University for Digital Technologies
in Medicine & Dentistry
Luxembourg

Module catalogue

for the extra occupational postgraduate master programme

Orthodontics

with the degree

Master of Science (MSc)

DTMD University for Digital Technologies in Medicine & Dentistry

Luxembourg

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DTMD university based in Luxembourg has decided on the following module catalogue for the extra occupational postgraduate master programme **Orthodontics**:

Module: 1	**Module title:** Introduction to orthodontics, diagnostics, treatment methods	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 1	**Type:** Compulsory module
Credit points: 4 ECTS	**Overall workload in h:** 88	**Attendance time in h:** 8 **Practical Work in h:** 40
		Self-study in h: 40
Duration and frequency: 1 day 1. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - name indications, use and purpose of orthodontics - explain different types of dysgnathia and describe common orthodontic problems using examples - describe diagnostic means used in orthodontics, such as the clinical examination, model analyses and imaging techniques - explain different treatment methods and criteria for choosing the right therapy depending on the type of dysgnathia and patient-related factors like compliance, dentition and age - differentiate removable and fixed appliances, functional orthodontics, surgical methods and further orthodontic possibilities focussing on their application ranges, advantages and disadvantages - describe the structure of a typical treatment process in chronological order – from the patient's first consultation to follow-up care	
Contents:	- introduction - use and purpose of orthodontics - clinical cases - introduction to orthodontic diagnostics	
Forms of teaching:	Lectures and practical exercise	
Type of learning:	Lectures with interactive elements, practical exercises in groups	

Requirements for awarding credit points (module examination, extent and duration of the examination):	compulsory participation (electronic check) - practical exercises under supervision - passed exam, duration of the examination 2h - in case of E-Learning: usage of all media available, 4-day release for exam
Applicability of the module:	No, specialized module
(Basic)-Literature:	- Graber, L. W., Vanarsdall Jr., R. W., Vig, K. W., & Huang, G. J. (2016). Orthodontics: Current Principles And Techniques. USA: Mosby/Elsevier. - Huang, G. J. (2018). Evidence-based orthodontics. USA: Wiley-Blackwell. - William R. Proffit, H. W. (2018). Contemporary Orthodontics. Philadelphia: Elsevier. - Bock, J. J., Bock, J., & Bock, F. (2011). Grundwissen Kieferorthopädie: Interdisziplinäre Zusammenarbeit, Diagnostik, Therapie. Balingen: Spitta-Verlag. - Diedrich, P. (2000). PDZ-Studienausgabe KFO Paket: Kieferorthopädie I, II, III. München: Urban & Fischer Verlag/Elsevier GmbH. - Harzer, W. (2011). Checklisten Zahnmedizin: Kieferorthopädie. Stuttgart: Thieme. - Knak, S. (2003). Praxisleitfaden Kieferorthopädie. München: Urban & Fischer Verlag/ Elsevier GmbH. - Notzel, F., & Schulze, C. (2008). Leitfaden der kieferorthopädischen Diagnostik: Analysen und Tabellen für die Praxis. Köln: Deutscher Ärzteverlag. - Sander, F. G., Schwenzer, N., & Ehrenfeld, M. (2011). ZMK-Heilkunde - Kieferorthopädie. Stuttgart: Thieme. - Schopf, P. (2008). Curriculum Kieferorthopädie - Band I und II. Berlin: Quintessenz. - Wichelhaus, A., Eichenberg, T., & Günter, A. (2017). Farbatlanten der Zahnmedizin: Kieferorthopädie - Therapie Band 1: Grundlegende Behandlungskonzepte. Stuttgart: Thieme.

Module: 2	**Module title:** Diagnostics I	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 1	**Type:** Compulsory module
Credit points: 5 ECTS	**Overall workload in h:** 128	**Attendance time in h:** 8 **Practical Work in h:** 20 **Self-study in h:** 100
Duration and frequency: 1 day 1. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - explain the basics of orthodontic diagnostics - implement those basics practically - take note of special orthodontic aspects during the anamnesis interview besides the general medical history - take anomalies, growth, pre-treatments and third-party medical history into account during the anamnesis interview - perform a clinical examination in orthodontics - deal with paediatric or adolescent patients and their parents, which requires special manners of communication - describe the correct manufacturing and measuring of models for model analysis, which is one of the main pillars of orthodontic diagnostics - carry out a model analysis on clinical examples	
Contents:	- anamnesis - clinical examination - model analysis	
Forms of teaching:	Lectures and practical exercise	
Type of learning:	Lectures and practical exercises in groups	
Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision - passed exam, duration of the examination 2h	

