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FACULTY OF STOMATOLOGY

STUDY PROGRAM 0911.1 STOMATOLOGY

CHAIR OF STOMATOLOGICAL PROPAEDEUTICS "PAVEL GODOROJA"

APPROVED

at the meeting of the Committee for Quality Assurance and Evaluation of the Curriculum Faculty of Stomatology

Minutes No. 2 of 13.02.2018

Committee president, PhD, DMS,

Associate professor,

Stepco Elena *E. Stepco*

APPROVED

at the Council meeting of the Faculty of Stomatology

Minutes No. 6 of 20.02.2018

Dean of Faculty of Stomatology,

PhD, DHMS, Professor,

Ciobanu Sergiu *S. Ciobanu*

APPROVED

at the meeting of the chair of Stomatological Propaedeutics "Pavel Godoroja"

Minutes nr. 3 of 20.10.2017

Head of chair, PhD, DHMS,

Associate professor,

Uncuța Diana *D. Uncuța*



CURRICULUM

DISCIPLINE: MODERN ENDODONTIC MANUAL AND ROTARY INSTRUMENTS

Integrated studies

Course type: **Optional discipline**

Chișinău, 2017



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I. PRELIMINARIES

• ***General presentation of the discipline: the place and role of the discipline in the formation of the specific competences of the vocational / specialty training program***

"Preclinical Endodontics" is a compartment of dentistry that studies the structure and function of the endodontium, the methods and techniques of manipulation in the pulp cavity in traumas, pathological changes in the pulp and periodontium.

The treatment of pulp diseases and the endodontic preparation of teeth for structural-functional restructurisation make up a strategic center of practical dentistry. Modern technological procedures allow the direct restoration of massive root distructions, favoring the preservation of original anatomical structures.

The most spectacular and fruitful expansion of endodontics throughout history has been consumed over the past 10-15 years through new imagistic investigations, surgical equipment, therapeutic concepts, materials and instrumentation, without any exaggeration considered revolutionary.

The endodontic space is a pulpo-dentinal complex whose basic elements are pulp and dentine adjacent to the dental cavity, joined together functionally and morphologically. Knowing the morphological particularities of the endodontic space of permanent teeth is a starting point for clinical and complementary examinations and for developing an individualized treatment plan that takes into account possible anatomical variations.

Preclinical endodontics is an indispensable compartment for both dental propaedeutics and other branches of modern dentistry. The passing of the students' training from the preclinical stage to the clinical stage of the dentistry is done by familiarizing them with the specifics of the preclinical endodontics in the simulator room, the dental office, the organization of patient dental care. The basic stages in the preclinical and clinical examination of patients and the clinical and paraclinical examination options described in this section are aimed at developing the clinical thinking of students in order to establish a plan for the diagnosis and treatment of pulpar diseases and apical periodontitis. At the same time, special attention is paid to manual endodontic instruments and rotary endodontic instruments, as well as the use of endodontic manual and rotary instruments in endodontic treatment, working length determination of root canals.

The manual endodontic instrument has kept its usefulness over time, despite the emergence of rotary systems. The number of manual instruments is steadily rising, with each producer trying to market more efficient, more flexible and more ergonomic variants. Most instruments follow the rules of the International Organization for Standardization (ISO), which together with the International Dental Federation (FDI), has established the standards for the classification of the endodontic instrument.

Doctor's conduct within the dentist's office is an important step in the development of future specialists, because endodontic treatment is an indispensable compartment of modern dentistry.

Mission of the curriculum (purpose) in vocational training

Preclinical endodontics aims to integrate the knowledge gained by future dentists in endodontic discipline in order to provide effective, harmless dental care in the treatment of dental caries complications according to quality criteria for other endodontic treatment by the European Endodontic Society, 2006.

At the same time, the clinical and paraclinical examination methods described in the preclinical endodontic discipline are intended to develop students' skills and clinical thinking aimed at the accumulation of endodontic skills and abilities in determining optimal methods of prophylaxis, diagnosis and treatment of pulpar inflammation and periapical tissue and improvement quality of life for patients.



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- **Languages of teaching:** romanian, russian and english.
- **Beneficiaries:** students of the second year, the faculty of Dentistry.

