial asthma, allergies, anaphylaxis. Development of practical skills in choosing a method and performing local anesthesia during endodontic manipulations.

### **6.3. Operating field isolation methods in endodontics**

Methods of partial and complete isolation of the operating field. Advantages and disadvantages of using isolation systems, indications for use. Selection of methods for isolating the operating field during endodontic manipulations. The method of application a rubber dam system depending on the clinical situation during endodontic manipulations. Development of practical skills in isolating the operating field during endodontic manipulations (application of rubber dam systems).

#### **6.4. Methods of vital pulp therapy**

Methods for preserving pulp vitality: vital pulp therapy. Goals, objectives and basic principles of the method. Indications for the use of the indirect pulp capping method. Mandatory and additional therapeutic measures in accordance with clinical protocols. Indications for the use of direct pulp capping and partial pulpotomy. Mandatory and additional therapeutic measures in accordance with clinical protocols. Selection of material for indirect and direct pulp capping. General and local contraindications to vital pulp therapy. Medical monitoring of treatment results.

#### **6.5. Creation of endodontic access to the root canal system**

Creation of access to the orifices of root canals during the treatment of endodontic and periapical pathologies, taking into account the anatomical and topographical features of pulp chambers of different functional groups of teeth. Preparation and opening of pulp chamber. Instruments for preparation of root canal orifices, rules of their usage. Methods for navigation of root canals and determining of working length. Practicing practical skills in creating access, detecting and expanding of root canals orifices; removal of pulp; determining the working length of root canals of teeth.

#### **6.6. Medical assistance in endodontics for conditions that pose a threat to life and (or) health of a person**

Indications for emergency measures in endodontic practice. Clinical manifestations of emergency conditions in the diagnosis and treatment of the diseases of dental pulp and periapical tissues. General diagnostic principles and algorithm of actions for pain, inflammation, bacteremia, local and systemic spread of infection in patients with the diseases of dental pulp and periapical tissues. Planning and determining the scope of emergency care for vital, necrotic and infected pulp, acute apical periodontitis, periapical abscess. Methods of providing emergency care in endodontics. Indications for surgical treatment of the diseases of dental pulp and periapical tissues, emergency hospitalization. Development of practical skills in choosing a method and performing local anesthesia during endodontic manipulations, creating access, detecting and expanding the orifices of root canals, extirpation of root pulp, determining the working length of the root canal of a tooth, instrumentation of root canals, medical treatment of root canals, filling root canals with pastes for temporary obturation.

#### **6.7. Preparation of the root canal system for obturation**

Goals and objectives of instrumentation of the root canal. Methods of instrumentation of root canals. Working rules for endodontic instruments. Clinical indications for the choice of instrumentation technique and instruments. Quality criteria for preparation of the root canal system for obturation. Mistakes and complications that occur during the stages of instrumentation of the root canal. Clinical manifestations, methods of elimination. Goals and objectives of medical treatment of root canals of teeth. Methods of medical treatment of root canals. Agents, rules and sequence of use of agents for irrigation. Clinical indications for the choice of irrigation technique. Quality criteria for medical treatment of root canals of teeth. Mistakes and complications that occur during the stages of medical treatment of the root canal. Clinical manifestations, methods of elimination. Development of

practical skills in instrumentation of the root canal (choice of instrumentation technique and instruments), medical treatment of the root canal, choice of antiseptic.

### **6.8. Methods of obturation the root canal system of teeth**

Goals and objectives of obturation the root canal system. Preparing the root canal for obturation. Clinical rationale for the choice of materials and methods for obturation of root canals. Requirements for materials for obturation of root canals, indications for use. Methods of obturation of root canals of teeth with materials for temporary obturation. Methods and techniques for permanent obturation of the root canal using gutta-percha, sealers in combination with various methods of insertion and condensation. Sealing of orifices of canals. Mistakes and complications that occur during the root canal obturation stage. Clinical manifestations, methods of elimination. Prevention of complications. Development of practical skills in obturation of root canals with pastes for temporary obturation, obturation of root canals with gutta-percha points using the lateral condensation method.