	- in case of E-Learning: usage of all media available, 4-day release for exam
Applicability of the module:	No, specialized module
(Basic)-Literature:	- Huang, G. J. (2018). Evidence-based orthodontics. USA: Wiley-Blackwell. - Lee W. Graber, R. L. (2016). Orthodontics: Current Principles and Techniques. St. Louis: Elsevier. - Rakosi, T., & Jonas, I. (1992). Color Atlas of Dental Medicine - Orthodontic Diagnosis. Stuttgart: Thieme. - Knak, S. (2003). Praxisleitfaden Kieferorthopädie. München: Urban & Fischer Verlag/ Elsevier GmbH. - Notzel, F., & Schulze, C. (2008). Leitfaden der kieferorthopädischen Diagnostik: Analysen und Tabellen für die Praxis. Köln: Deutscher Ärzteverlag. - Harzer, W. (2011). Checklisten Zahnmedizin: Kieferorthopädie. Stuttgart: Thieme.

Module: 3	**Module title:** Diagnostics II	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 1	**Type:** Compulsory module
Credit points: 5 ECTS	**Overall workload in h:** 128	**Attendance time in h:** 8 **Practical Work in h:** 40
		Self-study in h: 80
Duration and frequency: 1 day 1. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - interpret and analyse imaging diagnostics used in orthodontics - plan orthodontic therapies based on X-rays - take intraoral and extraoral photographs - perform a photo analysis which is used for monitoring and final evaluation and which is supposed to record visible functional and aesthetic disproportions - explain X-ray techniques commonly used in orthodontics - determine the patient's dentition age and anatomical features of the periodontium based on the orthopantomogram as a panoramic radiograph - determine the shape of the profile, teeth and jaw position and growth patterns using the cephalometric X-ray - use modern three dimensional methods, such as digital volume tomography - develop a suitable therapy plan which is based on the cephalometric analysis - draw precisely defined cephalometric landmarks, planes and angles on the cephalometric X-ray, put them into relation to each other and compare them to standard values - make a diagnosis and create a therapy plan on the basis of the results of the cephalometric analysis - perform cephalometric analyses for different clinical cases using cephalometric X-rays and draw all the taught landmarks and lines	

	- scientifically and descriptively present clinical cases by selecting suitable patient data and illustrative material
Contents:	- photo analysis - orthopantomogram - cephalometry - DVT - planning - drawing of different clinical cases - practice of cephalometric landmarks on cephalometric X-rays - presentation of clinical cases
Forms of teaching:	Lectures and practical exercise
Type of learning:	Lectures and practical exercises in groups
Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision - passed exam, duration of the examination 2h - in case of E-Learning: usage of all media available, 4-day release for exam
Applicability of the module:	No, specialized module
(Basic)-Literature:	- Lee W. Graber, R. L. (2016). Orthodontics: Current Principles and Techniques. St. Louis: Elsevier. - Huang, G. J. (2018). Evidence-based orthodontics. USA: Wiley-Blackwell. - Rakosi, T., & Jonas, I. (1992). Color Atlas of Dental Medicine - Orthodontic Diagnosis. Stuttgart: Thieme. - Drasnin, S. (2016). PowerPoint 2016: Die Anleitung in Bildern. Bonn: Vierfarben. - Harzer, W. (2011). Checklisten Zahnmedizin: Kieferorthopädie. Stuttgart: Thieme. - Knak, S. (2003). Praxisleitfaden Kieferorthopädie. München: Urban & Fischer Verlag/ Elsevier GmbH. - Notzel, F., & Schulze, C. (2008). Leitfaden der kieferorthopädischen Diagnostik: Analysen und Tabellen für die Praxis. Köln: Deutscher Ärzteverlag.

