Federal State Autonomous Educational Institution of Higher Education

**I.M. Sechenov First Moscow State Medical University**

**Ministry of Health of the Russian Federation**

**(Sechenov University)**

“Approved”

Academic council of FSAEI HE

I.M. Sechenov First Moscow

State Medical University

(Sechenov University)

“\_\_\_\_\_” of \_\_\_\_\_\_\_\_\_\_\_ 20\_\_\_

Protocol №\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SYLLABUS OF THE ELECTIVE

\_\_\_ BIOPHYSICAL TECHNOLOGIES IN DENTISTRY \_\_\_\_\_\_\_\_\_

\_ Basic professional educational program of higher education – specialty program

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_31.05.03 Dentistry \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2021-2022 year of admission

Discipline complexity \_\_\_\_\_\_\_\_ 2.0 \_\_\_\_\_\_\_\_\_ credit units

**1. Goals and objectives of mastering the elective course "Biophysical technologies in dentistry"**

**Purpose** Mastering theoretical and practical aspects of the use of biophysical technologies for the diagnosis, prevention, treatment and rehabilitation in dentistry.

**Objectives of the discipline.**

***To know:***

- the basic principles of the use of biophysical technologies for the diagnosis, prevention, treatment and rehabilitation in dentistry.

***To be able to:***

- apply biophysical methods of diagnosis, prevention, treatment and rehabilitation of dental diseases in dental office.

***To demonstrate:***

- skills in applying biophysical technologies in dentistry.

**2. Place of the Discipline in the structure of University Educational Program**

2.1. The Discipline is a part of Educational Unit С.3.18 Dentistry

2.2. To study the discipline, following knowledge and skills formed by previous disciplines / practices are necessary:

- mathematical, natural science course (physics, mathematics; biological chemistry - biochemistry of the oral cavity; normal physiology - physiology of the maxillofacial area; pathophysiology - pathophysiology of the head and neck);

- professional courses (internal diseases, clinical pharmacology; medical rehabilitation; general surgery, surgical diseases; dentistry).

2.3. The study of the discipline is necessary for the knowledge, skills and abilities formed by other professional disciplines / practices: dentistry, maxillofacial surgery, pediatric dentistry, orthodontics and children's prosthetics.

**3. Requirements for the results of mastering the discipline.**

The goal of mastering the discipline is formation of following professional competences (PC):