### **6.9. Methods of treatment of dental pulp diseases**

Goals and objectives of treatment of pulp diseases in permanent teeth. Treatment methods for pulpitis that exclude preservation of pulp vitality. Vital extirpation method. Indications for use. The sequence of endodontic manipulations in the treatment of pulp diseases using the vital extirpation method. Contraindications to the method of vital pulp extirpation. Indications for the use of non-vital extirpation. Devitalizing agents, complications of their usage. The sequence of endodontic manipulations in the treatment of pulp diseases using the method of non-vital extirpation. Justification of the limitations of using the method. Mandatory and additional therapeutic measures in accordance with clinical protocols in the treatment of patients with the diseases of dental pulp of permanent teeth. Medical monitoring of treatment results. Prognosis. Practicing the practical skill of opening of pulp chamber and applying a devitalizing paste, opening of pulp chamber, vital amputation of pulp and performing the stages of endodontic treatment.

### **6.10. Methods of treatment of periapical tissues' diseases of the tooth**

Goals and objectives of treatment of periapical tissues' diseases in permanent teeth. Absolute and relative contraindications to conservative methods of treatment. Treatment algorithm, sequence of endodontic manipulations in the treatment of acute and chronic forms of periapical tissues' diseases. Mandatory and additional therapeutic measures in accordance with clinical protocols in the treatment of patients with periapical tissues' diseases in permanent teeth. Indications for conservative surgical methods of treatment, tooth-preserving operations. Medical monitoring of treatment results. Prognosis. Practicing practical skills in performing stages of endodontic treatment.

### **6.11. Indications for endodontic retreatment and tooth-preserving surgery**

Reasons for progression or relapse of the disease after primary endodontic treatment. Persistent intraradicular and extraradicular infections, foreign body reaction, true cysts. Diagnosis, treatment planning. Prognosis. Determination of indications for endodontic retreatment without the use of surgery. Indications for periradicular surgery and tooth-preserving surgery.

### **6.12. Endodontic treatment in traumatic tooth injuries**

Clinical manifestations of complicated crown fracture, crown-root fracture, root fracture, tooth luxation. Examination of patients: collection of complaints and anamnesis; clinical examination; providing a plan for additional examination; interpretation of research results. Setting a diagnosis in accordance with the classification provided by the clinical protocol, differential diagnostics, possible mistakes at the stage of diagnostics and differential diagnostics, methods of prevention.

Treatment planning. Indications for endodontic treatment for traumatic injuries in permanent teeth, choice of material, algorithm of treatment stages. Mandatory and additional therapeutic measures in accordance with clinical protocols. Prognosis and biological consequences. Medical supervision. Providing of medical documentation.

### **6.13. Justification of postendodontic restoration of anatomical and functional integrity of tooth**

Features of the structure of tooth tissues after endodontic treatment. Biomechanical assessment of the tooth, biomechanical strategy for restorative treatment. Examination of patients after endodontic treatment. Determination and interpretation of the occlusal surface destruction index of the tooth, selection of a method for restoring the anatomical and functional integrity of the tooth in accordance with clinical protocols (restoration, dental prosthesis).

Therapeutic treatment measures: filling a tooth cavity after endodontic treatment using composite materials, compomers, giomers in combination with lining material or in combination with intracanal posts. Providing of medical documentation. Development of practical skills in determining and interpreting of the occlusal surface destruction index of the tooth and justifying the choice of method for restoring the anatomical and functional integrity of the tooth; restoration of the anatomical and functional integrity of the tooth after endodontic treatment.

### **6.14. Mistakes and complications in endodontic treatment**

Mistakes at the stages of diagnosis and treatment planning for the diseases of dental pulp and periapical tissues of the tooth. Mistakes and complications at the stages of endodontic treatment. Perforation of the wall, bottom of the pulp chamber, root canal of the tooth. Causes, prevention methods, strategy. Causes of endodontic instrument failure in the root canal. Factors influencing the success of extracting instrument fragments from root canals. Methods for removing instrument fragments from the root canal. Reasons for the formation of a ledge, extrusion of obturation material beyond the apical foramen of the root canal, methods of prevention, methods of elimination.

