Academic year 2021./2022.

Course title: Experimemntal procedures for determining the quality of composite materials

Department: Department for endodontics and restoratoive dentistry

Adress: University of Zagreb School of Dental Medicine, Gunduliceva 5, 10000 Zagreb

Total ECTS points: 4

Course leader: Professor Zrinka Tarle

Course associates. -

Teaching plan

	No. classes
Lecture	6
Seminar	7
Practical	7
Total	

1 class = 45 minutes

Course description

The development of composite materials is considered one of the greatest successes in dentistry. It is more correct to say that the Triassic: adhesion technology, composite materials and light polymerization is the foundation of modern restorative dentistry.

As composite materials have found applications in all branches of contemporary dental medicine, daily work in modern dental practice is unthinkable without this material group. Composite materials are used for many indications, ranging from reconstructions of carious defects, traumas, morphological and aesthetic abnormalities, discolorations in permanent and deciduous dentition, as cavity coatings, pit and fissure sealants, inlays, onlays, overlays, crowns, luting materials for indirect restorations and intracanal posts, for making core buildups, splints, adhesive bonding of orthodontic braces, etc.

Today's materials are expected to fit perfectly into existing dentition, simulating a natural tooth in color, translucency, shape and texture/morphology, while having adequate strength, wear, marginal adjustment, sealing, insolubility and biocompatibility. The improvement of materials and procedure in this area has resulted in very high quality, functionally and aesthetically stable restorations. Modern/recent composite materials have optimal combiations of their components that provide them with excellent physical-mechanical, boiological, optical and aesthetic properties compoarable to healthy enamel. In this course, the doctoral

student will acquire theorethical knowledge as well as experimental procedures for evaluation the quality of composite materuials such as: Fourier transform infrared spectroscopy (FTIR), electron microsvopy, and testing the physical and mechanical properties of composite materials.

Learning outcomes

1. Describe the concept of composite materials
2. Distuinguish types of composite materials and compare their properties
3. Analyse the advantages and disadvantages of individual materials and combine certain in different indications
4. Create optimal material with good physical-mechanical, aesthetic and biological properties

Course contet

Lecture

	Lecture topics	**Number of classes/hours**
1.	-definition, development and composition of resinuous composite materials	1
2.	-properties of composite materials	1
3.	-classification of composite materials	1
4.	-advantages and disadvantages of composite materials	1
5.	-experimental composite materials	2
6.	-	-
7.	-	-
8.	-	-
9.	-	-
10.	-	-

1 sat = 45 minuta

Seminari

	Seminar topics	**Number of classes/hours**
1.	-polymerization shrinkage and stress	2
2.	-degree of conversion and biocoompatibility	2
3.	-bioactive composite materials	1

4.	-the future of composite materials	2
5.	-	-
6.	-	-
7.	-	-
8.	-	-
9.	-	-
10.	-	-

1 sat = 45 minuta

Vježbe

	practicals topics	**Number of classes/hours**
1.	-FTIR – determination of the degree of conversion of composite materials	3
2.	-Universal instrument for testing of mechanical properties, Inspekt duo 5kN	4
3.	-	-
4.	-	-
5.	-	-
6.	-	-
7.	-	-
8.	-	-
9.	-	-
10.	-	-

1 class = 45 minutes

Literature

TARLE Z et al. Restorative dental medicine. Zagreb: Medicinska naklada; 2021.

TARLE Z, ATTIN T, MAROVIC D, ANDERMATT L, RISTIC M, TAUBÖCK TT. Influence of irradiation time on subsurface degree of conversion and microhardness of high-viscosity bulk-fill resin composites. Clin Oral Investig. 2015;19:831-40.

TARLE Z, PAR M. Bioactive dental composite materials. Rad HAZU. 2018;533(45):83-100. DOI: 10.21857/mnlqgc02ky

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

Zrinka Tarle was born on the 28th of August 1969.

She is a full professor, permanent position in the field of restorative dentistry and endodontics at the School of Dental Medicine, University of Zagreb. Her field of expertise is based on the investigation of properties and possible improvements of materials and procedures in restorative dental medicine. She obtained a PhD degree in 1995 with the doctoral dissertation "The evaluation of polymerization effect of pulsed laser light source in the composite resin sample".

She was the leader of the top graded project funded by the Ministry of Science "Nanostructure of restorative materials and interactions with hard dental tissues", the principal investigator of the program of Croatian Science Foundation: "Evaluation of new bioactive materials and procedure in restorative dental medicine", „Biomimetic intelligent composite materials" (active) and IADR project: Bulk versus incremental layering of composite: a practice-based, randomized, controlled, prospective clinical study: 'CED-IADR PBRN project'

She is a Dean of School of dental Medicine University of Zagreb from 2018. She was a Vice dean for Science and Research from 2007 to 2018., head of Postgraduate Doctoral Study Dental Medicine and head of Restorative dental medicine.

She was a mentor on 25 graduate theses, 2 master and 10 doctoral dissertations.
She is the author of more than 220 publications, lecturer at numerous national and international meetings and organizer of different courses, symposia and congresses.

She is a Board member of CED IADR (2008-2016, President 2013-2014), PER IADR (2014-; Treasurer 2016-), AODES (2015-2019) and a member of IADR Nominating (2015-2017, 2017-2018-Chair) and Tellers Committee (2018-2021. 2021-2021-Chair); a member of many international and national scientific associations, as well as boards and committees of University, Ministry of Science, Ministry of Health, Croatian Academy of Sciences and Arts and Croatian Science Foundation.

She got many national and international awards for her scientific work but the most important one was the National Award for Science in 2012. The biggest privilege was her choice in the Croatian Academy of Sciences and Arts.
She is married and the mother of two sons.

Bibliography:

https://www.bib.irb.hr/pretraga?operators=and|Tarle,%20Zrinka%20%2828282%29|text|profile