|  |  |  |  |
| --- | --- | --- | --- |
| n / # | Code of PC | Competence content  | As the result of mastering the discipline students must: |
| Know | Be competent | Have skills | Assessment tools \* |
|  | PC-1 | Ability to diagnose dental diseases in children and adults, to make a diagnosis. | General issues of organizing medical care for adults and childrenAnatomy of the head, maxillofacial region, features of blood supply and innervation, structure of teeth. Histology and embryology of the oral cavity and teeth, the main disorders of embryogenesis. Anatomical and functional status and condition, features of the organs of the maxillofacial region, taking into account age. Normal and pathological physiology of the dentition, its relationship with the functional status of other body systems and the levels of their regulation. The role of oral hygiene, nutrition and the use of fluorides in the prevention of dental and periodontal diseases. The method of obtaining information of patient’s life (anamnesis vitae) and diseases (anamnesis morbi), complaints from children and adults (their legal representatives) with dental diseases. Goals and objectives of individual and professional oral hygiene. Hygienic indices and methods for their determination. Methods of examination and physical examination, features of clinical dental examination in children and adults with dental diseases. Clinical features, diagnostic methods, classification of diseases of the teeth, periodontium, oral mucosa, lips in children and adults. Clinical features, diagnostic methods, classification of diseases of the bone tissue of the jaws, peripheral nervous system of the maxillofacial region, temporomandibular joint in children and adults. Methods of laboratory and instrumental studies and for assessing the status of health, medical indications for conducting studies, rules for interpreting their results. Medical indications and contraindications for the use of additional examination methods. Medical products used in the provision of medical care to children and adults with dental diseases. International Statistical Classification of Diseases and Related Health Problems (ICD). The procedure for providing medical care to the adult population with dental diseases. The procedure for providing medical care to children with dental diseases. Clinical recommendations on the provision of dental care. Conditions requiring emergency medical attention and urgent medical care. Sanitary and epidemiological requirements and issues of organizing sanitary and anti-epidemic (preventive) measures in order to prevent the occurrence and spread of infectious diseases. | Gather information about complaints, patient’s life (anamnesis vitae) and diseases (anamnesis morbi) in children and adults (their legal representatives) with dental diseases, identify risk factors and causes of dental diseases. Interpret information received from children and adults (their legal representatives) with dental diseases. Apply methods of visual inspection and physical examination of children and adults with dental diseases. Interpret the results of the visual inspection and physical examination of children and adults with dental diseases. Diagnose diseases of the pulp and periodontium, periodontal disease, oral mucosa and lips in children and adults with dental diseases. Diagnose in children and adults with dental diseases defects of teeth, dentition, dentoalveolar deformities and anomalies of teeth and jaws, complete absence of teeth and prerequisites for their development, injuries of teeth, bones of the facial skeleton and soft tissues of the maxillofacial region. To identify risk factors for oncological diseases of the maxillofacial region in children and adults with dental diseases. Formulate a provisional (preliminary) diagnosis, draw up a plan for conducting laboratory, instrumental and additional studies in children and adults with dental diseases in accordance with the procedures for providing medical care, clinical recommendations, taking into account the standards of medical care. Refer children and adults with dental diseases for laboratory, instrumental and additional studies in accordance with the current procedures for the provision of dental care, clinical guidelines, taking into account the standards of medical care. Refer children and adults with dental diseases for consultations with specialist doctors in accordance with the procedures for providing medical care, clinical recommendations, taking into account the standards of medical care. Interpret and analyze the results of consultations by medical specialists for children and adults with dental diseases. Justify the necessity and scope of additional examinations of patients (including X-ray radiological methods). Interpret and analyze the results of basic (clinical) and additional (laboratory, instrumental) examination methods in children and adults with dental diseases, including X-ray data. Make a differential diagnosis of dental diseases in children and adults. Formulate a final diagnosis in accordance with the International Statistical Classification of Diseases and Related Health Problems (ICD). To identify clinical symptoms of sudden acute diseases, conditions, exacerbations of chronic diseases without obvious signs of a threat to life, requiring emergency medical care. | Gather information about complaints, patient’s life (anamnesis vitae) and diseases (anamnesis morbi) in children and adults (their legal representatives) with dental diseases, identify risk factors and causes of dental diseases. Visual inspection and physical examination of children and adults with dental diseases.Diagnostics in children and adults: - dental caries, - non-carious lesions, - pulp and periapical tissue diseases, - periodontal diseases, - diseases of oral and lip mucosa, - teeth defects, - dentition defects, - dentoalveolar deformities, - anomalies of teeth and jaws, - complete absence of teeth.Identification of risk factors for oncological diseases of the maxillofacial region in children and adults with dental diseases.Formulation of a preliminary diagnosis, drawing up a plan for conducting instrumental, laboratory, additional studies, consultations with specialist doctors in children and adults with dental diseases.Referral of children and adults with dental diseases for instrumental, laboratory, additional studies, consultations of specialist doctors in children and adults with dental diseases in accordance with the current procedures for the provision of dental medical care to adults and children, clinical recommendations, taking into account the standards of medical care.Interpretation of data from additional (laboratory and instrumental) examinations of patients (including radiological methods).Making a preliminary diagnosis in accordance with the International Statistical Classification of Diseases and Related Health Problems (ICD).Making a differential diagnosis of dental diseases.Making a final diagnosis in accordance with the International Statistical Classification of Diseases and Related Health Problems (ICD).Recognition of conditions arising from sudden acute diseases, exacerbation of chronic diseases without obvious signs of a threat to the patient's life and requiring emergency medical care. | Questioning, test, clinical tasks |
|  | PC-2 | Ability to prescribing and conducting treatment for children and adults with dental diseases, monitoring its effectiveness and safety.   | The procedure for providing medical care to the adult population with dental diseases. The procedure for providing medical care to children with dental diseases. Clinical guidelines for providing medical care to patients with dental diseases.Medical care standards. Methods of drug and non-drug treatment, medical indications for the use of medical devices in dentistry. Groups of drugs used to provide medical care in the treatment of dental diseases; the mechanism of their action, medical indications and contraindications to the appointment; compatibility, possible complications, side effects, adverse reactions, including serious and unforeseen. Principles, techniques and methods of anesthesia, selection of the type of local anesthesia in the treatment of dental diseases. Ways to prevent or eliminate complications, side effects, adverse reactions, including serious and unforeseen, that occurred during the examination or treatment of patients with diseases of the teeth, pulp and periapical tissues, periodontium, oral mucosa and lips. Features of the provision of medical care in emergency forms for dental diseases. Materials science, technologies, equipment and medical products used in dentistry. Anatomy of the head, maxillofacial region, features of blood supply and innervation; the structure of the teeth; histology and embryology of the oral cavity and teeth, the main disorders of embryogenesis. | Develop a plan for the treatment of children and adults with dental diseases in accordance with the procedures for providing medical care, clinical recommendations, taking into account the standards of medical care. Select and prescribe medicines, medical devices (including dental materials), dietary nutrition, therapeutic regimen for the treatment of children and adults with dental diseases in accordance with the current procedures for the provision of medical care, clinical guidelines, taking into account the standards of medical care. Determine medical indications and contraindications for local anesthesia techniques in the maxillofacial region. Perform local anesthesia (application, infiltration, conduction) in children and adults with dental diseases. Perform medical interventions, including therapeutic, in children and adults with dental diseases on an outpatient basis (excluding endodontic retreatment): individual training in oral and dental hygiene, selection of means and items for oral hygiene, controlled toothbrushing, professional oral and dental hygiene, injection of drugs in the maxillofacial area, local application of remineralizing drugs in the tooth area, deep fluoridation of tooth enamel, sealing the fissure of the tooth with a sealant, professional teeth whitening, grinding and polishing of hard tooth tissues, restoration of a tooth with a filling using dental cements, chemically curing materials, photopolymers, restoration of teeth with the destruction of the contact point, restoration of a tooth with a filling material using anchor pins, application of a devitalizing paste, pulpotomy (amputation of the coronal pulp), extirpation pulp, instrumental and medical treatment of a well-permeable (well-passable) root canal, temporary filling with a root canal material, filling the root canal of a tooth with paste, gutta-percha pins, removal of supragingival and subgingival dental deposits in the tooth area (manually), ultrasonic removal of supragingival and subgingival dental deposits in the tooth area, closed curettage for periodontal diseases in the tooth area, application of a therapeutic dressing for periodontal diseases in the area of one jaw, prescription of drug therapy for diseases of the oral cavity and teeth, the appointment of dietary therapy for diseases of the oral cavity and teeth. Perform medical interventions, including surgical ones, in children and adults with dental diseases on an outpatient basis (excluding the extraction of impacted and dystopic teeth): tooth extraction, temporary tooth extraction, permanent tooth extraction, opening and drainage of an odontogenic abscess. Carry out a phased sanitation of the oral cavity (excluding sanitation of the oral cavity in children under anesthesia). Perform medical interventions, including orthopedic, in adults with dental diseases on an outpatient basis (excluding prosthetics on dental implants, technologies for automated production of orthopedic prosthetic dentures, complete removable plate and clasp dentures): obtaining anatomical and functional impressions, restoration of a tooth with a crown, restoration of integrity of the dentition with fixed bridges, prosthetics with partial removable partial dentures, correction of a removable orthopedic dentures, removal of a fixed orthopedic dentures and appliances. Interpret the results of X-ray examination of the maxillofacial region. To consult children and adults with diseases of the mucous membrane of the mouth and lips, to determine indications for referral to a specialist doctors. Prevent or eliminate complications, side effects, adverse reactions, including unforeseen ones, resulting from diagnostic or therapeutic manipulations, the use of drugs and (or) medical devices, non-drug treatment. | Development of a treatment plan for children and adults with dental diseases, taking into account the diagnosis, age and clinical symptoms in accordance with the current procedures for the provision of medical care, clinical recommendations, taking into account the standards of medical care.Providing emergency and emergency medical care to patients with dental diseases, in accordance with the current procedures for the provision of medical care, clinical guidelines, taking into account the standards of medical care. Selection and prescription of medicines, medical devices (including dental materials) for the treatment of dental diseases in children and adults in accordance with the current procedures for the provision of medical care, clinical guidelines, taking into account the standards of medical care.Prescribing dietary nutrition, health-improving regimen in the treatment of dental diseases in children and adults in accordance with the current procedures for the provision of medical care, clinical recommendations, taking into account the standards of medical care.Performing medical interventions in children and adults with dental diseases in accordance with the current procedures for the provision of medical care, clinical guidelines, taking into account the standards of medical care.Evaluation of the results of medical interventions in children and adults with dental diseases.Selection of the type and conduct of local anesthesia (application, infiltration, conduction) in children and adults with dental diseases.Evaluation of the effectiveness of the safety of the use of drugs, medical devices and non-drug treatment in children and adults with dental diseases.Counseling children and adults with diseases of the mucous membrane of the mouth and lips, determining indications for referral for a consultation with specialist doctors.Selection and prescription of medicines and medical devices, taking into account the diagnosis, age and clinical picture of a dental disease in accordance with the procedures for providing medical care, clinical recommendations, taking into account the standards of medical care.Determination of methods of administration, regimen and dose of drugs.Selection and prescription of non-drug treatment for children and adults with dental diseases in accordance with the procedures for providing medical care, clinical guidelines, taking into account the standards of medical care.Prevention and treatment of complications, side effects, adverse reactions, including unforeseen ones, resulting from diagnostic or therapeutic procedures, the use of drugs and (or) medical devices, non-drug treatment at a dental appointment.Providing medical care to children and adults in case of sudden acute diseases, conditions, exacerbation of chronic diseases without obvious signs of a threat to the life of the patient in an emergency form.The use of medicines and medical devices in the provision of medical care in an emergency form.  | Questioning, test, clinical tasks |
|  | PC-7 | Ability to analyze medical and statistical information, maintain medical records, organize the activities of medical personnel. | Rules for registration and features of maintaining medical documentation and records, including in the form of an electronic document, in medical organizations of a dental profile. Rules of work in medical information systems and information and telecommunication network "Internet". Job responsibilities of medical workers in medical organizations of the dental profile.Organization of the work of dental offices, equipment of dental offices, departments and clinics.Labor protection, safety and fire safety requirements, emergency procedures. | Prepare work plan and work report.Fill in medical documentation, including in the form of an electronic document, and control the quality of its maintenance.To analyze the medical and statistical indicators of the incidence of dental diseases.To use information systems in the field of healthcare and the information and telecommunications network "Internet" in their work.Supervise the performance of the duties of the medical staff at their disposal.Use in the work of personal data of patients and information constituting a medical secret. | Drawing up a work plan and a report on their work.Maintaining medical records, including in the form of an electronic document.Monitoring the performance of official duties at the disposal of medical personnel.The use of information systems in the field of healthcare and the information and telecommunication network "Internet".Use in the work of personal data of patients and information constituting a medical secret. | Questioning, test, clinical tasks |