### **6.15. Pathological tooth resorption**

Classification, criteria and signs of pathological tooth resorption. Mechanism of development of external and internal tooth resorption. Clinical manifestations. Basic principles of diagnostics, mandatory and additional diagnostic measures in accordance with clinical protocol. Setting a diagnosis in accordance with the classification provided by the clinical protocol. General principles of medical

prevention and planning of complex treatment of pathological tooth resorption. Providing of medical documentation.

### **6.16. Methods of endodontic treatment of pathological tooth resorption**

Indications for endodontic treatment of pathological resorption. Examination of patients with external and internal pathological tooth resorption: collection of complaints and anamnesis; clinical examination; providing a plan for additional examination; interpretation of research results. Treatment planning. Mandatory and additional therapeutic measures in accordance with clinical protocol. Features of the implementation of stages of endodontic treatment for pathological resorption, selection of materials and methods, determination of the time of medical supervision. Providing of medical documentation.

### **6.17. Criteria for assessing the quality of endodontic treatment**

Modern quality standard for endodontic treatment. Basic criteria for the quality of endodontic treatment. Factors influencing the outcome of endodontic treatment. Criteria for assessing the quality of endodontic treatment: subjective and objective criteria for treatment results. Clinical criteria for the quality of endodontic treatment: parameters for assessing sensitivity during percussion and palpation, pathological tooth mobility, periradicular pathology, signs of inflammation, patient complaints. X-ray criteria for the quality of endodontic treatment: parameters for assessing the quality of root canal obturation in terms of length, uniformity and density. Index assessment of endodontic status, X-ray parameters. Evaluation of the results of endodontic treatment: concepts of partial and complete reparation, progression of pathology. Functional criteria for the quality of endodontic treatment. Determining the time of the control examination. Development of practical skills in determining the time of medical observation and assessing the quality of treatment for the diseases of dental pulp and periapical tissues.

### **6.18. Endodontic retreatment of teeth**

Criteria and factors determining indications and contraindications for endodontic retreatment. Treatment planning. Features of the technique for performing treatment stages: creating repeated endodontic access, removing pin structures, restoring access to the apical region of the tooth canal. Methods of removing paste, gutta-percha, obturators, posts from the root canal, and extracting instrument fragments. Tools and agents, application features. Mistakes and complications at the stages of endodontic retreatment, methods of prevention and elimination. Quality assessment criteria. Development of practical skills in determining indications for endodontic retreatment and tooth-preserving surgery.

### **6.19. Methods for correcting the shade of non-vital tooth**

Causes of changes of the shade of non-vital tooth. Intracoronary teeth bleaching. Indications and contraindications for bleaching of teeth after endodontic treatment. Agents for intracoronary bleaching, methods of application. Methods of root canal isolation. Possible mistakes and complications. Prognosis. Shade-neutralizing technique for making veneers when the color of a non-vital tooth is changed.

### **6.20. Application of physiotherapeutic factors in endodontic treatment steps**

Physiotherapeutic factors: types, indications for use in endodontics. The use of ultrasound at the stages of endodontic treatment. Methodology for creating access

to root canals, searching of root canal orifices, removing pin structures, removing fragments of instruments, irrigating root canals, extracting obturation material. The use of laser radiation at the stages of endodontic treatment. Methods of using laser radiation to prepare the root canal for obturation and activation of irrigation solutions. Photodynamic therapy. The use of ozone for additional disinfection of tooth root canals. The use of physiotherapeutic factors for elimination pain appearing after endodontic treatment. Contraindications to the use of physiotherapeutic factors in endodontics, prevention of mistakes and complications.

#### **6.21. Odontogenic source of infection and focal disease**

Determination of the odontogenic source of infection and focal disease. Acute and chronic sepsis. The influence of odontogenic source of infection on the human organism. Diseases of patients with risk of bacteremia. Indications for prescribing systemic antibacterial therapy for conservative surgical methods of endodontic treatment in patients with concomitant systemic diseases. The use of medicines during endodontic treatment and in the postoperative period. Determination of medical indications for consultation with a medical specialist in accordance with protocols for the treatment of the diseases of dental pulp and periapical tissues in permanent teeth.

