STUDY GUIDE

Preparation for the

PRACTICAL EXAM in

„MICROSURGERY”

for students of the Dentistry Faculty

Institute of Surgical Research, University of Szeged

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Contents

Microsurgery – practice (course)

Introduction

Summary of aims and learning outcomes

The aim of the subject (Microsurgery lectures and practices combined): To provide basic microsurgical knowledge, instruments and techniques to dentistry students who are interested in different operative specialties.

Acquired competence: By applying microsurgical methods, the student is autonomously able to perform stitching and suturing and microsurgical knotting under an operating microscope and to perform end-to-end and end-to-side vessel anastomosis under simulated conditions.

Courses: No 1 lecture (FOG-MA531, 1 credit, 10 hours); **No 2 practice (FOG-MA532, 1 credit, 18 hours).**

Schedule and topics: practices

Week	Programme	Lectures (thematic units / topics)	Practices (thematic units / topics)
1	**L**	1. Introduction. Materials, instruments and equipment in microsurgery	
2	**L + P**	2. Oral and maxillofacial surgical aspects of microsurgery	1. Introductory exercises, hand-eye coordination
3	**L + P**	3. Clinical applications of microsurgery II. (Periodontology)	2. Knotting with two instruments
4	**L + P**	4. Clinical applications of microsurgery III. (Endodontics)	3. Microscopic suturing and knotting –I
5	**L + P**	5. Clinical indications, basic suturing techniques, sutures of vessels and nerves	4. Microscopic suturing and knotting –II
6	**P**		5. Suturing and knotting on silicone model
7	**P**		6. Mucosal sutures (under microscope)
8	**P**		7. Mucosal sutures (with loupe)
9	**P**		8. Endodontic microsurgery
10	**Practical exam**		9. Practical exam
11	**Break**		
12			
13			
14			
15			

L: lecture: Albert Gellért Education Center, Kossuth Lajos avenue 35. or online
P: Practices: Institute of Surgical Research, Pulz str. 1., Szeged

Methods of preparation for the practical exam

Practical exam tasks: (1) Stitching and knotting with microsurgical instruments on rubber pad, (2) Performing vertical mattress (Donati, double loop and Sato) and horizontal mattress sutures surgical "zig-zag" (figure of 8), two types of "dentists' "zig-zag" (figure of 8)) with a loupe or under microscope (one stitch from each type with instrumental knotting), (3; optional) Performing an end-to-end and end-to-side anastomosis on a vessel model (duration: max. 90 min)

Suggested steps of preparation:

ad 1. Attendance at practices: (9 x 90 min):
1. Introductory exercises, hand-eye coordination
2. Knotting with two instruments
3. Microscopic suturing and knotting –I
4. Microscopic suturing and knotting –II
5. Suturing and knotting on silicone model
6. Mucosal sutures (under microscope)
7. Mucosal sutures (with loupe)
8. Endodontic microsurgery
9. Practical exam

ad 2. Studying tutorial videos uploaded to CooSpace (wmv)
Microscopic eye-hand coordination exercises
Advanced surgical knotting techniques
Anastomosis on a silicone model of vessels
Basic microvascular suturing and knotting techniques on a biological model
Microvascular anastomosis *in vivo*
Mucosal sutures

ad 3. Studying evaluation criteria for practical exam (see Appendix) (see OSATS evaluation sheet at end of document)

ad. 4. Personal and online contact with the instructors (Institute of Surgical Research):
Dr. habil. Andrea Szabó (Associate Professor) szabo.andrea.exp@med.u-szeged.hu
Dr. Marietta Zita Poles (Assistant Professor) poles.marietta.zita@med.u-szeged.hu
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Attila Rutai (Ph.D. student) rutai.attila@med.u-szeged.hu

1.1. Course description

Milestone:	Milestone code:
Subject: Microsurgery	Subject code: FOK-MA530
Course: Microsurgery practice	**Course code: FOK-MA532**

Course credit:	**1**
Form of course completion:	**practical exam mark (5 grade)**
Type of course:	**practice**
Characteristics of course:	**small-group practice**
Recommended term of completion:	**autumn term**
Frequency of announcement of course:	**once a year**
No of course hours: - contact: - individual:	**- contact: 18 min** **- individual: 3 min**
No of course hours weekly:	**18 hours in total**
Language of course:	**English**
Department offering course:	**Institute of Surgical Research, University of Szeged**
Name and contact information of person in charge of course:	Dr. habil. Andrea Szabó (Associate Professor, Institute of Surgical Research, University of Szeged) szabo.andrea.exp@med.u-szeged.hu
Name and contact information of course instructors:	Dr. habil. Andrea Szabó (Associate Professor, Institute of Surgical Research, University of Szeged) szabo.andrea.exp@med.u-szeged.hu Dr. Marietta Zita Poles (Assistant Professor) poles.marietta.zita@med.u-szeged.hu Dr. Tamara Horváth (Assistant Professor) horvath.tamara@med.u-szeged.hu Attila Rutai (Ph.D. student) rutai.attila@med.u-szeged.hu