Module: 4	**Module title:** Presentation/writing techniques, anatomy: growth, bone and tooth movement	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 1	**Type:** Compulsory module
Credit points: 4 ECTS	**Overall workload in h:** 88	**Attendance time in h:** 8 **Practical Work in h:** 40
		Self-study in h: 40
Duration and frequency: 1 day 1. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - do scientific work - do literature research and interpret studies - write a scientific paper to prepare the future writing of a master thesis - name and show anatomical structures and their functions in the oral and maxillofacial area - explain the anatomy and physiology of growth and movement of teeth, bone and periodontium	
Contents:	- writing an article - writing a master thesis - anatomy - growth and tooth movement	
Forms of teaching	Lectures and practical exercise	
Type of learning:	Lectures and practical exercises in groups	
Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision - passed exam, duration of the examination 2h - in case of E-Learning: usage of all media available, 4-day release for exam	
Applicability of the module:	No, specialized module	
(Basic)-Literature:	- Alley, M. (2018). The Craft of Scientific Writing. USA: Springer. - Drake, R., & Vogl, W. (2014). Gray's Atlas Of Anatomy. USA: Churchill Livinstone.	

	- Gastel, B., & Day, R. A. (2016). How To Write And Publish A Scientific Paper. USA: Greenwood. - Peacock, J. L., & Peacock, P. (2011). Oxford Handbook of Medical Statistics. Oxford: Oxford University Press. - Proffit, W. R. (2018). Contemporary Orthodontics. USA: Mosby. - Diedrich, P. (2000). PDZ-Studienausgabe KFO Paket: Kieferorthopädie I, II, III. München: Urban & Fischer Verlag/Elsevier GmbH. - Drasnin, S. (2016). PowerPoint 2016: Die Anleitung in Bildern. Bonn: Vierfarben. - Harzer, W. (2011). Checklisten Zahnmedizin: Kieferorthopädie. Stuttgart: Thieme. - Sander, F. G., Schwenzer, N., & Ehrenfeld, M. (2011). ZMK-Heilkunde - Kieferorthopädie. Stuttgart: Thieme. - Schopf, P. (2008). Curriculum Kieferorthopädie - Band I und II. Berlin: Quintessenz. - Schulte, E., Schumacher, U., & Schünke, M. (2015). Prometheus - LernAtlas der Anatomie- Kopf, Hals und Neuroanatomie. Stuttgart: Thieme - Stengel, D., Bhandari, M., & Hanson, B. (2011). Statistik und Aufbereitung klinischer Daten. Stuttgart: Thieme. - Weiß, C., & Rzany, B. (2013). Basiswissen Medizinische Statistik. Berlin, Heidelberg: Springer.

Module: 5 & 6	**Module title:** Removable appliances in primary and mixed dentition I/II	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 1	**Type:** Compulsory module
Credit points: 4 ECTS	**Overall workload in h:** 108	**Attendance time in h:** 16 **Practical Work in h:** 30
		Self-study in h: 62
Duration and frequency: 2 days 1. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - describe anatomy, growth and movement of teeth, bone and periodontium - name and explain the functions of simple orthodontic appliances - apply functional orthodontics to convert muscular forces resulting from functional strain on the stomatognathic system into movement of teeth and jaws - explain different appliances regarding their functions, biological processes and temporal aspects concerning the growth period - explain and apply further treatment opportunities, such as active plates (Schwarz' plates), which evoke tooth movement with the help of screws and springs; maxillary expansion; 2by4 and bite jumping appliances - present scientific papers using the methods taught in the previous module	
Contents:	- anatomy: growth, bone and tooth movement - simple orthodontic appliances - functional orthodontics - treatment methods (Schwarz' plates in orthodontics, maxillary expansion, 2by4, bite-jumping appliances) - presentation of scientific articles	
Forms of teaching	- Lectures and practical exercise	
Type of learning:	- Lectures and practical exercises in groups	

Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision - passed exam, Duration of the examination 2h - in case of E-Learning: usage of all media available, 4-day release for exam
Applicability of the module:	No, specialized module
(Basic)-Literature:	- Fleming, P. S., & Lee, R. T. (2016). Orthodontic Functional Appliances: Theory And Practice. USA: Wiley-Blackwell. - Graber, L. W., Vanarsdall Jr., R. W., Vig, K. W., & Huang, G. J. (2016). Orthodontics: Current Principles And Techniques. USA: Mosby/Elsevier. - Huang, G. J. (2018). Evidence-based orthodontics. USA: Wiley-Blackwell. - Bock, J. J., Bock, J., & Bock, F. (2011). Grundwissen Kieferorthopädie: Interdisziplinäre Zusammenarbeit, Diagnostik, Therapie. Balingen: Spitta-Verlag. - Diedrich, P. (2000). PDZ-Studienausgabe KFO Paket: Kieferorthopädie I, II, III. München: Urban & Fischer Verlag/Elsevier GmbH. - Harzer, W. (2011). Checklisten Zahnmedizin: Kieferorthopädie. Stuttgart: Thieme. - Knak, S. (2003). Praxisleitfaden Kieferorthopädie. München: Urban & Fischer Verlag/ Elsevier GmbH. - Notzel, F., & Schulze, C. (2008). Leitfaden der kieferorthopädischen Diagnostik: Analysen und Tabellen für die Praxis. Köln: Deutscher Ärzteverlag. - Sander, F. G., Schwenzer, N., & Ehrenfeld, M. (2011). ZMK-Heilkunde - Kieferorthopädie. Stuttgart: Thieme. - Schopf, P. (2008). Curriculum Kieferorthopädie - Band I und II. Berlin: Quintessenz. - Wichelhaus, A., Eichenberg, T., & Günter, A. (2017). Farbatlanten der Zahnmedizin: Kieferorthopädie - Therapie Band 1: Grundlegende Behandlungskonzepte. Stuttgart: Thieme.

Module: 7 & 8	**Module title:** Fixed techniques – Basics I/II	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 1	**Type:** Compulsory module
Credit points: 5 ECTS	**Overall workload in h:** 128	**Attendance time in h:** 16 **Practical Work in h:** 40
		Self-study in h: 72
Duration and frequency: 2 days 2. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - explain the basics of fixed techniques - describe different bracket-technologies and adhesive techniques including their materials and application fields - bond brackets, fit multibands and ligate archwires on a fixed typodont in the lab - name different anchoring techniques and their indications, advantages and disadvantages - do the fitting of transpalatinal arches, quadhelices and lingual bows	
Contents:	- braces - adhesive techniques - lab exercises on a fixed typodont - practice of basic techniques: bonding brackets, fitting multibands, ligating archwires - advantages/disadvantages of different methods - presentation of scientific articles	
Forms of teaching:	Lectures and practical exercise	
Type of learning:	Lectures and practical exercises in groups	
Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision - passed exam, duration of the examination 2h - in case of E-Learning: usage of all media available, 4-day release for exam	
Applicability of the module:	No, specialized module	

(Basic)-Literature:	- Burstone, C. J., & Choy, K. (2015). The Biomechanical Foundation of Clinical Orthodontics. USA: Quintessence Publishing. - Park, J. H. (2020). Temporary Anchorage Devices in Clinical Orthodontics. Hoboken: Wiley-Blackwell. - Graber, L. W., Vanarsdall Jr., R. W., Vig, K. W., & Huang, G. J. (2016). Orthodontics: Current Principles And Techniques. USA: Mosby/Elsevier. - Huang, G. J. (2018). Evidence-based orthodontics. USA: Wiley-Blackwell. - Ikeda, K. (2014). TMJ 1st Orthodontics Concepts, Mechanics And Stability. Tokyo: Topnotch Kikau. - Bock, J. J., Bock, J., & Bock, F. (2011). Grundwissen Kieferorthopädie: Interdisziplinäre Zusammenarbeit, Diagnostik, Therapie. Balingen: Spitta-Verlag. - Diedrich, P. (2000). PDZ-Studienausgabe KFO Paket: Kieferorthopädie I, II, III. München: Urban & Fischer Verlag/Elsevier GmbH. - Harzer, W. (2011). Checklisten Zahnmedizin: Kieferorthopädie. Stuttgart: Thieme. - Knak, S. (2003). Praxisleitfaden Kieferorthopädie. München: Urban & Fischer Verlag/ Elsevier GmbH. - Notzel, F., & Schulze, C. (2008). Leitfaden der kieferorthopädischen Diagnostik: Analysen und Tabellen für die Praxis. Köln: Deutscher Ärzteverlag. - Sander, F. G., Schwenzer, N., & Ehrenfeld, M. (2011). ZMK-Heilkunde - Kieferorthopädie. Stuttgart: Thieme. - Schopf, P. (2008). Curriculum Kieferorthopädie - Band I und II. Berlin: Quintessenz. - Wichelhaus, A., Eichenberg, T., & Günter, A. (2017). Farbatlanten der Zahnmedizin: Kieferorthopädie - Therapie Band 1: Grundlegende Behandlungskonzepte. Stuttgart: Thieme.

