LECTURE OUTLINES
V semester, III course

LECTURE 1 (2 hours)

DENTAL CARIES – NATURE OF THE DISEASE PROCESS AND CLASSIFICATION. METHODS OF CARIES TREATMENT. BASIC PRINCIPLES OF OPERATIVE TREATMENT OF DENTAL CARIES. ISOLATION OF THE OPERATIVE FIELD DURING CARIES TREATMENT – METHODS AND MEANS. RUBBER DAM.

1. Nature of the carious process and classification.
2. Therapeutic approaches to the treatment of dental caries.
3. Scope of operative dentistry.
4. Basic principles of operative treatment - praeparatio, medicatio, obturatio cavi dentis.
5. Cavity – definition, elements.
6. Classifications of carious lesions and cavities.
7. External anatomy of teeth.
8. Occlusal forces – direction of action and neutralization.
9. Phases of cavity preparation. Instruments for cavity preparation.
10. Tooth numbering.
11. Isolation of the operative field for caries treatment – methods and devices.
12. Rubber dam – basic principles, components and instruments. Working technique.

LECTURE 2 - 2 hours

CLASS I AND CLASS II CAVITY PREPARATION FOR NON-ESTHETIC RESTORATIVE MATERIALS (DIRECT AND INDIRECT)

1. Indications, phases of preparation, instrumentation.
2. Class I cavity preparation for dental amalgam.
3. Conservative cavity preparation for small carious lesions.
4. Class I cavity preparation for extensive occlusal caries.
5. Class II cavity preparation for dental amalgam.
6. Types of retentions for small and extensive proximal cavities restored with dental amalgam and indirect cast metal restorations.
7. Differences between Class II cavity preparation for dental amalgam and indirect cast metal restorations.

LECTURE 3 - 2 hours

CLASS I AND CLASS II CAVITY PREPARATION FOR ESTHETIC RESTORATIVE MATERIALS (DIRECT AND INDIRECT)

1. Indications, phases of preparation, instrumentation.

2. Class I and Class II cavity preparation for direct composite materials.
3. Conservative cavity preparation for small carious lesions.
4. Cavity preparation for extensive carious lesions.
5. Alternative Class II cavity designs.
6. Class II cavity preparation for indirect composite restorations.
7. Differences between Class II cavity preparation for direct and indirect composite restorations.

LECTURE 4 - 2 hours

CLASS III, IV, AND V CAVITY PREPARATION. VENEERS. DIRECT AND INDIRECT RESTORATIONS

1. Indications, phases of preparation, instrumentation.
2. Class III cavity preparation for direct composite restoration.
3. Class IV cavity preparation for direct composite restoration.
4. Tooth preparation for veneers – indications, contraindications, and preparation margins.
5. Class V cavity preparation for direct restorations with composite, glass ionomer cement, and dental amalgam. Differences in preparation.

LECTURE 5 - 2 hours

DENTIN WOUND. THE SECOND BASIC PRINCIPLE OF OPERATIVE TREATMENT OF DENTAL CARIES

1. Dentin wound – characteristics.
2. Types of dentin in acute and chronic carious lesions. Therapeutic approaches.
3. Medicaments – classification, composition, pharmacodynamics, technique of application.
4. Temporary restorations – types, properties, technique of application.

LECTURE 6 -2 hours

THE THIRD BASIC PRINCIPLE OF THE OPERATIVE TREATMENT OF DENTAL CARIES

1. Definition.
2. Clinical requirements for restorative materials.
3. Cavity liners and bases – types, composition, properties, functions.
4. Instruments and techniques for the application of cavity liners and bases in different cavity classes according to the restorative material and the depth of the carious lesion.

LECTURE 7 - 2 hours

DENTAL AMALGAM. FABRICATION OF AMALGAM RESTORATIONS

1. Dental amalgam – definition, types, composition, setting reactions.
2. Physico-mechanical and medico-biological properties of amalgam restorations.
3. Fabrication of amalgam obturations – amalgam selection, mixing (trituration), homogenization.
4. Matrices, matrix retainers and wedges – purpose, types, placement, and adaptation.
5. Application and condensation of amalgam into the cavity.
6. Proximal and occlusal carving of amalgam obturations.
7. Finishing and polishing.

LECTURE 8 - 2 hours

GLASS IONOMER CEMENTS – TYPES, PROPERTIES, TECHNIQUE OF FABRICATION OF GLASS IONOMER OBTURATIONS

1. Glass ionomer cements – composition, types, properties, indications.
2. Classification.
3. Instruments and working technique of glass ionomer cements in different cavity classes.
4. "Sandwich" techniques of obturation.