1.1.1. Aim of the course

The aim of the subject (Microsurgery lectures and practices combined): To provide basic microsurgical knowledge, instruments and techniques to dentistry students who are interested in different operative specialties. Acquired competence: By applying microsurgical methods, the student is autonomously able to perform stitching and suturing and microsurgical knotting under an operating microscope and to perform end-to-end and end-to-side vessel anastomosis under simulated conditions.

1.1.2. Expected learning outcomes

List of acknowledged competencies provided by course

Expected learning outcomes (competency evaluation sheet)
(***the present guide covers items marked in boldface***):

Knowledge (lecture)	**Skills (practice)**	**Attitudes (practice)**	**Autonomy-responsibility (practice)**
The student is familiar with the clinical applications, indications and complications of microsurgical techniques.			
The student is familiar with theoretical foundation and methods of adjustment of the operating microscopes and is familiar with the principles of eye-hand coordination required for microsurgery.	**The student sets up, adjusts and uses any operating microscope or loupe and is able to perform coordinated movements using these devices under simulated conditions.**	**The student is ready to adhere strictly to the principles of microsurgery. The student properly sets up and uses microscopes and other magnifying devices without damaging them.**	**The student sets up, adjusts and uses operating microscopes and performs coordinated movements/tasks autonomously using microscopic magnification under simulated conditions.**
The student is familiar with the principles, methods and instruments of microsurgical knotting.	**The student routinely uses the microsurgical instruments during stitching used in vascular- and neurosurgery, and performs microsurgical stitching (including mucosal sutures) using appropriate methods in compliance with the standards (good clinical practice) of microsurgery and with proper**	**The student is ready to adhere strictly to the principles of microsurgical stitching, precisely and conducts the tasks conscientiously. Owing to a self-reflective attitude, the student improves any misconduct during implementation of microsurgical stitching and**	**The student performs microsurgical stitching and knotting techniques used in vascular- and neurosurgery autonomously using microscopic magnification under simulated conditions.**

	timing under simulated conditions.	**knotting.**	
The student is familiar with the principles, methods and instruments used in periodontology and endodontics.			

1.1.3. Prerequisites for course registration

Criteria for completing the course: attendance at practices and completion of CooSpace tasks: a minimum of 75% is compulsory. Completion of a successful practical exam (at least two of three practical exam tasks by the end of the semester)

1.1.4. Course content (main topics) – thematic units

1. Introductory exercises, hand-eye coordination
2. Knotting with two instruments
3. Microscopic suturing and knotting –I
4. Microscopic suturing and knotting –II
5. Suturing and knotting on silicone model
6. Mucosal sutures (under microscope)
7. Mucosal sutures (with loupe)
8. Endodontic microsurgery
9. Practical exam

1.1.5. Course schedule

Contact hours			Individual learning process	
Week	**Hours**	**Content**	**Hours**	**Content**
1				
2	**2**	**Practice 1:** Introductory exercises, hand-eye coordination	**0.5**	**Individual preparation for practices held in week 2 and 3:** Source: - Studying the following tutorial videos uploaded to CooSpace (wmv): Microscopic eye-hand coordination exercises - Answering self-assessment questions (see later) - Completion of CooSpace tasks (see later)
3	**2**	**Practice 2:** Knotting with two instruments	**0.5**	**Individual preparation for practices held in week 2 and 3:** Sources: - Studying the following tutorial videos uploaded to CooSpace (wmv): Microscopic eye-hand coordination exercises (recap) Advanced surgical knotting techniques - Answering self-assessment questions (see later) - Completion of CooSpace tasks (see later)