*\* kinds of evaluating tools, which can be used during the development of competence*: *colloquium control work, interview on situational tasks, written or computer testing, standard calculations , individual tasks, essay*

**4. Sections of discipline and competences that are formed during the study:**

|  |  |  |  |
| --- | --- | --- | --- |
| p / No. | Code of PC | Section of the discipline | Content |
| 1 | PC-1, PC-2, PC-7. | Physical factors used in dentistry | Galvanization and drug iontoophoresis, low-frequency pulsed currents, medium and high-frequency alternating current, electric and magnetic fields, light therapy, ultrasound, aerosol therapy, ozone therapy, water, heat, and mud therapy. Application in dentistry. Indications and contraindications. Technique and procedure. |
| 2 | PC-1, PC-2, PC-7.  | Principles of application of biophysical technologies in treatment and rehabilitation in dentistry | Principles of application of physical methods in the treatment and rehabilitation of caries and non-carious lesions of hard tooth tissues, pulpitis and periodontitis, periodontal and oral mucosa diseases, inflammation and injuries of the maxillofacial area, facial nerve disorders and temporomandibular joint. |

1. **Distribution of discipline labour intensity and academic work in semesters.**

|  |  |  |
| --- | --- | --- |
| Academic works | Labour intensity | Labour intensity (academic hours) in semester |
| credits  | academic hours |
| 5 | 6 | 7 | 8 | 9 | 10 |
| Classroom work | 2,0 |  |  |  |  |  | 36 |  |
|  Lectures (L) |  |  |  |  |  |  | 8 |  |
|  Lab works (LW) |  |  |  |  |  |  |  |  |
|  Practical classes (PC) |  |  |  |  |  |  |  |  |
|  Clinical classes (CC) |  |  |  |  |  |  | 28 |  |
|  Seminars (S) |  |  |  |  |  |  |  |  |
| Self-study (S-S) |  |  |  |  |  |  | 20 |  |
|  Intermediate attestation |  |  |  |  |  |  | 4 |  |
| TOTAL | 2.0 |  |  |  |  |  | 60 |  |

