University for Digital Technologies
in Medicine & Dentistry
Luxembourg

Module catalogue of the DTMD University for Digital Technologies in Medicine and Dentistry for the extra occupational master program " Periodontology/Implantology "

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1. Basics of dental anatomy and science			
Forms of teaching	▪ Lectures ▪ Practical courses	Name/s of lecturer/s	NN
Learning outcome	One aim of this course is refreshing the students‘knowledge in anatomy. The scientific names and functions of anatomical structures in the oral and maxillofacial area are common to them. The dissection course on prepared heads is supposed to give a spatial orientation and to teach possible position anomalies of anatomical structures which should be kept in mind during an operation. Another goal of this course is giving a deeper insight into scientific work by means of a hands-on-training. After the photo course the students are able to make photographic documentations of their clinical cases. They can deal with the difficult conditions occurring in intraoral photography and know which devices can be useful to them. Furthermore, the students are capable of doing literature research in renowned medical data bases such as PubMed. They know the relevant items in searching and choosing the correct articles. Apart from that they can interpret the studies with their statistics to make statements in their own work field. Using presentation programs such as power point is another item of the course. The students learn how to create their own presentations respecting the current design rules.		
Contents	▪ Anatomy ▪ Photo documentation ▪ Literature research ▪ Interpretation of studies ▪ Presentation		

2. Treatment concepts in implantology and periodontology			
Forms of teaching	Lectures	Name/s of lecturer/s	NN
Learning outcome	After this course the students know different treatment concepts in implantology and periodontology and their patient-centered and guideline-based application. They are capable of restructuring their practices regarding equipment, organisation and the employees‘ education and training to meet the requirements of the treatment concepts. Furthermore, the students are familiar with the use of the different instruments in peridontology and their preparation. The surgical instruments needed for an implantation and the different types of implant material including their advantages and disadvantages are known to them. Depending on the treatment concept these methods can be applied correctly in the individual patient situation. Apart from that the students are capable of interpreting x-rays regarding the relevant periodontal and implantological aspects. They know which imaging method (CT, DVT, x-ray) is indicated in the individual situation. The students are able to classify different levels of periodontitis due to clinical and diagnostic parameters in order to plan the optimal treatment for the patient. Besides inspection plaque and gum inflammation can be determined with the help of plaque- and gingiva-indices. Therefore, indices with yes/no-decision (such as the modified approximate plaque index and the modified sulcus bleeding index (Lange et al.)) for follow-up examinations and differentiated indices (such as the plaque index by Quigley and Hein and the gingiva index by Silness and Löe) are available. These and other indices are introduced and applied. Furthermore, the students know how to document a periodontal status including attachment loss. They can assess the actual inflammation activity of a gingival pocket by observing bleeding on probing. Additionally, tooth loosening and defect furcations can be classified in order to draw up a prognosis. On the basis of medical findings gained by the said diagnostic parameters the students can decide which of the eight main groups of the actual classification fits the present case. Furthermore, the innovations currently made in within this system are introduced.		
Contents	▪ Treatment concepts in periodontology ▪ Treatment concepts in implantology ▪ Practice requirements ▪ Education of assistances ▪ Practice structure		

2. Treatment concepts in implantology and periodontology	
	▪ Instruments ▪ Operation tools ▪ Implant materials ▪ X-ray ▪ DVT ▪ Indices ▪ Classifications ▪ ITI Classification for assessing the level of difficulty of the case

3. Periodontal disease and non-surgical therapy			
Forms of teaching	▪ Lectures	Name/s of lecturer/s	NN
Learning outcome	In this course the focus is on the non-surgical therapy of periodontal disease. They learn the theoretical backgrounds and the practical implementation of guideline-orientated therapy. Special attention is paid on the initial therapy of periodontitis. Apart from that the students get to know advantages and disadvantages of possible adjunctive therapies and their correct practical and chronological implementation regarding the latest research results. Laser treatment, photodynamic, antibiotic and prebiotic therapy are some of those adjunctive therapies. The common materials and active agents are explained in detail. Another feature of this course consists in the systemic aspects of periodontitis therapy. Given clinical examples the students learn the relevance of factors like nutrition, habits, hormones and underlying diseases in the aetiology of periodontitis. They can offer advice to their patients about compliance-dependent factors and they can also communicate with other professional disciplines, for example the internal medicine. The relevance of a responsible follow-up care is underlined. The students know about the importance of regular oral hygiene instructions, measuring the gingival pockets and professional cleaning provided by the practice team. They can set its frequency regarding the patient's individual risk in order to ensure long-term treatment success.		
Contents	▪ Pretreatment ▪ Initial therapy ▪ Adjunctive therapy (Laser, photodynamic therapy, antibiotics, prebiotics) ▪ Systemic aspects (nutrition, underlying diseases, internal medical support, supporting periodontitis therapy)		