4	**2**	**Practice 3:** Microscopic suturing and knotting –I	**0.5**	- Studying evaluation criteria for practical exam (see Appendix) (see OSATS evaluation sheet at end of document) - Answering self-assessment questions (see later)
5	**2**	**Practice 4:** Microscopic suturing and knotting –II		
6	**2**	**Practice 5:** Suturing and knotting on silicone model	**0.5**	**Individual preparation for practices held in week 6 and 7:** Source: - Studying the following tutorial videos uploaded to CooSpace (wmv): Anastomosis on a silicone model of vessels - Answering self-assessment questions (see later)
7	**2**	**Practice 6:** Mucosal sutures (under microscope)	**0.5**	**Individual preparation for practices held in week 6 and 7:** Source: - Studying the following tutorial videos uploaded to CooSpace (wmv): Mucosal sutures - Answering self-assessment questions (see later) - Completion of CooSpace tasks (see later)
8	**2**	**Practice 7:** Mucosal sutures (with loupe)		
9	**2**	**Practice 8:** Endodontic microsurgery		
10	**2**	**Practice 9:** Practical exam	**0.5**	**Preparation for the practical exam** Source: - Studying evaluation criteria for practical exam (see Appendix) (see OSATS evaluation sheet at end of document)

11		**break**		
12				
13				
14				
15				

1.1.6. Educational methodology used
Practice: repetitive individual practices

1.1.7. Further approaches used
Studying online materials for workshops as well as tutorial videos
Personal and online consultation with lecturers
Mock exam (see OSATS evaluation sheet at end of document)

1.1.8. Mid-year study requirements
Requirements for acknowledgement of practices: attending minimum of 75% of practices and completing minimum of 75% of CooSpace tasks.

1.1.9. Monitoring and evaluation of acquired knowledge and competencies
Continuous:
Interim evaluation: we evaluate the performance of the students on all practices and provide continuous feedback on their progress. The uploaded CooSpace tasks will be evaluated by the instructor of the group (pass / fail) and the most common mistakes will be highlighted in the course forum (anonymously).
Final:
Successful completion of the practical exam (at least two of the three practical exam tasks before the end of the semester).
Evaluation of acquired skills: Grading: The five-grade end-of-semester evaluation mark is based on the mark on the practical exam.
Grading:
Excellent (5): ≥85% (practical exam results)
Good (4): 84–75% (practical exam results)
Average (3): 74–65% (practical exam results)
Pass (2): 64–50% (practical exam results)
Fail (1): ≤49% (practical exam results)

1.1.10. Technical foundation required for teaching and learning the subject
Operating microscopes, microsurgical instruments, suture materials, silicone tubes as well as biopreparates are provided by our institute.

1.1.11. Quality improvement methods and development policy
Regular consultation with the instructors for the course and also with those teaching other subjects built on the skills acquired during the present course.
Continuous monitoring and incorporation of new scientific results into the curriculum, taking the expected competencies of the profession into account.
Use of modern teaching-learning strategies, modern work strategies and teaching methods to support the teaching-learning process (e.g. through high-quality instructional videos).
Results of (1) “student feedback on lecturers’ teaching activity” questionnaires completed by students at the end of the semester and (2) the students’ performance during the exams is carefully considered when shaping the curriculum content, also including changes in emphasized topics, and in skill development methods.

1.2. Thematic units

1.2.1. Thematic unit 1 – Practice 1: Introductory exercises, hand-eye coordination

1.2.1.1. Study tasks

Content: **Main topic: Introductory exercises, hand-eye coordination** List of subtopics: Positioning with the microscope, adjustment of the microscope. Basic eye-hand coordination exercises.
Learning outcome of thematic unit: The student sets up, adjusts and uses any operating microscope or loupe and is able to perform coordinated movements using these devices under simulated conditions.
Background: **Technical foundation** Microscopes, loupes and instruments for eye-hand coordination practices are provided by our institute. ***Study materials:*** - Self-assessment questions (see later) - CooSpace tasks (see later) - The following tutorial videos uploaded to CooSpace (wmv): Microscopic eye-hand coordination exercises

Contact hours			Individual learning process		
Week 2 **90 min**	Active participation in practice, mastering methods of good clinical practice.	Active participation, questions for instructor, discussion of possible problems	**30 min**	**Study activity:** - Watch related videos on CooSpace (wmv): Microscopic eye-hand coordination exercises	**Special instructions:** - Complete self-assessment questions related to the topic (see later) - Answer and upload completed tasks on CooSpace (see later)

1.2.1.2. Self-assessment questions

1. What posture should be held at the microscope?
2. How does the size of operative field change if we change the magnification?
3. How should the magnifying glasses (loupes) be adjusted?
4. Is it possible to change the magnification of a loupe?
5. How can we reduce tremor of the hand in microsurgery?
6. How can we prevent tremor of the hand in microsurgery?
7. How should the microsurgical instruments be held in the hand?
8. How many knots do we place on 9-0- and 10-0-s nylon threads?
9. Do we use double knots (surgeons' knot) in microvascular surgery?