II. DISCIPLINE ADMINISTRATION

Code of discipline	S.04.A.049		
Name of discipline	Modern endodontic manual and rotary instruments		
Responsible of discipline	Uncuța Diana PhD, DHMS, Associate Professor, head of chair Tighineanu Marcela , assistant professor		
Year	II	Semester	IV
Total number of hours, including:			30
Lectures	20	Practical courses	-
Seminars	-	Individual work	10
Evaluation form	C	Number of credits	1

III. THE TRAINING OBJECTIVES OF THE DISCIPLINE

- **At the level of knowledge and understanding:**
 - ✓ to know manual endodontic instruments;
 - ✓ to know the use of sound and ultrasound in endodontics;
 - ✓ to know the rotary steel tool;
 - ✓ to know the Ni-Ti rotary instrumentation;
 - ✓ to know the rotating Ni-Ti rotary instrumentation with continuous speed;
 - ✓ to know the rotary Ni-Ti instruments with mutual movement;
 - ✓ to know the Protaper system;
 - ✓ to know the Profile system;
 - ✓ to know the Protaper Next system;
 - ✓ to know the GT system;
 - ✓ to know the WaveOne system;
 - ✓ to be familiar with the SAF (Self Adjusting File) system.
 - ✓ to know the endodontic motors: X-Smart;
 - ✓ to understand the methods of handling the tools in the canals;
 - ✓ to understand manual widening techniques;
 - ✓ to know the standardized technique of root widening;
 - ✓ to know the technique of step-back of root enlargement;
 - ✓ to know the modified step-back technique of root widening;
 - ✓ to know the passive step-back technique of root widening;
 - ✓ to know the technique of balanced force of root widening;
 - ✓ to be familiar with the step-down / crown-down technique of the root widening;
 - ✓ to know the technique of double flare of root widening;
 - ✓ to know the technique of apical box of root widening;



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- ✓ to understand ultrasonic root canal preparation;
- ✓ to understand the vibratory preparation of the root canal;
- ✓ to know the Ni-Ti rotary systems;
- ✓ to understand the types of rotary widening movements;
- ✓ to know the continuous rotation;
- ✓ to understand the hybrid technique of rotary root canal widening;
- ✓ to understand mutual movement;
- ✓ to know the management of curved channels, calcified channels, C-shaped, S-shaped channels;
- **At application level:**
 - ✓ to distinguish manual instruments and devices required in endodontics;
 - ✓ to distinguish rotary instruments and devices required in endodontics;
 - ✓ to perform the methods of permeability and chemomechanical processing of the root canals;
 - ✓ to use different ways of handling canal instruments;
 - ✓ to perform manual widening techniques;
 - ✓ to perform ultrasonic root canal preparation;
 - ✓ to perform the vibratory preparation of the root canal;
 - ✓ to distinguish types of endodontic handpieces with vibratory action;
 - ✓ to distinguish steel rotary instruments;
 - ✓ to distinguish Ni-Ti rotary instruments;
 - ✓ to use endodontic handpieces: X-Smart;
 - ✓ to perform the way the instruments are handled in the canal;
 - ✓ to perform manual widening techniques;
 - ✓ perform standardized root-widening technique;
 - ✓ to perform the step-back technique of root widening;
 - ✓ to perform the modified root-widening step-back technique;
 - ✓ to carry out the passive step-back technique of root widening;
 - ✓ to know the technique of balanced force of root widening;
 - ✓ to perform the step-down / crown-down technique of the root widening;
 - ✓ to perform the technique of double flare of root widening;
 - ✓ to carry out the technique of the apical cylinder of root widening;
 - ✓ to distinguish Ni-Ti Rotary Systems;
 - ✓ to use different types of rotational widening movements;
 - ✓ to perform the hybrid rotation of the root canals;
 - ✓ to carry out mutual movement;
 - ✓ to distinguish the management of curved canals, calcified canals, C-shaped, S-shaped canals
- **At the integration level:**
 - ✓ to appreciate the level of endodontic care;
 - ✓ to assess the level of satisfaction of the patient according to various criteria;
 - ✓ to distribute the necessary endodontic instruments according to their purpose;
 - ✓ to ensure respect for professional ethics and deontology;
 - ✓ to highlight the patient's problem with the appreciation of the paraclinical examination options necessary to establish the correct diagnosis.

IV. PRECONDITIONS AND EXIGENCIES

Knowledge and respect of ethical-moral and professional norms in patient relations. Understanding how tools can be handled in the canal. Knowledge of manual widening techniques. Knowledge of manual endodontic instruments. Knowledge of rotary instruments. Understanding the use of sound and ultrasound in endodontics. Understand the use of rotary endodontic instruments. Understand the use of manual endodontic



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instruments. Understanding of manual widening techniques. Knowledge of hybrid rotation widening technique. Understand the management of curved channels, calcified channels, C-shaped channels.

