Academic year 2021./2022.

Course title: Investigation of biological and technological properties of root canal obturation materials

Department: Department of Endodontics and Restorative Dentistry

Adress: School of Dental Medicine, University of Zagreb, Gundulićeva 5; 10000 Zagreb

Total ECTS points: 3.0

Course leader: Professor Ivana Miletić

Course associates: Assocciate professor Anja Baraba, Anamaria Brozović, senior research associate (Institut Ruđer Bošković)

Teaching plan

	No. classes
Lecture	6
Seminar	6
Practical	3
Total	15

1 class = 45 minutes

Course description

The biological and technological characteristics of root canal filling materials are one of the factors influencing the outcome of endodontically treated teeth. A combination of gutta-percha and fillers that come into contact with periapical tissue and whose composition can affect healing is most often used to fill root canals. In addition to biocompatibility, the success of endodontic treatment is also influenced by the sealing ability of materials for orthograde and retrograde fillings. The theoretical part of the course includes introducing students to the properties of materials, procedures for testing cytotoxicity, mutagenicity and genotoxicity *in vitro* and *in vivo*. The materials can cause cell death: necrosis or apoptosis. In this part of the lecture, a complex network of signalling apoptotic pathways leading to cell death will be presented. The lectures will deal with the antibacterial properties of materials and methods of testing the antibacterial effect on microorganisms that are most often found in the root canal. Special focus will be to trends in future research. Seminars and exercises include introduction to cytotoxicity and mutagenicity testing procedures *in vitro* and *in vivo*, procedures for testing the antibacterial activity of root canal filling materials and testing the technological characteristics of materials.

Learning outcomes

1. Describe the properties of different root canal filling materials
2. Define procedures for testing the cytotoxicity, genotoxicity and antibacterial properties of root canal filling materials

3. Explain different forms of cell death
4. Describe procedures for testing the technological properties of root canal filling materials

Course content

Lecture

	Lecture topics	Number of classes/hours
1.	Root canal obturation materials	2
2.	Biological and technological testing of the obturation materials	2
3.	Investigation of bond strength of orthograde and retrograde filling materials	2
4.	-	-
5.	-	-
6.	-	-
7.	-	-
8.	-	-
9.	-	-
10.	-	-

1 sat = 45 minuta

Seminari

	Seminar topics	Number of classes/hours
1.	Bioceramic materials for orthograde and retrograde obturation	3
2.	Influence of oral medium on orthograde and retrograde filling materials	3
3.	-	-
4.	-	-
5.	-	-
6.	-	-
7.	-	-
8.	-	-
9.	-	-
10.	-	-

1 sat = 45 minuta

Vježbe

	practicals topics	Number of classes/hours
1.	Biological testing	2

2.	Technological testing	1
3.	-	-
4.	-	-
5.	-	-
6.	-	-
7.	-	-
8.	-	-
9.	-	-
10.	-	-

1 class = 45 minutes

Literature

1. Rotstein I, Ingle JI. Ingle's Endodontics. 7th ed. PMPH, USA 2019.
2. Berman LH, Hargreaves KM. Cohen's Pathways of the pulp. 12 ed. Elsevier 2020.
3. Torabinejad M, Rubinstein R. The art and science of contemporary surgical endodontics.1st ed. Quintessence Publishing Co, Inc. 2017.
4. Trope M, Debelian G. Priručnik iz endodoncije za praktičara. Quintessence, Publishin Co, Ltd, Chicago, Berlin. London Tokyo 2009.

CV (*curriculum vitae*) and bibliography of course leader

Professor Ivana Miletić was born on March 16, 1971 in Zagreb. She graduated from the School of Dental Medicine, University of Zagreb in 1995. Since 1996, she has been employed at the Department of Dental Pathology as a research fellow. She got her master degree in 1998., and PhD in 2000. In 2004., she passed the specialist exam in endodontics and dental pathology. She became an assistant professor in 2001., an associate professor in 2005., and in 2008. full professor: Since 2013. she has been a full professor with tenure. She has become primarius from 2021. Field of scientific activity includes endodontics, restorative dentistry and cariology. She was involved in the application of lasers in dentistry, testing of caries-preventive biomaterials, materials for obturation of root canals and post- endodontic reconstruction. She collaborates with colleagues from many countries, which has resulted in many scientific papers. She has led several university grants and is the leader of the project: "Research and development of new micro and nanostructured materials in dental medicine" funded by the Croatian Science Foundation (BIODENTMED No. 1718). In 2020, the CSF approved the funding of a PhD student under her mentorship. He is the leader of a multicentre clinical study whose results were published after two years in a scientific journal with a high impact factor. She has published 187 scientific and professional papers, conference papers and book chapters. Of these, 71 papers were published in journals indexed in WoSCC / ESCI citation indexes, cited 735 times (WoSCC) with H-index 18. She has actively participated in numerous domestic, European and world congresses

and held numerous invitational lectures at home and abroad. She has organized numerous courses and symposia. She has mentored two doctoral theses, and two more dissertations are under her mentorship. She was also a mentor to candidates for scientific master's degrees (9 defended scientific master's degrees). He actively participates in clinical and preclinical classes. He is the leader of the course "Clinical Endodontics I" in the Integrated Undergraduate and Graduate Studies, courses in postgraduate doctoral studies - dental medicine and postgraduate specialist studies, and participates in lectures within the continuing education of dentists. She actively speaks and writes English. She is a member of the following associations and societies: IADR (International Association for Dental Research), Ambassador to IADR from 2017 to 2020, Croatian Medical Association, Croatian Dental Society, Croatian Chamber of Dental Medicine. She was the secretary and country representative at the European Endodontic Society from 2006 to 2014. She is the founder and President of the Croatian Society for Minimum Interventional Dental Medicine-CMA, a member of the board of the Croatian Dental Society - CMA and vice president since 2021. In 2009 she received an award from the Croatian Medical Association in recognition of her special contribution, medical science and health in the Republic of Croatia, and in 2017 - a letter of thanks from the Croatian Medical Association. She got the State Award for Science for 2020 and the award "Andrija Štampar" in 2021. She is a member of the Science Committee and Vice President, and for International Cooperation. He is a member of the editorial board of "Applied Science", "Materials" and a guest editor of the journal "Materials". She is a reviewer for the journals: Journal of Dentistry, Journal of Adhesion Science and Technology, Clinical Oral Investigation, Photomedicine and Laser Surgery, Photodiagnosis and Photodynamic Therapy, Oral Health and Preventive Dentistry, Archives of Oral Biology, Indian Journal of Dental Research, Collegium Antropologicum, Acta Stomatologica Croatica, Acta Clinica Croatica, British Dental Journal, Journal of Adhesive Dentistry.

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