1.2.1.3. Self-evaluation based on self-assessment questions

Maximum number of points: 9. Successful completion requires completion of at least 60% (5 points).
0–5 points: fail (1)
6 points: pass (2)
7 points: average (3)
8 points: good (4)
9 points: excellent (5)

1.2.1.4. Tasks uploaded to CooSpace

1. Please summarize the method used to adjust the microscope before microsurgical interventions.
2. What types of microsurgical instruments do you know, and how should these be held in the hand?
3. Why is it important to practice eye-hand coordination tasks?

1.2.1.5. Evaluation of CooSpace tasks

The answers will be evaluated by the instructor of the group (pass / fail) and the most common mistakes will be highlighted in the course forum (anonymously).

1.2.1.6. Self-evaluation sheet

Please make sure that you have completed all the tasks for the thematic unit. When evaluating your own performance, please place an X in the most appropriate box. If any of the tasks listed have not been completed or were impossible to complete, put an X in the "No" column.

		No	Yes
1.	The student is familiar with the clinical applications, indications and complications of microsurgical techniques.		
2.	The student is familiar with theoretical foundation and methods of adjustment of the operating microscopes and is familiar with the principles of eye-hand coordination required for microsurgery.		
3.	The student is familiar with the principles, methods and instruments of microsurgical stitching and knotting.		

1.2. Thematic units

1.2.2. Thematic unit 2 – Practice 2: Knotting with two instruments

1.2.2.1. Study tasks

Content: **Main topic:** Knotting with two instruments List of subtopics: Basic two-handed knotting techniques performed with two instruments (under macroscopic conditions).
Learning outcome of thematic unit: The student is able to execute basic types of microsurgical knots at incisions of any direction, and starting with either hand.
Background: **Technical foundation** Microscopes, instruments, materials and threads used at practicing knotting with two instruments are provided by our institute. ***Study materials:*** - Self-assessment questions (see later) - CooSpace tasks (see later) - The following tutorial videos uploaded to CooSpace (wmv): Microscopic eye-hand coordination exercises Advanced surgical knotting techniques

Contact hours			Individual learning process		
Week 3 **90 min**	Active participation in practice, mastering methods of good clinical practice.	Active participation, questions for instructor, discussion of possible problems	**30 min**	**Study activity:** - Watch related videos on CooSpace (wmv): Microscopic eye-hand coordination exercises (recap) Advanced surgical knotting techniques	**Special instructions:** - Complete self-assessment questions related to the topic (see later) - Answer and upload completed tasks on CooSpace (see later)

1.2.2.2. Self-assessment questions

1. With which hand do we start knotting in case the suture was made by a right or a left-handed surgeon?
2. In which part of the thread should be gripped when knotting with two instruments?
3. How is knotting performed in case of instrument-tied knotting using the alternating and non-alternating method?
4. How the regular square knot is tied using two instruments?
5. How the knot structure is changing if either the short thread or the long thread is pulled (in case of instrument-tied knotting)?
6. What is the consequence of making the first half hitch double in case of microsurgical knotting?

1.2.2.3. Self-evaluation based on self-assessment questions

Maximum number of points: 6. Successful completion requires completion of at least 60% (4 points).
0–4 points: fail (1)
5-6 points: pass (2)

1.2.2.4. Tasks uploaded to CooSpace

1. Describe the consequences of pulling the long thread or of the short thread in case of instrument-tied knotting.
2. Describe the advantages of the alternating hand technique in case of instrument-tied knotting.

1.2.2.5. Evaluation of CooSpace tasks

The answers will be evaluated by the instructor of the group (pass / fail) and the most common mistakes will be highlighted in the course forum (anonymously).

1.2.2.6. Self-evaluation sheet

Please make sure that you have completed all the tasks for the thematic unit. When evaluating your own performance, please place an X in the most appropriate box. If any of the tasks listed have not been completed or were impossible to complete, put an X in the "No" column.

		No	Yes
1.	The student is able to execute basic types of microsurgical knots at incisions of any direction.		
2.	The student is able to execute basic types of microsurgical knots starting with either hand.		

1.2. Thematic units

1.2.3-4. Thematic unit 3-4 – Practices 3 and 4: Microscopic suturing and knotting –I-II.