**5.1. Discipline sections, academic works and current assessment tools**

|  |  |  |  |
| --- | --- | --- | --- |
| n / No. | Discipline sections | Academic works (academic hours) | Assessment tools |
|  |  |  | L | CC | S | SS | total |  |
| 1 | Physical factors used in dentistry | 4 | 14 |  | 10 | 28 | Test, clinical tasks |
| 2 | Principles of biophysical technologies applying for treatment and rehabilitation in dentistry | 4 | 14 |  | 10 | 28 | Test, clinical tasks |
| 3 | Intermediate attestation |  |  |  |  | 4 |  |
|  | TOTAL | 8 | 28 |  | 20 | 60 |  |

**5.2. Distribution of lectures**

|  |  |  |
| --- | --- | --- |
| n / a. | Themes of the lectures | Academic hours |
| 1. | Use of direct and alternating current of low frequency in dentistry | 2 |
| 2. | Use of alternating current of medium and high frequency, electromagnetic fields, ultrasound, light therapy, water, heat, mud therapy, aerosol therapy and ozone therapy in dentistry. | 2 |
| 3. | Guideline for the use of physical methods of treatment and rehabilitation in patients with hard tooth tissues diseases. | 2 |
| 4. | Guideline for the use of physical methods of treatment and rehabilitation in patients with periodontal and oral mucosa diseases. | 2 |
|  | TOTAL | 8 |

**5.3. Distribution of lab work**

|  |  |  |
| --- | --- | --- |
| n / a. | Theme of the lab work | Academic hours |
|  |  | Semester | Semester |
|  | **Not conducted** |  |  |
|  |  |  |  |
|  |  |  |  |
|  | TOTAL (total - AH) |  |  |

**5.4. Distribution of practical classes**

|  |  |  |
| --- | --- | --- |
| n / № | Name of topics for practical classes | Academic hours |
|  |  | Semester | Semester |
|  | **Not conducted** |  |  |
|  |  |  |  |
|  |  |  |  |
|  | TOTAL (total - AH) |  |  |

**5.4. Distribution of clinical classes**

|  |  |  |
| --- | --- | --- |
| n / № | The name of the topics of practical classes | AH |
| 1 | Galvanization and Iontophoresis.  | 2 |
| 2 | Transcanal effects of direct current | 2 |
| 3 | Physical diagnostic methods in dentistry. Electric pulp test. Apex Location. Measurement of the electrochemical potential of the oral cavity. | 3 |
| 4 | The use of pulse currents of low frequency, alternating currents of medium and high frequency, electric and electromagnetic fields in dentistry. Fluctuation. Darsonvalization. Diathermy. Magnetotherapy. | 3 |
| 5 | The use of phototherapy in dentistry. The use of ultraviolet, visible and infrared radiation. Laser therapy. Photodynamic therapy. | 2 |
| 6 | The use of vibrotherapy and ultrasound in dentistry. Iontotherapy, aerosol therapy, ozone therapy. Water, heat, mud therapy. | 2 |
| 7 | Physical methods in the treatment of carious and non-carious lesions of hard tooth tissues.  | 2 |
| 8 | Physical methods of diagnosis and treatment in endodontics. | 2 |
| 9 | Guideline for the use of physical methods in treatment and rehabilitation of patients with inflammatory processes of the maxillofacial region. | 2 |
| 10. | Guideline for the use of physical methods in treatment and rehabilitation of patients with traumatic injuries of the maxillofacial region. | 2 |
| 11 | Guideline for the use of physical methods in treatment and rehabilitation of patients with periodontal and oral mucosal diseases. | 3 |
| 12 | Guideline for the use of physical methods in treatment and rehabilitation of patients with facial nerves diseases and diseases of the temporomandibular joint | 3 |
|  | TOTAL | 28 |

**5.6. Distribution of seminars**

|  |  |  |
| --- | --- | --- |
| n / № | Themes of the seminars | Academic hours |
|  |  | Semester | Semester |
|  | **Not conducted** |  |  |
|  |  |  |  |
|  |  |  |  |
|  | TOTAL (total - AH) |  |  |

**5.7. Distribution of self-study by types**

|  |  |  |
| --- | --- | --- |
| № | Type of self-study work | Academic hours |
| 1. | Work with literary and other sources of information for the studied section | 10 |
| 2. | Work with electronic educational resources | 10 |
|  | TOTAL  | **20** |

**6. Assessment tools**

**6.1. Types of current control and intermediate attestation, assessment tools.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| №  | № of semester  | Types of control | Part of the discipline  | Assessment tools |
| Type | Number of questions  | Number of distractors |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|  | 9 | MCQs, interview, clinical cases | Physical factors used in dentistry | Test, clinical tasks | 505 | 55 |
|  | 9 | MCQs, interview, clinical cases | The principles of biophysical technologies in treatment and rehabilitation in dentistry | Test, clinical tasks | 505 | 55 |