#### **7. Interdisciplinary approach in endodontic treatment**

Planning for comprehensive dental rehabilitation of patients. Modern concept of preserving teeth involved in the odontogenic destructive process in periapical tissues. Tooth-preserving biotechnologies: development prospects. Interdisciplinary interaction in planning treatment of patients with diseases of the dental pulp and periapical tissues of tooth. Methods of endodontic treatment at the stages of surgical treatment when performing tooth-preserving operations. Purpose of retrograde root canal filling, indications, technique. Endodontic-endosseous implantation, transdental implantation. Interdisciplinary planning of endodontic treatment in the provision of prosthodontics care. Determination of indications for endodontic treatment when planning prosthodontic treatment. Regenerative endodontic procedures. Application of cell technologies in comprehensive treatment of the diseases of dental pulp and periapical tissues.

## ACADEMIC DISCIPLINE CURRICULAR CHART

Section, topic #	Section (topic) name	Number of hours		Self-studies	Form of control
		lectures	practical		
	<b>6 semester</b>				
<b>1.</b>	<b>Introduction to the discipline «Endodontics». Medical ethics and deontology in endodontics</b>	<b>1,33</b>	<b>6</b>	<b>4</b>	
	Endodontics. Basic terms and concepts. Regulatory and legal framework of patient admission	1,33	–	–	Taking notes of original sources
	Objectives of contemporary endodontic treatment. Medical ethics and deontology in endodontics	–	3	2	Interview, electronic tests, practical skill demonstration
	Requirements for the organization of patient reception for endodontic treatment. Principles and requirements for ergonomic endodontic manipulations	–	3	2	Interview, electronic tests, practical skill demonstration
<b>2.</b>	<b>Anatomical, histological and functional features of the dentine-pulp complex and periradicular tissues of tooth in health and disease</b>	–	<b>6</b>	<b>4</b>	
	Structure and functioning of dentine-pulp complex and periradicular tissues of the tooth	–	3	2	Interview, electronic tests, taking notes of original sources
	Microbiology of root canal system in the diseases of dental pulp and periapical tissues	–	3	2	Interview, electronic tests, taking notes of original sources
<b>3.</b>	<b>Mechanism of development, classification of the diseases of dental pulp and periapical tissues</b>	<b>1,33</b>	<b>3</b>	<b>1</b>	
<b>4.</b>	<b>Diagnosis of the diseases of dental pulp and periapical tissues</b>	–	<b>6</b>	<b>3</b>	
	Basic and additional methods of diagnosis of the diseases of dental pulp and periapical tissues	–	3	1	Interview, electronic tests, practical skill demonstration, taking notes of original sources



	Radiological methods of diagnosis in endodontics						Interview, electronic tests, practical skill demonstration, taking notes of original sources
5.	<b>Diseases of dental pulp and periapical tissues. Differential diagnosis</b>	<b>2,66</b>	<b>24</b>	<b>3</b>	<b>2</b>	<b>13</b>	
5.1.	<i>Differential diagnosis of the diseases of dental pulp</i> Pulp hyperemia. Acute pulpitis, purulent pulpitis	1,33	–	–	5	1	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
	Chronic pulpitis. Chronic ulcerative pulpitis, chronic hyperplastic pulpitis	–	3	3	1	1	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
	Pulp necrosis	–	3	3	1	1	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
	Pulp degeneration	–	3	3	2	2	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
5.2.	<i>Differential diagnosis of the diseases of periapical tissues of the tooth</i> Acute apical periodontitis	1,33	–	–	6	6	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
	Chronic apical periodontitis	–	3	3	2	2	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources

	Periapical abscess without sinus. Periapical abscess with sinus			3	2	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
5.3.	<i>Differential diagnosis of the diseases of dental pulp and periapical tissues</i>			3	2	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
6.	<b>Planning and implementation of endodontic treatment</b>	2,66		–	2	
6.1.	Planning of treatment of pulp and periapical tissues' diseases of permanent teeth	1,33		–	1	Taking notes of original sources
6.2.	Anesthesia in endodontic dental treatment	1,33		–	1	Taking notes of original sources
	<b>7 semester</b>					
6.	<b>Planning and implementation of endodontic treatment</b>	3,99		30	18	
6.1.	Planning of treatment of pulp and periapical tissues' diseases of permanent teeth	–		3	1	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
6.2.	Anesthesia in endodontic dental treatment	–		3	2	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
6.3.	Operating field isolation methods in endodontics	–		3	2	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
6.4.	Methods of vital pulp therapy	–		3	2	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources

6.5.	Creation of endodontic access to the root canal system	-	3	2	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
6.6.	Medical assistance in endodontics for conditions that pose a threat to life and (or) health of a person	-	3	2	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
6.7.	<i>Preparation of the root canal system for obturation</i>	2,66	-	2	
	Instrumentation of the root canals	1,33	-	1	Taking notes of original sources
	Medical treatment of the root canals	1,33	-	1	Taking notes of original sources
6.8.	Methods of obturation the root canal system of teeth	1,33	-	1	Taking notes of original sources
6.9.	<i>Methods of treatment of dental pulp diseases</i>	-	6	2	
	Treatment of pulpitis by means of vital pulp extirpation	-	3	1	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
	Treatment of pulpitis by means of devital pulp extirpation	-	3	1	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
6.10.	<i>Methods of treatment of periapical tissues' diseases</i>	-	6	2	
	Treatment of acute and chronic forms of apical periodontitis	-	3	1	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
	Treatment of periapical abscess	-	3	1	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources. Credit.

8 semester					
<b>6.</b>	<b>Planning and implementation of endodontic treatment</b>	-			
6.7.	<i>Preparation of the root canal system for obturation</i>	-	16	14	
	Instrumentation of the root canals	-	4	4	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
	Mistakes and complications during instrumentation of the root canal	-	4	4	Interview, electronic tests, clinical case studies, taking notes of original sources
	Medical treatment of the root canals	-	4	2	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
	Mistakes and complications during medical treatment of the root canal	-	4	4	Interview, electronic tests, clinical case studies, taking notes of original sources
6.8.	<i>Methods of obturation the root canal system of teeth</i>	-	12	10	
	Methods and techniques of temporary obturation of the root canals	-	4	4	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
	Methods and techniques of permanent obturation of the root canals	-	4	4	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
	Mistakes and complications during obturation of the root canals. Prevention of complications	-	4	2	Interview, electronic tests, clinical case studies, taking notes of original sources
6.11.	Indications for endodontic retreatment and tooth-preserving surgery	-	4	2	Interview, electronic tests, clinical case studies, taking notes of original sources



	Classification, mechanism of development, criteria and features of pathological tooth resorption	-	7	3	Interview, electronic tests, clinical case studies, taking notes of original sources
	Basic principles of medical prevention and planning of pathological root resorption comprehensive treatment	-	7	3	Interview, electronic tests, clinical case studies, taking notes of original sources
6.16	Methods of endodontic treatment of pathological tooth resorption	-	7	4	Interview, electronic tests, clinical case studies, taking notes of original sources
6.17	Criteria for assessing the quality of endodontic treatment	1,33	7	3	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources
6.18	Endodontic retreatment of teeth	1,33	7	3	Interview, electronic tests, practical skill demonstration, clinical case studies, taking notes of original sources. Examination
	<b>10 semester</b>				
4.	<b>Diagnosis of the diseases of dental pulp and periapical tissues</b>	-	7	7	
	Methods of visualization the operating field in endodontic practice	-	7	7	Interview, electronic tests, clinical case studies, taking notes of original sources
6.	<b>Planning and implementation of endodontic treatment</b>	-	21	25	
6.20	Methods for correcting the shade of non-vital tooth	-	7	10	Interview, electronic tests, clinical case studies, taking notes of original sources
6.21	Application of physiotherapeutic factors in endodontic treatment	-	7	10	Interview, electronic tests, clinical case studies, taking notes of original sources
6.22	Dental infection site and focal disease	-	7	5	Interview, electronic tests, clinical case studies, taking notes of original sources



## INFORMATION AND INSTRUCTIONAL UNIT

### LITERATURE

#### **Basic (relevant):**

1. Казеко, Л. А. Терапевтическая стоматология. Клиническая эндодонтия = Therapeutic dentistry. Clinical endodontics : учебник / Л. А. Казеко, Е. Л. Колб, О. С. Городецкая. – Минск : Вышэйшая школа, 2022. – 238 с.