LECTURE 9 - 2 hours

COMPOSITE MATERIALS – TYPES, PROPERTIES, INDICATIONS, CONTRAINDICATIONS

1. Composite materials – definition, composition, types, properties.
2. Classification.
3. Indications and contraindications for the application of composite materials.
4. Polymerization shrinkage of composite materials and methods of compensation.
5. C-factor and polymerization stress.
6. Types of composite materials according to their optical properties.
7. New generations of composite materials.

LECTURE 10 - 2 hours

ADHESIVE SYSTEMS – PURPOSE, TYPES.

1. Purpose of adhesive systems.
2. Adhesion to enamel and dentin.
3. Generations of adhesive systems – types, composition, properties and limitations.
4. Classification.

5. Functions of adhesive system components – etching agent, primer, adhesive.
6. Characteristics of micromechanical bonding to enamel and dentin – the hybrid layer. Durability and reliability.
7. Evolution of enamel and dentin bonding – chemical bonding.
8. Gold-standard adhesive systems for enamel and dentin.
9. Universal (multi-purpose) adhesive systems for bonding to different restorative materials.

LECTURE 11 – 2 hours
FABRICATION OF DIRECT COMPOSITE RESTORATIONS IN FRONTAL TEETH

1. Indications and contraindications for direct composite restorations.
2. Selection of composite materials according to their mechanical, physicochemical and optical properties. Biomimetic principles.
3. Matrices and matrix systems, wedges – types, working technique.
4. Instruments and techniques for fabrication of direct composite obturations in Class III, IV, and V cavity preparations.
5. Silicone index technique for direct composite restorations.

LECTURE 12 – 2 hours
FABRICATION OF DIRECT COMPOSITE RESTORATIONS IN DISTAL TEETH

1. Indications and contraindications for direct composite restorations.
2. Selection of composite materials according to their mechanical, physicochemical, and optical properties. Biomimetic principles.
3. Matrices and matrix systems, wedges – types, working technique.
4. Instruments and techniques for fabrication of direct composite obturations in Class I and II cavity.

LECTURE 13 – 2 hours
INDIRECT METAL, PORCELAIN, AND COMPOSITE RESTORATIONS. CAD/CAM SYSTEMS

1. Indications and contraindications.
2. Basic principles regarding preparation margins, contours, and occlusion.
3. Impression taking – direct and indirect techniques. Digital impression.
4. Adjustment and cementation of indirect metal restorations.
5. Contemporary methods for indirect porcelain and composite restorations. CAD/CAM systems.
6. Composite cements – types, composition, properties and disadvantages. Selection criteria.
7. Cementation protocols for indirect porcelain and composite restorations. Working technique.

LECTURE 14 – 2 hours
CAVITY PREPARATIONS AND RESTORATION STRENGTH IN EXTENSIVELY DAMAGED VITAL TEETH

1. Analysis of masticatory forces, thickness of the remaining tooth structure after caries removal, occlusal relationships with the opposing teeth, selection of restorative material.
2. Cusp protection in severely damaged posterior teeth.

3. Additional retentions – dentin chambers, dentin pins.
4. Instruments and techniques for the restoration of severely damaged vital teeth – direct and indirect restorations. Indications.

LECTURE 15 – 2 hours
ERRORS IN THE OPERATIVE TREATMENT OF DENTAL CARIES. FACTORS AFFECTING RESTORATION MARGINS

1. Errors and complications during cavity preparation for different cavity classes according to caries progression, masticatory forces and the type of restorative material.
2. Errors and complications during cavity medication according to the depth of the carious lesion and the type of restorative material.
3. Errors and complications during cavity obturation according to the type of restorative material, cavity margins, contours, proximal contacts, occlusion.
4. Factors affecting cavity margins – caries progression (occlusal, gingival, and proximal), masticatory forces, proximal contacts and occlusion, type of restorative material, esthetics.

PRACTICAL EXERCISE OUTLINES
V semester, III course

PRACTICAL EXERCISE 1 – 4 hours
INRODUCTION TO THE TECHNOLOGY AND THE WORKFLOW IN THE PRECLINICAL ROOM. DENTAL CARIES.
Dental caries – essence and classification. Methods of treatment. Essence of operative dentistry. Basic principles of treatment – praeparatio, medicatio, obturatio cavi dentis. Cavity – definition, elements, Black's classification. External anatomy of the teeth. Masticatory forces – direction and neutralization. Phases of cavity preparation. Instruments. Tooth numbering.