*\* forms of monitoring: monitoring individual work of students, monitoring mastering the theme; forms of intermediate attestation: test, exam*

**6.2. Examples of assessment tools**

***TEST***

**Establish compliance**

|  |  |
| --- | --- |
| **1. LEVEL OF THE PULP DAMAGE** |  **EPT VALUES** |
| 1) healthy pulp |  A) more than 200 μA |
| 2) damage of the coronal pulp |  B) 7 - 60 μA |
| 3) damage of the root pulp |  C) 61 - 100 μA |
| 4) total necrosis of the pulp |  D) 2 - 6 μA |
|  |  E) 101 - 200 μA. |

**Choose the correct answer**

**2. FOR THE BIOLOGICAL METHOD OF PULPITIS TREATMENT THE FOLLOWING METHODS ARE USED**

1) Laser therapy

2) laser therapy, UVD

3) laser therapy, UVD, microwave therapy

4) laser therapy, UVD, microwave therapy, paraffin therapy

5) laser therapy, UFO, microwave therapy, paraffin, muds

**3. BIOLOGICAL METHOD OF PULPITIS TREATMENT CAN BE PERFORMED IF EPT IS**

1) 1 - 7μA

2) 7 - 25 μA

3) 25 - 45 μA

4) 45 - 60 μA

5) 60 - 100 μA

**4. THE ACTION OF TRANSCANAL ELECTROPHORESIS TO THE PULP IS**

1 ) anti-inflammatory

2) analgesic

3) devitalizing

4) canal-expanding

5) desensitizing

**5. PARAMETERS OF TRANSCANAL IODINE ELECTROPHORESIS FOR PULPITIS TREATMENT:**

1) 1 procedure for 15 min

2) 1 procedure for 20 min

3) 2 procedures for 15 min

4) 2 procedures for 20 min

5) 1 procedure for 30 min

***CLINICAL CASES***

**Clinical task № 1**

 **Patient M., 45-year-old man. The diagnosis is chronic periodontitis of the upper first right molar. The X-ray is remarkable for the radiolucency with ill-defined borders in the periapical area of all the roots, less than 3 mm in size. In the apical third of the palatal root, the separated endodontic file was detected without extrusion in the periapical zone, the buccal root canals are obturated for 1/2 of the root length. The transcanal Iontophoresis with 10% potassium iodide solution was prescribed.**

 **Questions:**

1. The use of transcanal Iontophoresis in root canals with separated metal endodontic instrument is conraindicated (in what cases?)

2. The active electrode should be placed (where?)

3. During the procedure, the tooth should be isolated (with what?)

4. The course of treatment consists of (how many procedures?)

5. The duration of the procedure is (how much time?

**Answers:**

1. Contraindicated in cases where the instrument is extruded in the periapical zone.
2. Electrode should be placed in the orifice of root canal
3. Isolated with sticky wax
4. Treatment course consists of 3 - 4 procedures
5. Duration of each procedure is 20 min

**Clinical task № 2**

 **Patient A., 35-year-old. During the endodontic treatment of lower left second molar due to prosthetic indications it was revealed, that root canals can be negotiated to the 2/3 of the length.** **After the application of the devitalizing paste, electric pulp test from the root canals orifices is 80 μA. A course of transcanal iontophoresis was prescribed.**

 **Questions:**

1. What is the purpose of the transcanal iontophoresis prescription?

2. Is anesthesia necessary during the procedure?

3. What medications can be used for the transcanal iontophoresis

4. What is the minimal amperage for the pulpitis treatment?

5. What method allows to assess the effectiveness of transcanal iontophoresis in pulpitis?

**Answers:**

1. Pulp devitalization
2. Anesthesia is necessary.
3. Potassium iodide, dimexide.
4. Current strength:3 mA.
5. EPT.

**Clinical task № 3**

 **Patient D., 28-year-old. The diagnosis is periapical abscess without sinus in the area of the lower right first molar. Percussion is painful; in the root canals serous-purulent exudate is present. The X-ray demonstrates the radiolucency with ill-defined borders less than 3 mm in size**

 **Questions:**

1. What biophysical treatment method should be prescribed?

2. What is the purpose of the procedure?

3. The active electrode is anode or cathode?

4. With what solution should be moistened the active electrode?

5. The treatment course consists of (how many procedures?)

**Answers:**

1. Anod galvanization
2. Reduction of exudation, anti-inflammatory effect
3. Anode
4. Water.
5. Course of treatment 3 - 4 procedures.