1.2.3-4.1. Study tasks

Content: **Main topic:** Microscopic suturing and knotting List of subtopics: Stitching and knotting techniques performed on a rubber pad using microsurgical threads and instruments.
Learning outcome of thematic unit: The student sets up, adjusts and uses any operating microscope or loupe. The student is able to perform tasks requiring fine motoric movement (such as stitching and knotting) using microscope or loupe under simulated conditions.
Background: **Technical foundation** Microscopes, instruments, materials and threads used at practising stitching and knotting are provided by our institute. ***Study materials:*** - OSATS evaluation sheet (see end of the document) - Self-assessment questions (see later)

Contact hours			Individual learning process		
Week 4 **90 min**	Active participation in practice, mastering methods of good clinical practice.	Active participation, questions for instructor, discussion of possible problems	**30 min**	**Study activity:**	**Special instructions:** - Complete self-assessment questions related to the topic (see later) - Study evaluation criteria for practical exam (see Appendix; OSATS evaluation sheet at end of document)
Week 5 **90 min**	Active participation in practice, mastering methods of good clinical practice.	Active participation, questions for instructor, discussion of possible problems			

1.2.3-4.2. Self-assessment questions

1. Why the edge of the vessels should not be pinched with the forceps and what kind of method can we use to open the lumen instead?
2. Why do we use "halving technique" in microvascular surgery?
3. What is the correct order of the stitches in case of end-to-end anastomosis using halving technique?
4. What is the correct order of the stitches in case of end-to-side anastomosis using halving technique?
5. Why do we insert interrupted sutures in microvascular vascular surgery instead of continuous sutures?
6. What are the methodological similarities and differences between stitching an anastomosis on a silicon model or a vessel?
7. Why should we place larger incision on the recipient vessel than the diameter of the donor vessel in case of an end-to-side anastomosis?

1.2.3-4.3. Self-evaluation based on self-assessment questions

Maximum number of points: 7. Successful completion requires completion of at least 60% (5 points).
0–5 points: fail (1)
6-7 points: pass (2)

1.2.3-4.4. Evaluation criteria for practical exam (see Appendix) (see OSATS evaluation sheet at end of document)

1.2. Thematic units

1.2.5. Thematic unit 5 – Practice 5: Suturing and knotting on silicone model

1.2.5.1. Study tasks

Content: **Main topic:** Suturing and knotting on silicone model List of subtopics: Stitching and knotting techniques performed on a silicone model of vessels using microsurgical threads and instruments.
Learning outcome of thematic unit: The student routinely uses the microsurgical instruments during stitching used in vascular- and neurosurgery, and performs microsurgical stitching using appropriate methods in compliance with the standards (good clinical practice) of microsurgery and with proper timing under simulated conditions.
Background: **Technical foundation** Microscopes, instruments, materials, threads used for stitching and knotting, and the silicone models are provided by our institute. ***Study materials:*** - Self-assessment questions (see later) - CooSpace tasks (see later) - The following tutorial videos uploaded to CooSpace (wmv): Anastomosis on a silicone model of vessels

Contact hours			Individual learning process		
Week 6 **90 min**	Active participation in practice, mastering methods of good clinical practice.	Active participation, questions for instructor, discussion of possible problems	**30 min**	**Study activity:** - Watch related videos on CooSpace (wmv): Anastomosis on a silicone model of vessels	**Special instructions:** - Answer self-assessment questions related to the topic (see later)

1.2.5.2. Self-assessment questions

1. Why the edge of the vessels should not be pinched with the forceps and what kind of method can we use to open the lumen instead?
2. Why do we use "halving technique" in microvascular surgery?
3. How many stitches are to be inserted into an end-to-side anastomosis?
4. How many stitches are to be inserted into an end-to-end anastomosis?
5. What is the correct order of the stitches in case of end-to-end anastomosis using halving technique?
6. What is the correct order of the stitches in case of end-to-side anastomosis using halving technique?
7. Why do we insert interrupted sutures in microvascular vascular surgery instead of continuous sutures?
8. What are the methodological similarities and differences between stitching an anastomosis on a silicon model or a vessel?
9. Why should we place larger incision on the recipient vessel than the diameter of the donor vessel in case of an end-to-side anastomosis?