PRACTICAL EXERCISE 2 – 4 hours
CLASS I CAVITY PREPARATION FOR AMALGAM
Class I preparation for amalgam – definition. Conservative Class I cavity preparation for small carious lesions. Class I cavity preparation for extensive carious lesions. Phases of cavity preparation for amalgam – instruments, resistant cavity form, critical analysis of the principle "extension for prevention of secondary caries". Masticatory forces – direction and neutralization in Class I preparations. Retentive cavity form. Types of box shapes. Highlights of Class I cavity preparation.

PRACTICAL EXERCISE 3 – 4 hours
CLASS II CAVITY PREPARATION FOR AMALGAM
Class II cavity – definition, indications. Access to the carious lesion – types and technique. Types of cavity configurations. Elements of Class II cavity. Phases of cavity preparation. Masticatory forces – direction and neutralization, resistant cavity walls. Analysis and application of Black`s principle "extension for prevention" for Class II cavity for amalgam – occlusal box, proximal box and isthmus – the connection between the occlusal and the proximal boxes. Types of macro-mechanical retentions according to cavity width. Types of Class II cavities according to caries localization. Isthmus preparation rules.

PRACTICAL EXERCISE 4 – 4 hours
CLASS I AND CLASS II CAVITY PREPARATION FOR DIRECT COMPOSITE MATERIALS

Class I and Class II cavities for direct composite materials – definition, indication. Types of cavity configurations. Phases of cavity preparation. Differences between cavities for composite material and dental amalgam, reduction of the phases of cavity preparation. Evolution of the approach – from classical to contemporary – critical analysis. Changes in Black's principles. Argumentation of terms: resistant cavity form, "extension for prevention", "prevention of extension", and retentive form according to aesthetic materials requirements. Instruments.

PRACTICAL EXERCISE 5 – 4 hours
CLASS II CAVITY PREPARATION FOR INDIRECT RESTORATIONS (ESTHETIC AND NON-ESTHETIC)
Properties of indirect restorations, indications. Nomenclature, basic configurations – inlay,

onlay, overlay. Class II cavity preparation for indirect restorations – characteristics of cavity preparation for esthetic and non-esthetic restorative materials. Differences between cavity preparation for amalgam, cast metal and aesthetic indirect restorations. Instruments and preparation technique.

PRACTICAL EXERCISE 6 – 4 hours
CLASS III AND CLASS V CAVITY PREPARATION FOR DIRECT COMPOSITE MATERIALS

Class III and class V cavities – definition, indications, features of cavity preparation, instruments. Characteristics of the cervical region. Access to the carious lesion – types of cavity configurations. Preparation technique. Masticatory forces – direction and neutralization. Elastic deformation in the cervical region. Beveling of the cavity margins in class III and class V cavities – types, preparation technique, and purpose.

PRACTICAL EXERCISE 7 – 4 hours
CLASS IV CAVITY PREPARATION FOR DIRECT COMPOSITE MATERIALS

Class IV cavities – definition, indications, special features of cavity preparation, instruments. Class IV cavity preparation for composite materials – indications, phases of cavity preparation, additional retentive features. Direct and indirect techniques for restoration of frontal teeth with extensive defects. Veneers – types, indications, working stages

PRACTICAL EXERCISE 8 – 4 hours
CLASS I, II, AND IV CAVITY PREPARATION FOR DIRECT COMPOSITE MATERIALS ON EXTRACTED TEETH

Hard dental tissues (enamel, dentin, cementum) and their significance in cavity preparation. The dentino-enamel junction (DEJ). Buccal and lingual contours, proximal contacts, embrasures, occlusal anatomy in the context of cavity preparation. Preparation of Class I and Class II cavities for direct composite materials: specific features. Types of Class I and Class II cavity designs for small and extensive carious lesions. Differences between cavity preparations for composite materials and conventional cavity preparations for non-aesthetic restorative materials. Preparation of Class IV cavities for small and extensive defects. Specific features of cavity design. Significance of the cementoenamel junction (CEJ) in the preparation of Class II and Class IV cavities. Instruments.

PRACTICAL EXERCISE 9 – 4 hours
MID-TERM TEST ON THE FIRST BASIC PRINCIPLE OF CARIES TREATMENT: PRAEPARATIO CAVI DENTIS (WRITTEN AND PRACTICAL TASK BASED ON THE SYLLABUS). ASSESSMENT CRITERIA.

PRACTICAL EXERCISE 10 – 4 hours
THE SECOND BASIC PRINCIPLE OF CARIES TREATMENT: MEDICATIO CAVI DENTIS. VARNISHES, LINERS, BASES.