Module: 9	**Module title:** Fixed techniques – Biomechanics I	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 2	**Type:** Compulsory module
Credit points: 5 ECTS	**Overall workload in h: 128**	**Attendance time in h:** 8 **Practical Work in h:** 50
		Self-study in h: 70
Duration and frequency: 1 day 2. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - understand biomechanics of the interaction between brackets, archwires and teeth - visualise the change in position of teeth caused by treatment using a typodont and a water bath - understand the forces occurring in the bracket-archwire system and avoid treatment mistakes	
Contents:	- archwires - interaction of brackets and archwires - practical exercises on a wax typodont (lab) by using a water bath	
Forms of teaching:	Lectures and practical exercise	
Type of learning:	Lectures and practical exercises in groups	
Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision - passed exam, duration of the examination 2h - in case of E-Learning: usage of all media available, 4-day release for exam	
Applicability of the module:	No, specialized module	
(Basic)-Literature:	- Burstone, C. J., & Choy, K. (2015). The Biomechanical Foundation of Clinical Orthodontics. USA: Quintessence Publishing. - Park, J. H. (2020). Temporary Anchorage Devices in Clinical Orthodontics. Hoboken: Wiley-Blackwell. - Graber, L. W., Vanarsdall Jr., R. W., Vig, K. W., & Huang, G. J. (2016). Orthodontics: Current Principles And Techniques. USA: Mosby/Elsevier.	

	- Huang, G. J. (2018). Evidence-based orthodontics. USA: Wiley-Blackwell. - Ikeda, K. (2014). TMJ 1st Orthodontics Concepts, Mechanics And Stability. Tokyo: Topnotch Kikau. - Diedrich, P. (2000). PDZ-Studienausgabe KFO Paket: Kieferorthopädie I, II, III. München: Urban & Fischer Verlag/Elsevier GmbH. - Harzer, W. (2011). Checklisten Zahnmedizin: Kieferorthopädie. Stuttgart: Thieme. - Knak, S. (2003). Praxisleitfaden Kieferorthopädie. München: Urban & Fischer Verlag/ Elsevier GmbH. - Sander, F. G., Schwenzer, N., & Ehrenfeld, M. (2011). ZMK-Heilkunde - Kieferorthopädie. Stuttgart: Thieme. - Schopf, P. (2008). Curriculum Kieferorthopädie - Band I und II. Berlin: Quintessenz. - Wichelhaus, A., Eichenberg, T., & Günter, A. (2017). Farbatlanten der Zahnmedizin: Kieferorthopädie - Therapie Band 1: Grundlegende Behandlungskonzepte. Stuttgart: Thieme.

Module: 10	**Module title:** Fixed techniques – Biomechanics II	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 2	**Type:** Compulsory module
Credit points: 4 ECTS	**Overall workload in h: 88**	**Attendance time in h:** 8 **Practical Work in h:** 20
		Self-study in h: 60
Duration and frequency: 1 day 2. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - understand the complex biomechanics of orthodontic treatments, especially the bracket – archwire interaction - foresee, prevent and solve problems resulting from the treatment	
Contents:	- biomechanics - interaction of brackets and archwires – consolidation - presentation of scientific articles	
Forms of teaching:	Lectures and practical exercise	
Type of learning:	Lectures and practical exercises in groups	
Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision - passed exam, duration of the examination 2h - in case of E-Learning: usage of all media available, 4-day release for exam	
Applicability of the module:	No, specialized module	
(Basic)-Literature:	- Burstone, C. J., & Choy, K. (2015). The Biomechanical Foundation of Clinical Orthodontics. USA: Quintessence Publishing. - Park, J. H. (2020). Temporary Anchorage Devices in Clinical Orthodontics. Hoboken: Wiley-Blackwell. - Graber, L. W., Vanarsdall Jr., R. W., Vig, K. W., & Huang, G. J. (2016). Orthodontics: Current Principles And Techniques. USA: Mosby/Elsevier.	