1.2.5.3. Self-evaluation based on self-assessment questions

Maximum number of points: 9. Successful completion requires completion of at least 60% (5 points).
0–5 points: fail (1)
6 points: pass (2)
7 points: average (3)
8 points: good (4)
9 points: excellent (5)

1.2.5.4. Evaluation criteria for practical exam (see Appendix) (see OSATS evaluation sheet at end of document)

1.2. Thematic units

1.2.6. Thematic unit 6 – Practice 6: Mucosal sutures (under microscope)

1.2.6.1. Study tasks

Content: **Main topic:** Mucosal sutures (under microscope) List of subtopics: Stitching of mucosal sutures (interrupted, horizontal and vertical mattress and running sutures) and knotting.
Learning outcome of thematic unit: The student routinely uses the microsurgical instruments during stitching used in vascular- and neurosurgery, and performs microsurgical stitching (including mucosal sutures) using appropriate methods in compliance with the standards (good clinical practice) of microsurgery and with proper timing under simulated conditions.
Background: **Technical foundation** Instruments, materials and threads used at practising mucosal sutures are provided by our institute

Contact hours			**Individual learning process**		
Week 7 **90 min**	Active participation in practice, mastering methods of good clinical practice.	Active participation, questions for instructor, discussion of possible problems	**30 min**	**Study activity:** - Watch related videos on CooSpace (wmv): Mucosal sutures	**Special instructions:** - Complete self-assessment questions related to the topic (see later) - Answer and upload completed tasks on CooSpace (see later)

1.2.6.2. Self-assessment questions

1. What are the advantages of mattress sutures?
2. What are the advantages and disadvantages of running sutures?
3. What are the special characteristics of mucosal sutures regarding wound edges?
4. What are the advantages of surgical “zig-zag” (figure of 8) sutures?
5. What are the advantages of dentists’ “zig-zag” (figure of 8) sutures?

1.2.6.3. Self-evaluation based on self-assessment questions

Maximum number of points: 5. Successful completion requires completion of at least 60% (3 points).
0–3 points: fail (1)
4-5 points: pass (2)

1.2.6.4. Tasks uploaded to CooSpace

1. Describe the indications of mucosal sutures.
2. Describe the special characteristics of mucosal sutures regarding the wound edges.
3. Describe the main characteristics of mattress sutures used in dentistry practice.

1.2.6.5. Evaluation of CooSpace tasks

The answers will be evaluated by the instructor of the group (pass / fail) and the most common mistakes will be highlighted in the course forum (anonymously).

1.2.6.6. Self-evaluation sheet

Please make sure that you have completed all the tasks for the thematic unit. When evaluating your own performance, please place an X in the most appropriate box. If any of the tasks listed have not been completed or were impossible to complete, put an X in the "No" column.

		No	Yes
1.	The student is able to perform basic horizontal and vertical mattress suture types under simulated conditions autonomously.		
2.	The student is able to perform basic running suture types under simulated conditions autonomously.		

1.2. Thematic units

1.2.7. Thematic unit 7 – Practice 7: Mucosal sutures (with loupe)

1.2.7.1. Study tasks

Content: **Main topic:** Mucosal sutures (with loupe) List of subtopics: Stitching and knotting on rubber pads using a loupe.
Learning outcome of thematic unit: The student sets up, adjusts and uses any operating microscope or loupe and is able to perform coordinated movements using these devices under simulated conditions.
Background: **Technical foundation** Loupes, instruments, materials and threads used at practicing mucosal sutures are provided by our institute

Contact hours			**Individual learning process**		
Week 8 **90 min**	Active participation in practice, mastering methods of good clinical practice.	Active participation, questions for instructor, discussion of possible problems			

1.2.7.2. Self-assessment questions

1. What types of instruments are used for suturing vessels with a diameter bigger than 0.4-0.2 mm?
2. How the loupe can be set?
3. Can the magnification and the working distance be changed during working with a loupe?

1.2.7.3. Self-evaluation based on self-assessment questions

Maximum number of points: 3. Successful completion requires completion of at least 60% (2 points).

1.2.7.4. Self-evaluation sheet

Please make sure that you have completed all the tasks for the thematic unit. When evaluating your own performance, please place an X in the most appropriate box. If any of the tasks listed have not been completed or were impossible to complete, put an X in the "No" column.

		No	Yes
1.	The student is familiar with the advantages and disadvantages of loupes and microscopes, and is able to decide which device to choose independently in the given situation.		
2.	The student sets up, adjusts and uses loupe and is able to perform microsurgical interventions under simulated conditions.		