#### **Additional:**

2. Борисенко, Л. Г. Геронтостоматология = Geriatric dentistry : учеб.-метод. пособие. – Минск : БГМУ, 2019. – 35 с.

3. Захарова, И. А. Анестезия в клинике терапевтической стоматологии = Anesthesia in clinical therapeutic dentistry : учеб.-метод. пособие. – Минск : БГМУ, 2021. – 24 с.

4. Захарова, И. А. Неотложные состояния, общие заболевания и другие факторы риска в стоматологии = Emergency conditions, general diseases and other risk factors in dentistry: учеб.-метод. пособие – Минск : БГМУ, 2017. – 12 с.

5. Медикаментозная обработка системы корневых каналов зубов = Medical treatment of tooth root canal system : учеб.-метод. пособие / А. В. Бутвиловский [и др.]. – Минск : БГМУ, 2022. – 28 с.

6. Методы определения рабочей длины корневого канала = Methods of root canal working length determination : учеб.-метод. пособие / Т. Н. Манак [и др.]. – Минск : БГМУ, 2021. – 32 с.

7. Реставрационные материалы и техники. Эндодонтическое лечение = Restorative materials and techniques. Endodontic treatment : учеб.-метод. пособие / Т. Н. Манак [и др.] – Минск : БГМУ, 2020. - 48 с.

8. Bjrndal, L. Textbook of Endodontology, 3<sup>rd</sup> Edition / L. Bjrndal, L.-L. Kirkevang, J. Whitworth. – Wiley-Blackwell, 2018. – 504 p.

9. Hargreaves K.M. Cohen's Pathways of the Pulp, 11<sup>th</sup> Edition / К. М. Hargreaves, L. Н. Berman. – Elsevier, 2016. – 907 p.

#### **METHODOLOGICAL RECOMMENDATIONS FOR THE ORGANIZATION AND PERFORMANCE OF SUPERVISED STUDENT INDEPENDENT WORK IN THE ACADEMIC DISCIPLINE**

The time allotted for student independent work can be used for:

- preparation for the lectures and practical classes;
- preparation for the credits and examination on discipline;
- studying topics (issues) assigned for independent work;
- doing the case studies;
- research and creative assignments;
- preparation of thematic reports, essays, presentations;
- practical assignments;
- taking notes on academic literature;
- compiling a review of scientific literature;
- designing of information and demonstration materials (stands, posters, graphs, tables, newspapers, etc.);



compiling a thematic selection of original sources and Internet sources;  
creation of tests for the mutual control.

#### LIST OF AVAILABLE DIAGNOSTIC TOOLS

The following forms are used for competences assessment:

**Oral form:**

interview;  
practical skill demonstration.

**Written form:**

taking notes of original sources.

**Oral-written form:**

credit;  
examination;  
clinical case studies.

**Technical form:**

electronic tests.

**Simulation form:**

objective structured clinical examination.

#### LIST OF AVAILABLE TEACHING METHODS

Traditional method (lecture, practical classes);

Active (interactive) methods:

Problem-Based Learning (PBL);

Team-Based Learning (TBL);

Case-Based Learning (CBL);

Research-Based Learning (RBL).

training based on simulation technologies.

#### LIST OF PRACTICAL SKILLS

Name of practical skill	Forms of practical skill check/monitoring
1. Communication skills in interaction with the patient, compliance with medical ethics and deontology when performing endodontic treatment	Practical skill implementation at the dental chair. Solving a situational task. Completing dental outpatient records of the patient
2. Execution of medical documentation at therapeutic appointment for treatment of dental pulp and apical periodontal diseases	Practical skill implementation at the dental chair. Solving a situational task. Completing dental outpatient records of the patient
3. Compliance with the requirements of ergonomics in performing endodontic	Practical skill implementation at the dental chair. Solving a situational task.