V. THEMES AND ORIENTATIVE DISTRIBUTION OF HOURS

Nr. d/o	THEME	Number of hours	
		Courses	Individual
	Manual and rotary endodontic instrumentation. Use of manual and rotary endodontic instruments in the permeability, enlargement and chemomechanical processing of the root canal.	1	
1.	Endodontic hand instruments.	1	1
2.	Sound and ultrasound used in endodontics.	1	
3.	Steel rotary instruments.	1	1
4.	Ni-Ti Rotary Instrument: Continuous, Mutual Motion, Protaper System, Profile System, Protaper Next System, GT System, WaveOne System, Self Adjusting File (SAF).	1	1
5.	Endodontic handpieces: X-Smart.	1	1
6.	Methods of handle of the instruments in the canal.	1	
7.	Manual widening techniques: standardized technique, step-back technique, modified step-back technique, passive step-back technique, balanced force technique, step-down / crown-down technique, the apical cylinder technique.	1	1
8.	Ultrasonic root canal preparation.	1	
9.	Vibratory preparation of the root canal. Ni-Ti Rotary Milling Systems.	1	1
10.	Types of rotary swing movements: continuous rotation. Universal ProTaper system, Profile GT technology, Profile system, ProTaper Next system,	1	1
11.	WaveOne system, GT system.	1	1
12.	Hybrid radial widening of root canals.	1	
13.	Mutual Movement.	1	1
14.	Management of curved canals, calcified canals, C-shaped canals.	1	
15.		1	1
16.		1	
17.		1	
18.		1	
19.		1	
20.		1	
Total		20	10

VI. REFERENT OBJECTIVES AND CONTENT UNITS

Objectives	Content units
Manual and rotary endodontic instruments. The use of manual and rotary endodontic instruments in the permeability, enlargement and chemomechanical processing of the root canal.	
<ul style="list-style-type: none"> ✓ to know the endodontic instruments; ✓ to know the methods of using sound and ultrasound in endodontics; ✓ to know the rotary steel instruments; ✓ to know the Ni-Ti rotary instruments; ✓ to know the Ni-Ti rotary instruments with continuous speed; ✓ to know the rotating Ni-Ti instruments with mutual movement; ✓ to know the Protaper System; ✓ to know the Profile system; 	Endodontic hand instruments. Sound and ultrasound used in endodontics. Steel rotary tool. Ni-Ti Rotary Instrument: Continuous, Mutual Motion, Protaper System, Profile System, Protaper Next System, GT System, WaveOne System, Self Adjusting File (SAF). Endodontic handpieces: X-Smart. How to handle instruments in the canal. Manual widening techniques: standardized technique, step-back technique, modified step-back technique, passive



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Objectives	Content units
<ul style="list-style-type: none"> ✓ to know the Protaper Next system; ✓ to know the GT system; ✓ to know the WaveOne system; ✓ to be familiar with the SAF (Self Adjusting File); ✓ to know the endodontic handpieces: X-Smart; ✓ to know how to handle instruments in the canal; ✓ to know the manual widening techniques; ✓ to be familiar with the standardized technique; ✓ to know the step-back technique; ✓ to be aware of the modified step-back technique; ✓ to know the passive step-back technique; ✓ to know the technique of balanced force; ✓ be familiar with the step-down / crown-down technique; ✓ to know the technique of double flare; ✓ know the apical cylinder technique; ✓ be aware of the way of ultrasonic preparation of the root canal; ✓ to know how to prepare the vibratory root canal; ✓ to know Ni-Ti Rotary Milling Systems. ✓ be able to differentiate between different types of rotary widening movements; ✓ be aware of the continuous rotation movement; ✓ be aware of the hybrid rotation technique of root canals. ✓ to know the mutual movement; ✓ to know the management of curved canals, calcified canals, C-shaped, S-shaped canals; 	<p>step-back technique, balanced force technique, step-down / crown-down technique, double flare technique, the apical cylinder technique.</p> <p>Ultrasonic root canal preparation.</p> <p>Vibratory preparation of the root canal.</p> <p>Ni-Ti Rotary Milling Systems.</p> <p>Types of rotary swing movements: continuous rotation.</p> <p>Universal ProTaper system, Profile GT technology, Profile system, ProTaper Next system, WaveOne system, GT system.</p> <p>Hybrid rotary widening of root canals.</p> <p>Mutual Movement.</p> <p>Management of curved canals, calcified canals, C-shaped canals.</p>

VII. PROFESSIONAL SPECIFIC (SC) AND TRANSVERSAL (TC) COMPETENCES AND STUDY OUTCOMES

Professional competencies (specific) (SC)

SC1: Knowledge of manual endodontic instruments. Knowing how to use sound and ultrasound in endodontics.

SC2: Knowledge of rotary steel instruments. Knowledge of Ni-Ti Rotary Instrumentation: Continuous, Mutual Motion, Protaper System, Profile System, Protaper Next System, GT, WaveOne System, Self Adjusting File (SAF). Knowledge of Endodontic handpieces: X-Smart.