Definition, clinical indications. Dentin wound – characteristics. Basic groups of materials for short-term and long-term medication. Medicaments – classification, pharmacodynamics and application technique. Liners, varnishes and bases – essence, classification, indications, properties (biological and mechanical requirements). Instruments – specifics in the application

according to the type of medicament, liner or base. Fabrication technique with different cavity designs. Temporary restorations – types, qualities, indications, application techniques with different cavity designs.

PRACTICAL EXERCISE 11 – 4 hours
THE THIRD BASIC PRINCIPLE OF CARIES TREATMENT: OBTURATIO CAVI DENTIS. DENTAL AMALGAM. FABRICATION OF AMALGAM RESTORATIONS.

Definition of the principle obturatio cavi dentis. Obturation materials – clinical requirements. Dental amalgam – definition, types, composition, chemical reactions. Physico-mechanical and medico-biological characteristics of amalgam restorations. Amalgam selection. Mixing (trituration), homogenizing. Matrix systems: matrix bands, matrix retainers and wedges – purpose, types, placement and adaptation. Placement and condensation of amalgam. Proximal and occlusal contouring of the amalgam restoration. Finishing and polishing.

PRACTICAL EXERCISE 12 – 4 hours
FABRICATION OF DIRECT COMPOSITE RESTORATIONS IN THE DISTAL REGION

Composite materials – definition, composition, types, qualities. Instruments and techniques for the fabrication of direct composite restorations. Adhesive systems – purposes, types. Adhesion to enamel. Adhesion to dentin. Classification of contemporary adhesive systems. Hybrid layer – definition. Characteristics of the micromechanical bond with enamel and dentin. Advantages and disadvantages of adhesive systems. Matrix systems: matrix bands, matrix retainers, wedges – purpose, types, placement and adaptation for the restoration of cavities with direct composite materials. Establishment of proper proximal contact and occlusal anatomy. Finishing and polishing

PRACTICAL EXERCISE 13 – 4 hours
FABRICATION OF DIRECT COMPOSITE RESTORATIONS IN THE FRONTAL REGION

Anatomical and aesthetic considerations in the restoration of anterior teeth. Matrix systems: matrix bands, wedges - purpose, types, placement and adaptation. Instruments – specific requirements for anterior restorations. Incremental layering of composite materials. Direct and direct-indirect techniques for the restoration of extensive defects in anterior teeth. Silicone index.

PRACTICAL EXERCISE 14 – 4 hours
FINAL TEST ON THE THREE BASIC PRINCIPLES OF CARIES TREATMENT – PRAEPARATIO CAVI DENTIS, MEDICATIO CAVI DENTIS, OBTURATIO CAVI DENTIS (WRITTEN AND PRACTICAL TASK, BASED ON THE SYLLABUS).

PRACTICAL EXERCISE 15 – 4 hours

ACCEPTANCE OF THE FINISHED PRACTICAL WORK AND VERIFICATION OF THE SEMESTER

LECTURE OUTLINES
VI semester, III course

LECTURE 16 – 2 hours
SUBJECT, GOALS, AND OBJECTIVES OF ENDODONTICS. TOPOGRAPHIC ANATOMY OF THE ROOT CANAL SYSTEM

1. Definition of endodontium.
2. Historical development of Endodontics.
3. Topographic anatomy of the pulp cavity in different groups of teeth.
4. Pulp chamber – shape, pulp chamber roof and pulp horns, pulp chamber floor, location and names of the canal orifices.
5. Root canals – number, shape and configuration.
6. Variations in the number and location of root canals.
7. Anatomical and radiographic apex of the tooth.
8. Anatomical apical foramen – location, shape, dimensions, distance from the root apex.
9. Physiological apical foramen – definition, location, size, distance from the anatomical apical foramen.
10. Age-related changes in the root canal system – characteristics of the pulp chamber, canal orifices, and root canals. Gerontology.

LECTURE 17 – 2 hours
ENDODONTIC TREATMENT – OBJECTIVES, BIOLOGICAL AND MECHANICAL PRINCIPLES. METHODS AND TECHNIQUES FOR ISOLATION OF THE OPERATIVE FIELD. RUBBER DAM

1. Endodontic triad – Praeparatio, Medicatio, Obturatio canalis radicis dentis.
2. Isolation of the operative field – methods and means.
3. Rubber dam – purpose, components, instruments and techniques for rubber dam placement.
4. Rubber dam isolation of teeth with compromised coronal tooth structure – rationale, approaches.

LECTURE 18 – 2 hours
ENDODONTIC ACCESS

1. Endodontic access – definition, goals, requirements, stages.
2. Endodontic access cavity preparation – definition, stages, differences from cavity preparation for caries treatment, designs for different groups of teeth and teeth with carious destruction.
3. Instruments for endodontic access – types and techniques of use.
4. Contents of the cavum pulpae – instruments and techniques for their removal.
5. Localisation of root canal orifices. Examination of the pulp chamber floor and its anatomical landmarks – visual, tactile, and colorimetric techniques.
6. Establishment of straight-line access for endodontic instruments to the apical third of

the root canal – anatomical rationale, instruments and techniques of use.