**Clinical task № 4**

 **Patient M., 42-year-old. During the endodontic treatment of central lower left incisor due to prosthetic indications it was revealed, that root canal can be negotiated to the 2/3 of the length. The electric pulp test value from the root canal orifice is 150 μA. A course of depo phoresis was prescribed.**

 **Questions:**

1. What medication should be applied in the root canal when using this method?

2. What current should be used for the procedure?

3. An electrode inserted in the root canal should be connected to anode or cathode?

4. With a current of 1 mA what is the duration of the procedure?

5. The treatment course consists of (how many procedures?)

**Answers:**

1. Copper-calcium hydroxide
2. Permanent current
3. Cathode
4. 5 min.
5. Treatment course 3 procedures.

**Clinical task № 5**

 **Patient K., 38-year-old. The diagnosis is chronic ulcerative pulpitis of the lower right first molar. After the application of the devitalizing paste, electric pulp test value from the root canals orifices is 180 μA. All canals can be negotiated to the 2/3 of the length. The separated endodontic file was detected** **in the mesial lingual canal without extrusion in the periapical zone. A course of apex phoresis was prescribed.**

 **Questions:**

1. Where should be placed the apex-phoresis active electrode?

2. The use of apex phoresis in root canals with separated metal endodontic instrument is contraindicated (in what cases?)

3. With what solution should be moistened the root canal before the procedure?

4. What is the duration of each procedure of apex phoresis?

5. What conductor should be used for apex-phoresis?

**Answers:**

1. In the root canal
2. Contraindicated in cases where the instrument is extruded in the periapical zone.
3. Saline
4. 5 min
5. Silver-copper electrode

**7.Educational & methodical support of the discipline (printed editions, electronic publi-cations, internet other network resources)**

 **7.1. The basic textbooks 7.1. List of literature:**

|  |  |  |
| --- | --- | --- |
| No | Book  | Authors |
| At the department | In the library |
| 1. | Volkov A.G., Dikopova N.Zh., Makeeva I.M., Sokhova I.A. Physical methods for the diagnosis and treatment of dental diseases. Tutorial. - M.: Publishing. First MGMU them. THEM. Sechenov. 2016 .-- 62 p. | 20 |  |
| 2. | Volkov A.G., Dikopova N.Zh., Makeeva I.M., Byakova S.F. Physical methods for the diagnosis and treatment of periodontal and oral mucosa diseases. Tutorial. - M.: Publishing. First MGMU them. THEM. Sechenov. 2016 .-- 48s. | 20 |  |
| 3 | Makeeva I.M., Volkov A.G., Daurova F.Yu., Dikopova N.Zh., Kozhevnikova L.A., Makeeva M.K., Talalaev E.G., Shishmareva A.L. Physical treatment methods in dentistry. Textbook allowance / Moscow, 2017 .-- 112s. | 20 |  |
| 4. | Volkov A.G., Mikhaleva I.N. “Physical methods of treatment of periodontal diseases” in the book: Therapeutic dentistry: textbook: at 3 o’clock / ed. G.M. Barera. - M., 2008. - Part 2, - Periodontal disease. - S. 210 - 221. | 1 |  |

**7.2. Additional editions**

|  |  |  |
| --- | --- | --- |
| No. | Book  | Authors |
| At the department | In the library |
| 1. | O.Efanov, YuS. Sukhanova “Physical methods of treatment of periodontal diseases”. M., 2010 .-- 188 p. | 10 |  |
| 2. | Ed. V.M. Bogolyubov. Physiotherapy and balneology. Book I, - M., 2008. – 408p. | 1 | 1 |
| 3. | Ed. V.M. Bogolyubov. Physiotherapy and balneology. Book II, - M., 2008 .-- 312 p. | 1 | 1 |
| 4. | Ed. G.N. Ponomarenko. Physiotherapy. National leadership. \_ M., 2009 .-- 864 p. | 1 | 1 |