4. Perio-plastic aesthetic surgery in implantology			
Forms of teaching	▪ Lectures ▪ Practical Courses	Name/s of lecturer/s	NN
Learning outcome	After this module the students know the clinical steps and techniques of perio-plastic aesthetic surgery. In order to provide a satisfying primary stability implants need to be inserted into a jaw bone which has a sufficient vertical dimension. After tooth loss the non-strained bone is resorbed after a while. For placing an implant the missing bone must be augmented at first. By means of a hands-on-training the students learn which techniques and bone replacement materials are available and what are their advantages and disadvantages. They also learn when it is the right moment to use them during the healing process. The students know which areas and techniques are suitable for transplanting connective tissue grafts. They are confident in using the taught transplant removal techniques and the implant uncovering techniques. Apart from that they know which bone replacement materials are suitable in different clinical situations and how to use them. They can transplant free grafts. Furthermore, they know how the tissue develops during the wound healing process and they can diagnose and treat complications such as rejection of the graft or wound healing disorder. They are capable of covering recessions around implants in order to achieve an aesthetically and hygienically perfect outcome.		
Contents	▪ Ridge augmentation ▪ Bone replacement materials ▪ Connective tissue grafts ▪ Removal techniques ▪ Uncovering techniques ▪ Free grafts ▪ Recession coverage and grafts		

5. Surgical therapy of periodontal disease and recession treatment

Forms of teaching	▪ Lectures ▪ Practical courses	Name/s of lecturer/s	NN
Learning outcome	After this course the students are familiar with the principles of the surgical therapy of periodontal disease. They know which kind of operation is required in special clinical cases and how it is prepared. Both theoretically and practically, the students learn different flap techniques which allow the removal of concrements and pathogenic microorganisms under visual inspection. Another item of this course is the resective therapy. By removing parts of the bone a positive bone architecture is built, which leads to a better attachment of the soft tissue. The resective therapy of furcation defects, which contains odontoplasty, root amputation/hemisection and premolarization, is also taught and practised. The students learn new possibilities and limits of regenerative therapy, which aims at the new formation of periodontal structures. Therefore, bone replacement materials are used to serve osteogenesis, osteoinsuction and osteokonductivity. These materials have different advantages, disadvantages and indications regarding their origin (autologous, allogenic, xenogenic). All their properties are explained in detail. The „guided tissue regeneration“(GTR) stops the immediate proliferation of the rapid recovering epithelium cells in order to provide enough time for the slow recovering periodontal cells. This is enabled by a mechanical border. For this purpose, different absorbable and non-absorbable membranes are available. Enamel matrix derivatives such as Emdogain® are available to stimulate the new formation of root cementum. By means of a hands-on-training the handling of these materials is taught. Furthermore, the theoretical and practical background of the surgical methods of recession coverage is taught. Here the recession is assigned to the corresponding Miller class in order to predict both treatment success and surgical possibilities. The students know which conditions (oral hygiene, no inflammations, removal of root caries and fillings) need to be fulfilled before a surgery can be done. Depending on the origin of the recession (anatomical like tooth shape or muscle pulls or external influences like trauma or inflammation) different techniques are used. There are pedicle flaps including rotational pedicels and coronally advanced flaps, as well as free grafts (epithelial and subepithelial). Furthermore, frenotomy and frenectomy are applied.		
Contents	▪ OP-indications ▪ OP-preparation		

5. Surgical therapy of periodontal disease and recession treatment	
	▪ Flap surgery ▪ Resective therapy ▪ Regenerative therapy ▪ Material (EMD®, GTR, KEM) ▪ Recession coverage

6. Hard tissue augmentation I			
Forms of teaching	▪ Lectures	Name/s of lecturer/s	NN
Learning outcome	This course concentrates on hard tissue augmentation. In practical lessons different methods of bone augmentation, such as the lateral augmentation of horizontal bone defects, are taught. A sufficient bone width is required for the stable insertion of implants and for stabilising soft tissue in order to prevent recessions, especially in the region of papillae. For instance, this can be achieved by transplanting bone blocks. The technique of „Guided Bone Regeneration (GBR)“ uses absorbable and non-absorbable membranes to protect and stabilise vertical and horizontal bone transplants. Especially combined with bone replacement material this method promises success. By using membranes and mesh, large defects can be covered and soft tissue can be shaped in order to achieve optimal aesthetics and a good cleanability. Advantages and disadvantages of the different types of membranes and bone replacement materials (autologous, allogenic, xenogenic) are taught and all the named techniques are practised within a hands-on training. Vertical augmentation, such as internal and external sinus floor elevation, is used on severely atrophied jaw. These challenging techniques require theoretical and practical skills, which are taught in this module.		
Contents	▪ Bone augmentation ▪ GBR-technique ▪ Materials (autologous, allogenic, xenogenic) ▪ Bone blocks ▪ Sinus lift ▪ Membranes		