manipulations	
4. Planning examination of patient with pulp and periapical diseases of permanent teeth	Practical skill implementation at the dental chair. Solving a situational task. Completing dental outpatient records of the patient
5. Diagnosis of the diseases of dental pulp and periapical tissues: performing and interpreting the results of thermal test; performing and interpreting the results of electric pulp test; interpreting the results of contact dental radiography; interpreting the results of cone beam computed tomography; making diagnosis of the «disease of dental pulp» in accordance with classification provided by the clinical protocol; making diagnosis of the «disease of periapical tissues of the tooth» in accordance with classification provided by the clinical protocol	Practical skill implementation at the dental chair. Solving a situational task. Completing dental outpatient records of the patient
6. Treatment planning for a patient with pulp and periapical diseases of permanent teeth	Practical skill implementation at the dental chair. Solving a situational task. Completing dental outpatient records of the patient
7. Performing the steps of endodontic treatment: selection of method and implementation of local anesthesia in endodontic manipulations; isolation of the operating field during endodontic manipulations (application of rubberdam); pulp chamber opening and application of devitalizing paste; pulp chamber opening and vital pulp amputation; cavity access, scouting and shaping of root canal orifices; pulp extirpation;	Practical skill implementation at the dental chair. Republican Center for Professional Certification and Simulation Training (hereinafter - RCPC & ST). Solving a situational task. Completing dental outpatient records of the patient

<p>determination of the root canal working length;  root canal instrumentation (selection of the shaping technique and instruments);  medical treatment of the root canal, selection of antiseptic;  temporary obturation of the root canal;  root canal obturation with gutta-percha cones using lateral condensation technique</p>	
<p>8. Determination of medical follow-up periods and treatment quality evaluation for the diseases of dental pulp and periapical tissues</p>	<p>Practical skill implementation at the dental chair.  Solving a situational task.  Completing dental outpatient records of the patient</p>
<p>9. Determination of indications for endodontic retreatment and tooth-preserving surgery</p>	<p>Practical skill implementation at the dental chair.  Solving a situational task.  Completing dental outpatient records of the patient</p>
<p>10. Determination and interpretation of Occlusal Surface Destruction Index and justification of postendodontic restoration of anatomical and functional integrity of tooth</p>	<p>Practical skill implementation at the dental chair.  Solving a situational task.  Completing dental outpatient records of the patient</p>
<p>11. Performing postendodontic restoration of anatomical and functional integrity of tooth</p>	<p>Practical skill implementation at the dental chair. RCPC &amp; ST.  Solving a situational task.  Completing dental outpatient records of the patient</p>

**LIST OF LECTURES****6 semester**

1. Endodontics. Basic terms and concepts. Regulatory and legal framework of patient admission.
2. Mechanism of development, classification of the diseases of dental pulp and periapical tissues.
3. Differential diagnosis of the diseases of dental pulp.
4. Differential diagnosis of the diseases of periapical tissues of the tooth.
5. Planning of treatment of pulp and periapical tissues' diseases of permanent teeth.
6. Anesthesia in endodontic dental treatment.

**7 семестр**

1. Instrumentation of the root canals.
2. Medical treatment of the root canals.
3. Methods of obturation the root canal system of teeth.

**9 semester**

1. Endodontic treatment in traumatic tooth injuries.
2. Justification of postendodontic restoration of anatomical and functional integrity of tooth.
3. Mistakes and complications in endodontic treatment.
4. Pathological tooth resorption.
5. Criteria for assessing the quality of endodontic treatment.
6. Endodontic retreatment of teeth.

**LIST OF PRACTICAL STUDIES****6 semester**

1. Objectives of contemporary endodontic treatment. Medical ethics and deontology in endodontics.
2. Requirements for the organization of patient reception for endodontic treatment. Principles and requirements for ergonomic endodontic manipulations.
3. Structure and functioning of dentine-pulp complex and periradicular tissues of the tooth.
4. Microbiology of root canal system in the diseases of dental pulp and periapical tissues.
5. Mechanism of development, classification of the diseases of dental pulp and periapical tissues.
6. Basic and additional methods of diagnosis of the diseases of dental pulp and periapical tissues.
7. Radiological methods of diagnosis in endodontics.
8. Pulp hyperemia. Acute pulpitis, purulent pulpitis.
9. Chronic pulpitis. Chronic ulcerative pulpitis, chronic hyperplastic pulpitis.
10. Pulp necrosis.