1.2. Thematic units

1.2.8. Thematic unit 8– Practice 8: Endodontic microsurgery

1.2.8.1. Study tasks

Content: **Main topic:** Endodontic microsurgery List of subtopics: Demonstration of endodontic microsurgical interventions on biological preparetes (*ex vivo*) under an operating microscope.
Learning outcome of thematic unit: The student is able to perform endodontic microsurgical interventions under microscope under simulated conditions.
Background: **Technical foundation** Microscopes, biopreparates, instruments, materials and threads used for perform endodontic microsurgical interventions are provided by our institute.

Contact hours			**Individual learning process**		
Week 9 **90 min**	Active participation in practice, mastering methods of good clinical practice.	Active participation, questions for instructor, discussion of possible problems			

1.2.8.2. Self-assessment questions

1. What materials are used for retrograde filling and how is it performed?
2. During apicoectomy, how many millimetres of the root and how many percent of the lateral channels should be removed?
3. What are the main types of flaps?
4. What are the principles of creating flaps, what kind of instruments are used?

1.2.8.3. Self-evaluation based on self-assessment questions

Maximum number of points: 4. Successful completion requires completion of at least 60% (3 points).

1.2.8.4. Self-evaluation sheet

Please make sure that you have completed all the tasks for the thematic unit. When evaluating your own performance, please place an X in the most appropriate box. If any of the tasks listed have not been completed or were impossible to complete, put an X in the "No" column.

		No	Yes
1.	The student is familiar with the principles, materials and methods used at endodontic microsurgical interventions.		

1.2. Thematic units

1.2.9. Thematic unit 9 – Practice 9: Practical exam

1.2.9.1. Study tasks

Content: **Main topic:** Practical exam List of subtopics: (1) Microsurgical stitching on rubber pad and knotting (2) Mucosal sutures (vertical and horizontal mattress sutures), (3, optional) End-to-end and end-to-side anastomoses on silicone model of vessel.
Learning outcome of thematic unit: The student routinely uses the microsurgical instruments during stitching used in vascular- and neurosurgery, and performs microsurgical stitching using appropriate methods in compliance with the standards (good clinical practice) of microsurgery and with proper timing under simulated conditions.
Background: **Technical foundation** Microscopes, instruments, materials, threads used for stitching and knotting, on rubber pads and silicone vessel models are provided by our institute. ***Study materials:*** - Evaluation criteria for practical exam (see Appendix) (see OSATS evaluation sheet at end of document)

Contact hours			Individual learning process		
Week 10 **90 min**	Exam tasks: (1) Microsurgical stitching on rubber pad and knotting (2) Mucosal sutures (vertical and horizontal mattress sutures), (3, optional) End-to-end and end-to-side anastomoses on silicone model of vessel.		**30 min**		**Special instructions:** - Study evaluation criteria for practical exam (see Appendix) (see OSATS evaluation sheet at end of document)

1.2.9.2. Evaluation of the practical exam

Completion of a minimum two of all three exam tasks is mandatory in week 10. It is possible to improve the exam tasks for certain grades. The grade results from the average for the exam tasks.

1.2.9.3. Evaluation criteria for practical exam (see Appendix) (see OSATS evaluation sheet at end of document)

Institute of Surgical research „Microsurgery" practical exam (OSATS=Organized Structured Assessment of Technical Skills)
Each student starts from grade 5, which will be reduced by 1 grade each for errors/mistakes. Serious errors result in the exam being repeated.
If a student recognizes a mistake or misconduct, verbally indicates and corrects* it during certain procedures, no mark is deducted.

Evaluation of Task I. Microsurgical stitching on a rubber pad and knotting
Stitching on a knotting pad (performing 10 stitches into a vertical and 5 stitches into a horizontal incision followed by regular knotting using two instruments; maximum duration: 90 min)

Phases	**Skill**	**Mistakes: 1 mark deducted each (-1 point)**	**Deduction**
Mounting the needle	Mounting the needle in the needle holder at half of the length.	Incorrect mounting of the needle*	
Stitching	The needle holder / forceps is held in a pen-grip.	Holding and using the needle holder / forceps incorrectly.*	
	The tissue is fixed with forceps during the stitching, the needle is passed through the tissue while following its curvature. Meanwhile, the integrity of the tissue and needle is preserved	Damage to the tissue. Pinching the edge of the incision with the forceps. Breaking the needle/straightening the needle.	
	The distance of stitches from the edge is identical, and not bigger than the diameter of the needle.	The distances of the stitches from the incision site are not appropriate or not identical.*	
	Stitches are proportional (2 mm apart), perpendicular to the incision.	The distances between the stiches are not appropriate or not identical. The stitches are not perpendicular to the wound.*	
Knotting	Knots are performed properly (two knots are performed with alternating hands, both knots are simple).	The student is not able to knot with two instruments. The first half hitch is made with a double loop or more than two simple knots are made.*	
	The knots are of adequate tightness (the edges do not overlap).	Knots are too loose or too tight, the edges are overlapping.*	
	It takes up to a maximum of 90 minutes to place 15 stitches and knots.	Running out of time, slow execution of the task (suturing/knotting).	
Quality of stitches and knots	All stitches and knots are performed properly.	Only 60-80% of stitches and knots are regular.	
		Less than 60% of stitches and knots are regular.	-2