LECTURE 19 – 2 hours
HAND ENDODONTIC INSTRUMENTS – TYPES, INDICATIONS FOR USE

1. Historical development of endodontic instruments.
2. Classification of endodontic instruments.
3. ISO standardization of endodontic instruments – tip diameter, colour coding, graphic symbols, length and working length, taper.
4. Classical hand endodontic instruments with .02 taper – K-files, H-files, barbed broaches. Characteristics, working motion, Advantages and disadvantages.
5. Hybrid endodontic instruments according to alloy type, cross-section, taper, working length, instrument design and tip modifications.
6. Basic characteristics of nickel-titanium instruments.
7. Hybrid hand endodontic instruments with greater taper – purpose and techniques of use.

LECTURE 20 – 2 hours
CONTENTS OF THE ROOT CANAL SYSTEM – INSTRUMENTS AND TECHNIQUES FOR THEIR REMOVAL. WORKING LENGTH OF THE ROOT CANALS AND METHODS FOR ITS DETERMINATION

1. Types of contents of the root canal system – characteristics.
2. Hand instruments for root canal cleaning – approaches, instruments and techniques of work
3. Instruments for initial examination of the root canal.
4. Machine-driven instruments for root canal cleaning – approaches, instruments and techniques of work.
5. Removal of vital, necrotic, and infected pulp from the root canals. Characteristics of narrow and obliterated root canals, techniques, instruments and irrigants.
6. Removal of root canal filling materials, cements and radicular posts from the root canals. Technique od work, instruments and irrigants.
7. Coronal and apical end of the root canal. Selection of coronal reference point. Reference points.
8. Methods for determining the working length of the root canal – anatomical, clinical, radiographic, electrometric.
9. Clinical methods for determining the working length of the root canal – DTSAC and PS: critical analysis.
10. Radiographic methods – diagnostic radiography, radiography with an instrument in the root canal, error correction method.
11. Electrometric methods –apex locators for determining the working length of the root canals. Principle of operation, influence of the root canal contents on the accuracy of apex locators, techniques of use

12. Means for fixing the working length on the endodontic instruments.

LECTURE 21 – 2 hours
TECHNIQUES FOR ROOT CANAL PREPARATION WITH HAND INSTRUMENTS

1. Biological and mechanical principles of root canal preparation.
2. Instruments and medicaments for intracanal irrigation supporting root canal preparation. Recapitulation.
3. Apico-coronal preparation techniques – types and basic principles of the technique.
4. Standard preparation – indications, instruments, technique, advantages and disadvantages.
5. Step-back technique – indications, technique, advantages over the standard technique.
6. Roane's balanced force technique – indications, instruments, technique.
7. Schilder's technique for preparation – instruments, sequence of the procedure, and root canal recapitulation.
8. Corono-apical preparation techniques – types and basic principles of the technique.
9. Crown-down technique – indications, instruments, technique.
10. Methods and techniques for the preparation of curved root canals.

LECTURE 22 – 2 hours
MACHINE-DRIVEN ENDODONTIC INSTRUMENTS – TYPES, INDICATIONS FOR USE

1. Types of machine-driven instruments for root canal preparation – rotary and reciprocating motion. Classification and purpose.
2. Machine-driven stainless steel endodontic instruments – Gates-Glidden, Pesso (Largo), etc.
3. Basic characteristics of nickel-titanium instruments.
4. Machine-driven rotary Ni-Ti endodontic instruments – ProTaper systems.
5. Machine-driven reciprocating endodontic instruments – WaveOne systems.
6. Oscillating machine-driven instruments (sonic and ultrasonic endodontic systems) – indications, advantages and disadvantages.

LECTURE 23 – 2 hours
TECHNIQUES FOR ROOT CANAL PREPARATION USING MACHINE-DRIVEN INSTRUMENTS WITH ROTARY AND RECIPROCATING MOTION

1. Basic rules and principles for working with machine-driven Ni-Ti endodontic instruments – Crown-down technique. Preservation of the anatomy of the root canal system.
2. Glide path creation – goals, instruments, techniques.
3. Endodontic motors and handpieces with rotary and reciprocating motion. Parameters and settings for different endodontic instrument systems.
4. Machine-driven root canal preparation with ProTaper systems – sequence of instruments and preparation technique.
5. Machine-driven root canal preparation with WaveOne systems – sequence of instruments and preparation technique.