SC3: Know how to handle the tools in the canal. Understand manual widening techniques: standardized technique, step-back technique, modified step-back technique, passive step-back technique, balanced force technique, step-down / crown-down technique, double flare technique, the apical cylinder technique.

SC4: Knowing the methods of ultrasonic and vibratory preparation of the root canal. Knowledge of the



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Ni-Ti Rotary Milling System.

SC5: Description and knowledge of types of rotary widening. Understanding the hybrid rotation technique of root canals. Knowing the management of curved canals, calcified canals, C-shaped canals.

SC6: Demonstration and application of acquired knowledge in the clinical and paraclinical evaluation of the endodontic patient. Selection and argumentation of communication techniques, data collection and patient preparation for endodontic treatment. Promoting the principles of tolerance and compassion towards patients.

Transverse competencies (TC)

TC1: Applying professional evaluation standards, acting according to professional ethics, as well as the provisions of the legislation. Promoting logical reasoning, practical applicability, assessment and self-assessment in decision-making.

TC2: Performing activities and exercising the roles specific to team work within the endodontic office / department. Promoting the spirit of initiative, dialogue, cooperation, positive attitude and respect for others, empathy, altruism and continuous improvement of their own activities;

TC3: Systematically assessing personal skills, roles and expectations, applying self-assessments to learned processes, acquired skills and professionalism needs, effective use of language skills, knowledge in information technologies, research and communication skills to deliver quality services and adapting to the dynamics of policy requirements in health and for personal and professional development.

Study finalizations

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

- ✓ to know the manual and rotary endodontic instruments used in endodontic treatment;
- ✓ to know the techniques of use of manual and rotary endodontic instruments;
- ✓ to know the methods of using sound and ultrasound in endodontics;



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VIII. STUDENT'S SELF-TRAINING

Nr.	Expected product	Implementation strategies	Assessment criteria	Implementation terms
1.	Working with informational sources	Reading the lecture or the material in the manual on the subject. Reflecting on the topic in the questions. Knowing and selecting additional information sources on the topic. Reading the text carefully and describe the essential content. Wording of generalizations and conclusions regarding the importance of the theme / subject.	The ability to extract the essentials. Interpretative skills. The ability to analyze and communicate the material accumulated on its own.	During the semester
2.	Solving case problems	Solving case problems, with argumentation of conclusions at the end of each practical lessons. Verification of the finalities and appreciation of their achievement. Selection of additional information, using electronic addresses and additional bibliography.	The quality of solving problems of situation and clinical case, the ability to formulate and interpret clinical and paraclinical data. Ability to analyze selected information from national and international professional websites.	During the semester
3.	Evaluation of perception (basic knowledge) in clinical and paraclinical examination of patients. Evaluation of methods of asepsis and antisepsis in endodontic cabinet / section. Each student will complete the patient's medical record, systematize the stages of the clinical examination and collect the anamnesis. Establish indications for paraclinical investigations, arguing their need.			



IX. METHODOLOGICAL SUGGESTION FOR TEACHING-LEARNING-ASSESSMENT

✓ Teaching and learning methods used

When teaching the optional discipline **Modern, manual and rotary endodontic instruments** different teaching methods and methods are used, oriented towards the efficient acquisition and achievement of the objectives of the didactic process. Course classes (lectures) are provided for the discipline. Courses are held in the fourth semester by the course owner. As a teaching aid, the specialized manuals available in the university library, the methodological recommendations of the department's staff, tables, schemes, information sources in electronic format, national and international professional websites, etc. are available.

Learning methods are recommended: learning theoretical material after lecture and manually; observation - identifying the characteristic features of doctor-patient communication; analysis - in the use of clinical and paraclinical examination methods of patients, as well as methods and stages of prevention, asepsis and antisepsis; comparison - analysis by comparison of the methods of collecting the anamnesis, of the paraclinical examination methods according to their advantages and disadvantages; elaboration of the algorithm - selection of the mandatory elements and elaboration of the patient consultation algorithm; modeling - identifying and selecting the elements needed to model situations when consulting patients, formulating conclusions, arguing, and making the final decision.

✓ *Applied teaching strategies / technologies (specific to the discipline)*

Face-to-face, individual, brainstorming, group discussion, clinical case analysis, teambuilding, clinical exam simulation, mini-research, comparative analysis.

✓ *Methods of assessment (including the method of final mark calculation)*

✓ *Final: colloquy.*

X. RECOMENDED LITERATURE:

A. Mandatory:

1. Iliescu A. *Tratat de endodonție*. București, 2015, 959 p.
2. Garg N., Garg A. *Textbook of Endodontics*. New Delhi, London, Philadelphia, Panama, 2014, 603 p.
3. Hargreaves K., Berman L.H. *Cohen's Pathways of the Pulp*. Missouri, 2016, 907 p.