11. Pulp degeneration.
12. Acute apical periodontitis.
13. Chronic apical periodontitis.
14. Periapical abscess without sinus, periapical abscess with sinus.
15. Differential diagnosis of the diseases of dental pulp and periapical tissues.

#### **7 semester**

1. Planning of treatment of pulp and periapical tissues' diseases of permanent teeth.
2. Anesthesia in endodontic dental treatment.
3. Operating field isolation methods in endodontics.
4. Methods of vital pulp therapy.
5. Creation of endodontic access to the root canal system.
6. Medical assistance in endodontics for conditions that pose a threat to life and (or) health of a person.
7. Treatment of pulpitis by means of vital pulp extirpation.
8. Treatment of pulpitis by means of devital pulp extirpation.
9. Treatment of acute and chronic forms of apical periodontitis.
10. Treatment of periapical abscess.

#### **8 semester**

1. Instrumentation of the root canals.
  2. Mistakes and complications during instrumentation of the root canal.
  3. Medical treatment of the root canals.
  4. Mistakes and complications during medical treatment of the root canal.
  5. Methods and techniques of temporary obturation of the root canals.
  6. Methods and techniques of permanent obturation of the root canals.
  7. Mistakes and complications during obturation of the root canals.
- Prevention of complications.
8. Indications for endodontic retreatment and tooth-preserving surgery.

#### **9 semester**

1. Application of cone beam computed tomography in endodontics.
2. Endodontic treatment in traumatic tooth injuries.
3. Justification of postendodontic restoration of anatomical and functional integrity of tooth.
4. Mistakes in diagnosis and treatment planning of the diseases of dental pulp and periapical tissues.
5. Tooth perforations. Prevention. Treatment methods.
6. Endodontic instrument fracture inside the root canal.
7. Management of fractured endodontic instruments.
8. Classification, mechanism of development, criteria and features of pathological tooth resorption.
9. Basic principles of medical prevention and planning of pathological tooth resorption comprehensive treatment.
10. Methods of endodontic treatment of pathological tooth resorption.

11. Criteria for assessing the quality of endodontic treatment.
12. Endodontic retreatment of teeth.

**10 semester**

1. Methods of visualization the operating field in endodontic practice.
2. Methods for correcting the shade of non-vital tooth.
3. Application of physiotherapeutic factors in endodontic treatment.
4. Dental infection site and focal disease.
5. Interdisciplinary interaction in treatment planning for patients with the diseases of dental pulp and periapical tissues.
6. Tooth-preserving technologies in endodontic practice.
7. Regenerative technologies in endodontics.

**PROTOCOL OF THE CURRICULUM APPROVAL  
BY OTHER DEPARTMENTS**

Title of the discipline requiring approval	Department	Amendments to the curriculum in the academic discipline	Decision of the department, which designed the curriculum (date, protocol # )
1. Periodontology	Periodontology	no	19.09.2023, protocol #2
2. Prosthetic Dentistry	Prosthetic Dentistry and Orthodontics	no	19.09.2023, protocol #2
3. Therapeutic Dentistry	Conservative Dentistry	no	19.09.2023, protocol #2
4. Maxillofacial Surgery and Oral Surgery	Maxillofacial Surgery	no	19.09.2023, protocol #2

**COMPILERS:**

Head of the Department of Endodontics  
of the educational institution «Belarusian  
State Medical University», PhD,  
Associate Professor

  
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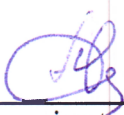
V.A.Andreeva

Professor of the Department of  
Endodontics of the educational  
institution «Belarusian State Medical  
University», D.Sc., Associate Professor

  
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A.V.Butvilovsky

Associate Professor of the Department  
Of Endodontics of the educational  
institution «Belarusian State Medical  
University», PhD, Associate Professor


  
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signature

L.N.Palianskaya

Curriculum content, composition and the accompanying documents comply with the  
established requirements.

Dean of the Medical Faculty for  
International Students of the educational  
institution «Belarusian State Medical  
University»

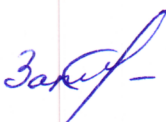
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signature

O.S.Ishutin

Methodologist of the educational  
institution «Belarusian State Medical  
University»

13.11.2023

  
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signature

S.V.Zaturanova