LECTURE 24 – 2 hours
CHARACTERISTICS OF THE PREPARED ROOT CANAL SYSTEM. MEDICATION TREATMENT – GOALS, AGENTS, PROPERTIES, METHODS. IRRIGATION AND LONG-TERM MEDICATION

1. Characteristics of the prepared root canal.
2. Agents for medication treatment of the root canal system – classification and indications for use.
3. Agents for short-term medication (irrigating solutions) and medicaments for long-term intracanal medication. Types.
4. Medicaments for short-term medication – pharmacodynamics of 3% H_2O_2, sodium hypochlorite, chlorhexidine, EDTA.
5. Methods of irrigant delivery into the root canal system – irrigation needles, devices, and systems.
6. Methods of irrigant activation – sonic and ultrasonic irrigation, laser-activated irrigation, photoactivated irrigation, etc.
7. Medicaments for long-term intracanal medication – types, indications for use, application technique.
8. Pharmacodynamics of $Ca(OH)_2$ pastes, corticosteroid-antibiotic pastes, polyantibiotic pastes, etc.

LECTURE 25 – 2 hours
OBTURATION OF THE ROOT CANAL SYSTEM – DEFINITION, OBJECTIVES, MATERIALS, METHODS

1. Goals of root canal obturation.
2. Apical and coronal limits of the root canal filling.
3. Classification of root canal filling materials – non-setting pastes, setting pastes, solid materials, sealers, gutta-percha, obturators.
4. Therapeutic non-setting pastes – calcium hydroxide pastes and mixtures of antibiotics and chemotherapeutic agents – composition, pharmacodynamics, indications for use.
5. Setting pastes – sealers. Classification, composition, pharmacodynamics, properties and disadvantages.
6. Instruments and methods for root canal filling with pastes – hand and machine-driven methods. Indications for use and techniques.

LECTURE 26 – 2 hours
COLD GUTTA-PERCHA OBTURATION TECHNIQUES FOR THE ROOT CANAL SYSTEM – SINGLE-CONE TECHNIQUE, LATERAL CONDENSATION

1. Cold obturation techniques – classification, advantages and disadvantages.
2. Gutta-percha – composition, types, gutta-percha cones (standardized and non-standardized), disinfection, impregnation.
3. Single-cone obturation technique – cone selection, calibration, sequence of the procedure, advantages and disadvantages.
4. Lateral condensation – sequence of the procedure, instruments, master cone selection, spreader selection, sealer placement technique.
5. Hydraulic condensation – obturation with calcium silicate sealer (bioceramic) and a calibrated gutta-percha cone. Definition of the method, instruments and technique.

Advantages and disadvantages.

LECTURE 27 – 2 hours
WARM GUTTA-PERCHA CONDENSATION TECHNIQUES FOR ROOT CANAL OBTURATION. VERTICAL CONDENSATION – TRADITIONAL AND CONTEMPORARY TECHNIQUES. OBTURATORS

1. Characteristics of gutta-percha for thermal root canal obturation techniques.
2. Warm condensation techniques – classification, advantages and disadvantages.
3. Schilder's vertical condensation – main stages: gutta-percha cone fitting: DownPack, BackPack. Instruments and devices.
4. Contemporary warm techniques – injection technique, Backfill, continuous wave of condensation.
5. Obturators – history and evolution of the techniques.
6. Root canal obturation with obturators – instruments for root canal verification, obturator selection, equipment, technique, advantages and disadvantages.

LECTURE 28 – 2 hours
RESTORATION OF ENDODONTICALLY TREATED TEETH

1. Characteristics of endodontically treated teeth.
2. Analysis of the radiographic status, periodontal status, occlusion analysis and development of a treatment plan for post-endodontic restoration.
3. Selection of a restoration method and materials according to the degree of tooth destruction.
4. Post systems – types, advantages and disadvantages. Radicular posts – metal and fiberglass posts.
5. Rules and technique for the preparation for prefabricated radicular posts.
6. Cast post-and-core restorations – indications, fabrication technique, advantages and disadvantages.
7. Restoration of endodontically treated teeth with extensive destruction without radicular posts – rules and technique for preparation and restoration.
8. Cementation protocols for metal and fiberglass posts. Specific features.

LECTURE 29 – 2 hours
ERRORS IN PREPARATION, MEDICATION, AND OBTURATION OF THE ROOT CANAL SYSTEM

1. Errors in endodontic access.
2. Errors in root canal cleaning and shaping: perforation of the pulp chamber floor, fracture of an endodontic instrument in the canal, alteration of the working length, perforation of the root canal wall, dentinal blockage, ledge formation and false canal (via falsa), extrusion of root canal contents into the periapical tissues.
3. Errors in root canal irrigation – extrusion of the irrigant and root canal contents.
4. Errors in root canal obturation – root cracks and fractures, lack of hermetic seal, extrusion of root canal filling material.