	- Huang, G. J. (2018). Evidence-based orthodontics. USA: Wiley-Blackwell. - Ikeda, K. (2014). TMJ 1st Orthodontics Concepts, Mechanics And Stability. Tokyo: Topnotch Kikau. - Diedrich, P. (2000). PDZ-Studienausgabe KFO Paket: Kieferorthopädie I, II, III. München: Urban & Fischer Verlag/Elsevier GmbH. - Harzer, W. (2011). Checklisten Zahnmedizin: Kieferorthopädie. Stuttgart: Thieme. - Knak, S. (2003). Praxisleitfaden Kieferorthopädie. München: Urban & Fischer Verlag/ Elsevier GmbH. - Sander, F. G., Schwenzer, N., & Ehrenfeld, M. (2011). ZMK-Heilkunde - Kieferorthopädie. Stuttgart: Thieme. - Schopf, P. (2008). Curriculum Kieferorthopädie - Band I und II. Berlin: Quintessenz. - Wichelhaus, A., Eichenberg, T., & Günter, A. (2017). Farbatlanten der Zahnmedizin: Kieferorthopädie - Therapie Band 1: Grundlegende Behandlungskonzepte. Stuttgart: Thieme.

Module: 11 & 12	**Module title:** Presentation of clinical cases I	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 2	**Type:** Compulsory module
Credit points: 5 ECTS	**Overall workload in h:** 128	**Attendance time in h:** 8 **Practical Work in h: 5**0
		Self-study in h: 70
Duration and frequency: 2 days 2. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - present clinical cases solved by orthodontics - demonstrate the whole treatment process, from the first patient contact to diagnostics, planning, treatment completion and recall - present simple and complex cases with moderate difficulty which were treated with multiband appliances - illustrate the used orthodontic techniques with the help of intraoral photographs - discuss the outcome and possible alternative treatments for different cases	
Contents:	- presentation of detailed clinical situations - simple cases - cases with moderate difficulty/complexity - presentation of scientific articles	
Forms of teaching:	Lectures and practical exercise	
Type of learning:	Lectures and practical exercises in groups	
Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision - passed exam, duration of the examination 2h - in case of E-Learning: usage of all media available, 4-day release for exam	
Applicability of the module:	No, specialized module	
(Basic)-Literature:	- Askari, M., & Alexander, S. A. (2017). Atlas of Orthodontic Case Reviews. USA: Wiley-Blackwell.	

	- Diedrich, P. (2000). PDZ-Studienausgabe KFO Paket: Kieferorthopädie I, II, III. München: Urban & Fischer Verlag/Elsevier GmbH. - Knak, S. (2003). Praxisleitfaden Kieferorthopädie. München: Urban & Fischer Verlag/ Elsevier GmbH. - Sander, F. G., Schwenzer, N., & Ehrenfeld, M. (2011). ZMK-Heilkunde - Kieferorthopädie. Stuttgart: Thieme. - Schopf, P. (2008). Curriculum Kieferorthopädie - Band I und II. Berlin: Quintessenz. - Wichelhaus, A. (2019). Farbatlanten der Zahnmedizin: Kieferorthopädie - Therapie Band 2: Spezielle Behandlungskonzepte. Stuttgart: Thieme.

Module: 13	**Module title:** Fixed techniques – Special cases I	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester: 2**	**Type:** Compulsory module
Credit points: 5 ECTS	**Arbeitsbelastung (gesamt)in h:** 128	**Attendance time in h:** 8 **Practical Work in h: 40**
		Self-study in h: 80
Duration and frequency: 1 say 2. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - solve challenging cases as they appear in adult's orthodontics - apply special techniques for complex biomechanical situations with a high demand on anchoring on a flexible wax typodont - level tilted teeth using springs and the overlay technique - move front teeth in the vertical dimension or treat a deep overbite using an additional nickel titanium archwire with the overlay technique	
Contents:	- levelling techniques - overlay techniques - presentation of scientific articles	
Forms of teaching:	Lectures and practical exercise	
Type of learning:	Lectures and practical exercises in groups	
Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision - passed exam, duration of the examination 2h - in case of E-Learning: usage of all media available, 4-day release for exam	
Applicability of the module:	No, specialized module	
(Basic)-Literature:	- Askari, M., & Alexander, S. A. (2017). Atlas of Orthodontic Case Reviews. USA: Wiley-Blackwell. - Park, J. H. (2020). Temporary Anchorage Devices in Clinical Orthodontics. Hoboken: Wiley-Blackwell.	