**7.3. Tutorial guides.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  № | Name | Authors | Edition | Exemplars |
| In the library | at the department |
| 1 | 2 | 3 | 4 | 7 | 8 |
|  | Instrumental methods of diagnosis and treatment of dental diseases. | Volkov A.G., Dikopova N.Zh., Makeeva I.M., Sokhova I.A. | Ed. First MGMU them. THEM. Sechenov. 2016 |  | 20 |
|  | Physical methods for the diagnosis and treatment of periodontal disease and oral mucosa. | Volkov AG, Dikopova NJ, Makeyev IM, Byakova SF | Ed. First MGMU them. THEM. Sechenov. 2016 |  | 20 |
|  | Physical treatment methods in dentistry. | Makeeva I.M., Volkov A.G., Daurova F.Yu., Dikopova N.Zh., Kozhevnikova L.A., Makeeva M.K., Talalaev E.G., Shishmareva A.L. | Ed. RUDN, 2017 |  | 20 |

**7.4. Recommendations for the tutors**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  No. | Name | Authors | Edition | Exemplars |
| In the library | at the department |
| 1 | 2 | 3 | 4 | 7 | 8 |
|  | Logical-didactic schemes of practical exercises in physiotherapy “Physiotherapy of dental diseases” | Edited by O.I. Efanova | M., 2013 |  | 20 |
|  | Logical and didactic schemes of practical exercises in physiotherapy “Physical healing factors” | Edited by O.I. Efanova | M., 2013 |  | 20 |

**8. Material and technical instrumentation of the discipline.**

**8.1. Logistic support of the discipline.**

1. dental offices with universal dental units;

2. class rooms for reports, presentations and discussions.

**8.2. Equipment for tutorials.**

-multimedia complex (laptop, projector, screen), TV, video camera, slide scope, VCR, PC, video and DVD players, monitors, slide sets, tables / multimedia visual materials in various sections disciplines, videos, boards, etc.

- diagnostic and medical equipment (D.C. devices, pulse currents devices, variable currents of medium and high frequency devices, magnet therapy devices, light therapy equipment, ultrasound apparatus etc.).

- electrodes, gaskets, spirits, sticky dental wax, medicines and dental materials.

- Dental units, chairs, tables and chairs, dental trays with a full set of instruments used in the therapeutic department

- Forms: consultation papers, return papers, prescriptions.

**Educational technologies in an interactive form used in the process of teaching the discipline:**

**9.1. Examples of educational technologies in an interactive form:**

In accordance with the requirements of the Federal State Educational Standard, the active and interactive forms of performing classes are widely used in the educational process (computer presentation of expert materials, computer simulation; visualized test tasks; videos, analysis of specific situations, etc.) The specific weight of classes performed in interactive forms is **at least 10% of** classroom classes.

* 1. **Electronic educational resources used in the process of teaching the discipline:**

|  |  |  |
| --- | --- | --- |
| No. | Name and brief description of electronic educational and information resources (electronic publications and information databases) | Number of copies, access points |
| *1* | *2* | *3* |
| 1 | Educational portal of the First MGMU them. THEM. Sechenovahttp: //dl.sechenov.ru/ |  |
| 2 | Central Scientific Medical Library <http://www.scsml.rssi.ru/> |  |
| 3 | Library of Natural Sciences of the Russian Academy of Sciences<http://www.benran.ru/>; [http://www.benran.ru/Magazin/El/Str\_elk1.htm](http://www.benran.ru/magazin/el/str_elk1.htm) |  |
| 4 | International citation database PubMedhttp://www.ncbi.nlm.nih.gov/ |  |
| 5 | Publishing house of academic medical literature Elsevierhttp: //www.elsevier. com / |  |
| 6 | Scientific Electronic Library eLibraryhttp://elibrary.ru// |  |
| 7 | Information and educational portal for doctors Univadishttp://www.univadis.ru/ |  |
| 8 | Electronic Medical Library Consultant of a doctorhttp://www.rosmedlib.ru/ |  |

Working elective discipline program “Biophysical Technologies in Dentistry” was developed by the Department of Therapeutic Dentistry

Developers ::

Professor of the Department, DDS \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ A.G. Volkov

Associate Professor, PHD \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ N.Ž. Dikopova

Accepted at a reunion of the Department of Restorative Dentistry

From \_\_\_\_\_\_\_\_\_\_\_\_\_20\_\_\_\_Protocol No. \_\_\_\_

Head of the Department, Professor I.M. Makeeva

*Signature Full name*

Approved by the Teaching and Methodical Council of the Faculty of Dentistry

\_\_\_ \_\_\_\_\_\_\_20\_\_\_\_\_ Protocol No. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Chairman of the EMC \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ О .I. Admakin

 and the first names, last name,