LECTURE 30 – 2 hours
RETREATMENT OF ENDODONTICALLY TREATED TEETH – INSTRUMENTS AND TECHNIQUES

1. Reasons for retreatment of endodontically treated teeth.
2. Removal of obstructions – obliterations, ledges, fractured instruments. Technique and sequence of the procedure.
3. Devices and instruments – ultrasonics, solvents, thermomechanical approaches, ProTaper D system, SAF system, etc.

PRACTICAL EXERCISE 16 – 4 hours
ENDODONTICS: SUBJECT, GOAL AND OBJECTIVES

Endodontium – definition. History of endodontics. Topographic anatomy of the pulp cavity in different teeth groups. Pulp cavity – shape, chamber roof with pulp horns, chamber floor with root canal orifices. Root canals – number, location, comparative dimensions, shape. Exceptions to the standard number of canals in a single root. Anatomical apical foramen – definition, location, shape, size. Change of location and size with age, reasons for this change. Anatomical and radiographic apex. Physiological apical foramen – synonyms, definition, location, size, changes with age, distance from the anatomical apical foramen.

PRACTICAL EXERCISE 17 – 4 hours
ENDODONTIC TREATMENT – GOALS, BIOLOGICAL AND MECHANICAL PRINCIPLES. RUBBER DAM.

The endodontic triad – preparation, medication, obturation. Isolation of the operative field – types of isolation, devices and working technique. Rubber dam – definition, working technique, importance**.**

PRACTICAL EXERCISE 18 – 4 hours
ENDODONTIC ACCESS CAVITY PREPARATION.

Endodontic access – definition, goals, requirements, phases. Preparation of the endodontic access cavity – definition, differences from a caries cavity, endodontic access cavities in different teeth groups and various carious lesions. Burs – types and working technique.

PRACTICAL EXERCISE 19 – 4 hours
ACCESSING CAVUM PULPAE. ORIFICES LOCATION.

Contents of cavum pulpae – pulp tissue, putrid pulp tissue, cements and obturation materials. Instruments and medicaments for their removal – excavator, round bur, hydrogen peroxide, sodium hypochlorite.

Locating the root canal orifices – visually, using a dental probe, configuration of the pulp floor. Securing a free and safe access of the endodontic instruments to the tooth apex – anatomical reasons, instruments and working technique.

PRACTICAL EXERCISE 20 – 4 hours
HAND AND MACHINE DRIVEN ENDODONTIC INSTRUMENTS – CLASSIFICATION AND STANDARDIZATION

Standardization of instruments – essence, lengths, diameters, numbering, colour coding according to ISO. Shortcomings of conventional standardization system, contemporary changes in standards. Classification of endodontic instruments: hand and machine driven. Conventional (taper .02) instruments – shortcomings. Hybrid instruments – characteristics. Stainless steel machine driven endodontic instruments – Gates-Glidden, Peeso. NiTi machine driven endodontic instruments – rotary (ProTaper) and reciprocating (WaveOne, Reciproc). Basic characteristics of NiTi endodontic instruments, sizes, symbols.

PRACTICAL EXERCISE 21 – 4 hours
CONTENTS OF THE ROOT CANALS AND INSTRUMENTS FOR THEIR REMOVAL

Root canal contents – characteristics. Instruments for initial scouting of the root canals. Hand instruments for removal of the root canal contents. Barbed broach – characteristics, indications, working technique for removal of pulp tissue. Contemporary instruments for scouting of the root canal and reaching the apical foramen – K-files, D-finders, C-files. Instruments for removal of root filling materials in cases of endodontic retreatment – H-files, D-files. Initial irrigation.

PRACTICAL EXERCISE 22 – 4 hours
ROOT CANAL WORKING LENGTH

Coronal and apical limits of the root canal. Root canal working length – definition. Methods for determining working length – anatomical, clinical, radiographic, electrometric. Anatomical methods for determining working length – critical analysis. Clinical methods – DTSAC and periodontal sensitivity (PS) – anatomical prerequisites for their application; working technique and instruments; advantages and disadvantages – critical analysis. Radiographic methods – diagnostic radiography, method for correction of the mistake with an instrument in the root canal, critical analysis. Electrometrical methods – definition, explanation, devices, working technique, advantages and disadvantages; influence of the root canal content on the accuracy of the electrometrical methods. Ways of fixing the endodontic working length on the instruments.