	- Melsen, B., & Cesare, L. (2022). Adult Orthodontics. Hoboken: Wiley-Blackwell. - Diedrich, P. (2000). PDZ-Studienausgabe KFO Paket: Kieferorthopädie I, II, III. München: Urban & Fischer Verlag/Elsevier GmbH. - Knak, S. (2003). Praxisleitfaden Kieferorthopädie. München: Urban & Fischer Verlag/ Elsevier GmbH. - Sander, F. G., Schwenzer, N., & Ehrenfeld, M. (2011). ZMK-Heilkunde - Kieferorthopädie. Stuttgart: Thieme. - Schopf, P. (2008). Curriculum Kieferorthopädie - Band I und II. Berlin: Quintessenz. - Wichelhaus, A. (2019). Farbatlanten der Zahnmedizin: Kieferorthopädie - Therapie Band 2: Spezielle Behandlungskonzepte. Stuttgart: Thieme.

Module: 14	**Module title:** Fixed techniques – Special cases II	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 2	**Type:** Compulsory module
Credit points: 5 ECTS	**Overall workload in h:** 128	**Attendance time in h:** 8 **Practical Work in h: 55**
		Self-study in h: 65
Duration and frequency: 1 day 2. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - treat complex orthodontic cases - solve cases with a high demand on anchoring theoretically and practically	
Contents:	- practical exercises of complex cases - presentation of scientific articles	
Forms of teaching:	Lectures and practical exercise	
Type of learning:	Lectures and practical exercises in groups	
Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision - passed exam, duration of the examination 2h - in case of E-Learning: usage of all media available, 4-day release for exam	
Applicability of the module:	No, specialized module	
(Basic)-Literature:	- Askari, M., & Alexander, S. A. (2017). Atlas of Orthodontic Case Reviews. USA: Wiley-Blackwell. - Park, J. H. (2020). Temporary Anchorage Devices in Clinical Orthodontics. Hoboken: Wiley-Blackwell. - Diedrich, P. (2000). PDZ-Studienausgabe KFO Paket: Kieferorthopädie I, II, III. München: Urban & Fischer Verlag/Elsevier GmbH. - Knak, S. (2003). Praxisleitfaden Kieferorthopädie. München: Urban & Fischer Verlag/ Elsevier GmbH. - Sander, F. G., Schwenzer, N., & Ehrenfeld, M. (2011). ZMK-Heilkunde - Kieferorthopädie. Stuttgart: Thieme.	

	- Schopf, P. (2008). Curriculum Kieferorthopädie - Band I und II. Berlin: Quintessenz. - Wichelhaus, A. (2019). Farbatlanten der Zahnmedizin: Kieferorthopädie - Therapie Band 2: Spezielle Behandlungskonzepte. Stuttgart: Thieme.

Module: 15 & 16	**Module title:** Fixed techniques – Bone anchoring	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 3	**Type:** Compulsory module
Credit points: 5 ECTS	**Overall workload in h:** 128	**Attendance time in h:** 16 **Practical Work in h:** 40 **Self-study in h:** 72
Duration and frequency: 2 days 3. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - insert orthodontic mini-implants which are temporally inserted and therefore called “transitoric anchoring devices” (TADs) for absolute anchoring - anchor bracket-bonded teeth at the jaw bone by rubbers and wires so that a faster and more efficient tooth movement is provided - explain indications, advantages, disadvantages and the procedure of this method	
Contents:	- absolute anchoring concepts with the use of TADs - practical exercises on a typodont - presentation of scientific articles	
Forms of teaching:	Lectures and practical exercise	
Type of learning:	Lectures and practical exercises in groups	
Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision - passed exam, duration of the examination 2h - in case of E-Learning: usage of all media available, 4-day release for exam	
Applicability of the module:	No, specialized module	
(Basic)-Literature:	- Cousley, R. (2013). The Orthodontic Mini-implant Clinical Handbook. USA: Wiley-Blackwell. - Haggerty, C. J., & Laughlin, R. M. (2015). Atlas Of Operative Oral And Maxillofacial Surgery. USA: Wiley-Blackwell.	