7. Hard tissue augmentation II			
Forms of teaching	▪ Lectures	Name/s of lecturer/s	NN
Learning outcome	This class deepens the content of the previous module. The focus is on bone augmentation using bone blocks in different clinical cases. Here special attention is paid to the reconstruction of severely atrophied bone. For this purpose, autologous bone, for example won from the iliac crest, or bone replacement material can be used. Apart from that additional surgical interventions, such as sinus lift in the upper jaw or vestibuloplasty, are necessary. Augmentation is also used on vertical defects next to single teeth. Here the defect is filled by bone or bone replacement material and protected by a membrane to improve the chances of recovery. Furthermore, the students learn the handling of „Platelet Rich Fibrin(PRF)“-membranes. Here fibrin and endogenous growth factors are isolated from centrifuged blood. These growth factors stimulate and accelerate the healing process without the risk of a rejection reaction. The extracted material is put on the filled defect so that the growth factors can have a local effect. The use of synthesized growth factors is another item of this module.		
Contents	▪ Bone augmentation using bone blocks ▪ Reconstruction of severely atrophied jaw ▪ Vertical augmentation on single teeth ▪ PRF ▪ Growth factors		

8. Clinical cases for hard and soft tissue augmentation			
Forms of teaching	▪ Lectures	Name/s of lecturer/s	NN
Learning outcome	Clinical cases solved with hard and soft tissue augmentation are introduced. The whole process with focus on the surgical aspect is explained. Intraoperative photographs are used to explain the implemented surgical techniques in detail. Also the outcome and possible alternative therapies are discussed with regard on the experience of the treating dentist.		
Contents	▪ Clinical cases ▪ Surgical techniques ▪ discussion		

9. Basics of implant prosthetics			
Forms of teaching	Lectures	Name/s of lecturer/s	NN
Learning outcome	In this module the students learn the basics of implant prosthetics. The temporary restoration can be made in the lab or chairside. An immediate restoration is important especially in the anterior region, where it is designed without contact. In the posterior region clamping effects should be avoided. The different techniques are explained. Temporary restorations are needed in case of immediate or early loading if they are indispensable for aesthetics and function. Removable dentures, adhesive bridges and temporary bridges are used for that. Because the temporary treatment helps shaping the soft tissue it is an important treatment step. Techniques to design an ideal emergence profile are demonstrated. The students ought to understand the technical steps taking place in the lab. Furthermore, different impression techniques (open and closed-tray impressions) and their indications, advantages and disadvantages are explained. The production and use of individualised impression posts are also detailed. An important aspect of implant prosthetics is the choice of the correct abutment. It links the implant to the visible prosthetic restoration. There are abutments made of titanium and ceramics. They can be pre-assembled and possibly grindable or they can be individually adjusted on the patient's situation by the CAD/CAM method. The students learn how to select the correct abutment following certain criteria. They also learn the advantages and disadvantages of different prosthetic materials.		
Contents	▪ Temporary treatment ▪ Emergence profile ▪ Master cast fabrication ▪ Selecting the abutment and individualisation ▪ Impression ▪ Materials		

10. Prosthetic solutions on implants

Forms of teaching	E-Learning	Name/s of lecturer/s	NN
Learning outcome	In this module the possible prosthetic solutions on implants are introduced. Fixed restorations with screwed or individually produced crowns are used for single tooth gaps and bridge restorations. The diminished jaw can be treated with telescope systems, ball abutments, locators, magnets and bar restorations. These methods and their indications are explained in detail. Especially in complex clinical cases it is important to choose the right restoration because different systems can be combined with each other or with the residual dentition as a hybrid prosthesis. The students learn the single clinical and technical steps in the correct order. Apart from that they learn how to deal with complications. Another feature of this module is digital implantology which is increasingly prevalent. By virtual 3d-planning the correct implant positions can be set and transmitted to a template which can be produced by CAD/CAM technique. Abutments and temporary restorations can also be produced with this method. The students get to know the new possibilities of digital dentistry.		
Contents	▪ Fixed and removable restorations ▪ Enchoring elements for removable dentures ▪ Complex clinical cases ▪ Clinical and technical work steps ▪ Complication management ▪ Digital solutions		