PRACTICAL EXERCISE 23 – 4 hours
HAND ENDODONTIC INSTRUMENTS FOR CLEANING AND SHAPING OF THE ROOT CANALS. WORKING TECHNIQUE.

Hand endodontic instruments with taper .02 – K-files, K-reamers, H-files. Characteristics, types, working mode. Hand endodontic instruments with greater taper – ProTaper. Prevention of errors in the preparation.

PRACTICAL EXERCISE 24 – 4 hours
MACHINE DRIVEN INSTRUMENTS FOR CLEANING AND SHAPING OF THE ROOT CANALS – TYPES, INDICATIONS FOR A SYSTEM SELECTION. WORKING TECHNIQUE.

Main characteristics of NiTi instruments. Basic principles of working with machine driven instruments. Machine driven stainless steel endodontic instruments – Gates-Glidden, Peeso. NiTi endodontic instruments – rotary (PathFile, ProGlider, ProTaper Gold, ProTaper Next) and reciprocating (WaveOne). Characteristics of the root canal system and technique when choosing a machine driven system for cleaning and shaping.

PRACTICAL EXERCISE 25 – 4 hours
TEST ON ENDODONTIC ACCESS, WORKING LENGTH, INSTRUMENTS AND TECHNIQUES FOR ROOT CANAL PREPARATION.
CHARACTERISTICS OF THE PREPARED ROOT CANAL AND ROOT CANAL MEDICATION.

Characteristics of the prepared root canal. Free dentinal debris, smear layer, contents of the dentinal tubules. Medicaments for short-term medication and pharmacological effect – 3% hydrogen peroxide, sodium hypochlorite and EDTA. Irrigation protocol for infected and non-infected root canals. Irrigation techniques – irrigation syringes and needles, irrigation systems. Advantages and disadvantages. Methods for activating the irrigation solutions - manual, sonic and ultrasonic activation, heating of the solution, laser-assisted activation, ozone activation. Medicaments for long-term medication – calcium hydroxide, corticosteroids. Pharmacodynamics. Final irrigation of the root canals – significance, means, methods.

PRACTICAL EXERCISE 26 – 4 hours
ROOT CANAL OBTURATION – DEFINITION, GOALS, MEANS, METHODS.

Apical and coronal limits of the root canal obturation. Classification of root canal filling materials – non-setting pastes, setting pastes, sealers, gutta-percha, adhesive materials. Pastes that do not set inside the root canal – historical review. Antiseptic non-setting pastes – iodoform-based, tricresol-formalin-based and trioxymethylene-based – composition, pharmacodynamics and indications. Therapeutic non-setting pastes – calcium hydroxide-based, antibiotics and chemotherapeutic mixtures – composition, pharmacodynamics and indications. Instruments and methods for filling with pastes – hand instruments, Lentulo spiral fillers, syringes with endodontic tips. Criteria for filling the root canal with a paste and a Lentulo spiral filler.

PRACTICAL EXERCISE 27 – 4 hours
ROOT CANAL FILLING MATERIALS – PASTES THAT SET INSIDE THE ROOT CANAL – CLASSIFICATION. GUTTA-PERCHA. SINGLE CONE TECHNIQUE.

Classification of root canal filling materials. Types, composition, pharmacodynamics and indications. Sealers based on eugenol, resins, calcium hydroxide and calcium silicate. Instruments and methods for filling root canals with sealers. Gutta-percha cones for additional sealing of pastes filling – types, advantages and disadvantages. Gutta-percha – essence, types, qualities. Root canal filling with gutta-percha cones and a sealer – single cone technique. Ways of implementation. Advantages and disadvantages of the method. Indications for applying additional gutta-percha cones.

PRACTICAL EXERCISE 28 – 4 hours
OBTURATION OF THE ROOT CANALS WITH TERMOPLASTIFIED GUTTA-PERCHA.

Filling root canals with termoplastified gutta-percha – injection technique, vertical condensation, Thermafil system. Essence, advantages and disadvantages. Errors and complications during obturation.

PRACTICAL EXERCISE 29 – 4 hours
FINAL TEST ON ENDODONTIC TREATMENT.
RESTORATION OF ENDODONTICALLY TREATED TEETH

Characteristics of the endodontically treated teeth. Criteria for the choice of a restoration method according to the extent of loss of tooth structure. Radicular post systems – types, advantages, disadvantages and working techniques. Contemporary approaches.

PRACTICAL EXERCISE 30 – 4 hours

HANDING IN OF THE FINISHED PRACTICAL WORK AND VERIFICATION OF THE SEMESTER. ASSESMENT OF RADIOGRAPHS.