Evaluation of Tasks II. Performing of vertical mattress (Donati, double loop and Sato) and horizontal mattress sutures (surgical "zig-zag" (figure of 8) and both types of dentist' "zig-zag" (figure of 8) stitches) with use of a loupe or under a microscope (one stitch from each type, with instrumental knotting) (duration: max. 30 min)

Phases	**Skill**	**Mistakes: 1 mark deducted each (-1 point)**	**Deduction**
Mounting the needle	Mounting the needle in the needle holder at half of the length.	Incorrect mounting of the needle*	
Stitching	The needle holder / forceps is held in a pen-grip.	Holding and using the needle holder / forceps incorrectly.*	
	The needle is passed through the tissue while following its curvature. Meanwhile, the integrity of the tissue and needle is preserved.	Damage to the tissue. Breaking the needle/straightening the needle.	
	Performs the following stitch types on request: 1. Donati; 2. Double loop; 3. Sato; 4. surgical "zig-zag" (figure of 8); 5. dentists' "zig-zag" (figure of 8) type I; 6. dentists' "zig-zag" (figure of 8) type II	The student can not place the correct stitch type on request.	
	The distance of stitches from the edge is identical.	The distances of the stitches from the incision site are not appropriate or not identical.*	
	Stitches are proportional (2 mm apart), perpendicular to the incision.	The distances between the stiches are not appropriate or not identical. The stitches are not perpendicular to the wound.*	
Knotting	Knots are performed properly (two knots are performed with alternating hands).	The student is not able to knot with two instruments.	
	The knots are of adequate tightness (the edges do not overlap).	Knots are too loose or too tight, the edges are overlapping.*	
	It takes up to a maximum of 30 minutes to perform 6 different types of stitches.	Running out of time, slow execution of the task (suturing/knotting).	
Quality of stitches and knots	All stitches and knots are performed properly	Only 60-80% of stitches and knots are regular.	
		Less than 60% of stitches and knots are regular.	-2

Optional:

Evaluation of Tasks III. Stitching of an end-to-end and an end-to-side anastomosis on a silicone model of vessels

An end-to-end and an end-to-side anastomosis on a silicone vessel model with 2 mm diameter (placing of 8 regular stitches with knotting using two instruments; maximum duration: 90 min)

Phases	**Skill**	**Mistakes: 1 mark deducted each (-1 point)**	**Deduction**
Mounting the needle	Mounting the needle in the needle holder at half of the length.	Incorrect mounting of the needle*	
Stitching	The needle holder / forceps is held in a pen-grip.	Holding and using the needle holder / forceps incorrectly.*	
	Anastomoses are performed with the “halving technique”.	Stitches are not placed according to the “halving technique” or they are not placed in the correct order.	
	The tissue is fixed with forceps during the stitching, the needle is passed through the tissue while following its curvature. Meanwhile, the integrity of the tissue and needle is preserved	Damage to the tissue. Pinching the edge of the incision with the forceps. Breaking the needle/straightening the needle.	
	The distance of stitches from the edge is identical, and not bigger than the diameter of the needle.	The distances of the stitches from the incision site are not appropriate or not identical.*	
	Stitches are proportional (2 mm apart), perpendicular to the incision.	The distances between the stiches are not appropriate or not identical. The stitches are not perpendicular to the wound.*	
Knotting	Knots are performed properly (two knots are performed with alternating hands, both knots are simple).	The student is not able to knot with two instruments. The first half hitch is made with a double loop or more than two simple knots are made.*	
	The knots are of adequate tightness (the edges do not overlap).	Knots are too loose or too tight, the edges are overlapping.*	
	It takes up to a maximum of 90 minutes to perform both anastomoses (8+8 stitches and knots).	Running out of time, slow execution of the task (suturing/knotting).	
Quality of stitches and knots	All stitches and knots are performed properly.	Only 60-80% of stitches and knots are regular.	
		Less than 60% of stitches and knots are regular.	-2