11. Implantation in perio-patients and prosthetic cases

Forms of teaching	E-Learning	Name/s of lecturer/s	NN
Learning outcome	In this course the students learn how to deal with the difficulties in inserting implants into perio-patients' jaws. There are different aspects to be respected for there is a high risk of losing the implant due to periimplantitis. Making sure careful pre-treatments and follow-up treatments are provided the long-term prognosis of the implants is only slightly decreased in perio-patients. On the one hand it is important which implant system and surface or coating is used to provide an uneventful healing. On the other hand, any inflammation should be eliminated by a periodontal pre-treatment. The students learn what is important about the pre-treatment and how they can measure a success. The follow-up treatment consists of removing subgingival plaque from surfaces, measuring the probing depth, defining reference points and improving the patient's compliance. The surgical approach being ideal in terms of practical work and time management is made subject of discussion. Correcting soft tissue deficits of recessions is of importance in order to provide a good osseointegration. Types of healing and prosthetic aspects are explained. Depending if single tooth gaps need to be filled or if implants provide the possibility of a fixed or combined fixed and removal restoration to increase the number of abutments, different aspects have to be considered. Different clinical cases are shown. The students learn which technical aspects are to be considered in order to design a periodontally perfect superstructure, for example easy removal of cement residues and a good cleanability.		
Contents	▪ Materials (implantats, surfaces, links) ▪ OP-pre-treatment ▪ OP-preparation ▪ OP-process ▪ Types of healing ▪ Prosthethic aspects		

12. Implantation in esthetic regions and immediate restaurations

Forms of teaching	E-Learning	Name/s of lecturer/s	NN
Learning outcome	This module deals with implantation and temporary restoration in aesthetic regions. The tooth extraction itself can already pave the way for aesthetics. That is why a traumatic extraction is to be avoided and the buccal lamella is to be protected. Techniques and instruments to achieve that aim are introduced to the students. Furthermore, the relevance of the right time for implantation regarding the aesthetic outcome is discussed. There are an immediate implantation, a delayed immediate implantation (6-8 weeks after extraction) and a late implantation to be distinguished. To obtain an aesthetically ideal result, a preferably early implantation considering the biological circumstances should be aspired. The low-risk late implantation should be chosen for aesthetically less relevant regions. Each method with its advantages and disadvantages is explained in detail. Furthermore, the surgical, biological and prosthetic risks which can influence the aesthetic results are treated. Typical trouble spots as they occur in the practice and ways to solve them are presented.		
Contents	▪ Extraction ▪ Immediate implantation ▪ Delayed implantation ▪ Risks and trouble spots		

13. Clinical cases in implantology and periodontology

Forms of teaching	E-Learning	Name/s of lecturer/s	NN
Learning outcome	In this course different clinical cases in the field of implantology and periodontology are introduced. The whole process starting with anamnesis, pre-treatment, surgical and prosthetic treatment up to follow-up treatments is demonstrated with the help of photographs. The applied (periodontal-)surgical procedures and the individual problems are detailed. The outcome and possible alternative therapies are discussed and the students can benefit from the wealth of experience of the docent.		
Contents	▪ Clinical cases ▪ Surgical procedures in implantology and parodontology ▪ discussion		

14. Periimplantitis and prevention			
Forms of teaching	▪ Lectures	Name/s of lecturer/s	NN
Learning outcome	After this module the students are familiar with the aetiology and pathogenesis of periimplantitis, the inflammation of the implant bed and its precursor, the mucositis. They know about the relations between the pathogenic bacterial flora, oral hygiene, the conditions of the tissue, the implant abutment, the prosthetic restoration and systemic factors (underlying diseases, nicotine consumption, immune status) Diagnostic methods using periodontal probes and x-ray technique and the following classification of the defect are explained by reference to clinical examples. Furthermore, therapy opportunities like cleaning the implant's surface, surgical intervention with possible augmentation and explantation are shown. Furthermore, additional medicine and its effects are explained. The students learn how periimplantitis can be prevented by preventive measures. In each treatment step there are possible error sources: During the surgery (e.g. trauma, wrong positioning of the implant), designing the prosthetics (cleanability, misfit), insertion (excess cement). The pre-treatment of periodontally diseased teeth, which increase the risk of periimplantitis, is another item of this module. Besides the students learn the important aspects of the follow-up treatment.		
Contents	▪ Diagnostics ▪ Therapy ▪ Prevention		