	- Diedrich, P. (2000). PDZ-Studienausgabe KFO Paket: Kieferorthopädie I, II, III. München: Urban & Fischer Verlag/Elsevier GmbH. - Knak, S. (2003). Praxisleitfaden Kieferorthopädie. München: Urban & Fischer Verlag/ Elsevier GmbH. - Ludwig, B. (2008). Mini-Implantate in der Kieferorthopädie. Berlin: Quintessenz. - Sander, F. G., Schwenzer, N., & Ehrenfeld, M. (2011). ZMK-Heilkunde - Kieferorthopädie. Stuttgart: Thieme. - Schopf, P. (2008). Curriculum Kieferorthopädie - Band I und II. Berlin: Quintessenz. - Wichelhaus, A. (2019). Farbatlanten der Zahnmedizin: Kieferorthopädie - Therapie Band 2: Spezielle Behandlungskonzepte. Stuttgart: Thieme.

Module: 17 & 18	**Module title:** Speech therapy, dyskinesia I/II	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 3	**Type:** Compulsory module
Leistungspunkte Credits: 4 ECTS	**Overall workload in h:** 88	**Attendance time in h:** 16 **Practical Work in h: 30** **Self-study in h:** 42
Duration and frequency: 2 days 3. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - understand and solve functional problems which can occur during or after orthodontic treatments - make the right diagnosis and start the correct therapy without sustaining losses in treatment success - diagnose temporomandibular joint dysfunction as a multifactorial process resulting in a symptom complex comprising headaches and cervical pain, toothache of unknown origin, earache and tinnitus - understand pathogenesis, classification, diagnostics and therapy of temporomandibular joint dysfunction - differentiate types of occlusal splints and their indication, materials, advantages and disadvantages - notice indications for physiotherapy - take care of aspects of communication and patient education due to the role of psychosomatic issues in this process - understand the importance of speech therapy - explain how speech impediments can be caused by dental deformities and how misaligned teeth can be caused or enhanced by the muscular influence of the surrounding tissue - understand correlations between speech therapy and tooth alignment - plan and perform an interdisciplinary therapy	
Contents:	- dysfunction and temporomandibular joint dysfunction - occlusal splints	

	- physiotherapy - speech therapy - presentation of scientific articles
Forms of teaching:	Lectures and practical exercise
Type of learning:	Lectures and practical exercises in groups
Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision - passed exam, duration of the examination 2h - in case of E-Learning: usage of all media available, 4-day release for exam
Applicability of the module:	No, specialized module
(Basic)-Literature:	- Ikeda, K. (2014). TMJ 1st Orthodontics Concepts, Mechanics And Stability. Tokyo: Topnotch Kikau. - Kandasamy, S., Greene, C. S., Rinchuse, D. J., & Stockstill, J. W. (2015). TMD And Orthodontics: A Clinical Guide For The Orthodontist. USA: Springer. - Fischer-Voosholz, M., & Spenthof, U. (2002). Orofaziale Muskelfunktionsstörungen: Klinik - Diagnostik - Ganzheitliche Therapie (Praxiswissen Logopädie). Heidelberg: Springer. - Hugger, A., & Kordaß, B. (2017). Handbuch Instrumentelle Funktionsanalyse und funktionelle Okklusion: Wissenschaftliche Evidenz und klinisches Vorgehen. Berlin: Quintessenz. - Prodinger-Glöckl, D. (2013). CMD in der Osteopathie: Interdisziplinäre Zusammenarbeit mit der Kieferorthopädie. Stuttgart: Haug. - Ridder, P. (2016). Craniomandibuläre Dysfunktion: Interdisziplinäre Diagnose- und Behandlungsstrategien. München: Urban & Fischer/Elsevier. - Schindler, H. J., & Türp, J. C. (2016). Konzept Okklusionsschiene: Basistherapie bei schmerzhaften kraniomandibulären Dysfunktionen. Berlin: Quintessenz. - Schulte, E., Schumacher, U., & Schünke, M. (2015). Prometheus- LernAtlas der Anatomie- Kopf, Hals und Neuroanatomie. Stuttgart: Thieme. - Stelzenmüller, W., & Wiesner, J. (2010). Therapie von Kiefergelenkschmerzen: Ein Behandlungskonzept für Zahnärzte, Kieferorthopäden und Physiotherapeuten. Stuttgart: Thieme.

Module: 19 & 20	**Module title:** Presentation of clinical cases II – Orthognatic surgery	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 3	**Type:** Compulsory module
Credit points: 5 ECTS	**Overall workload in h:** 128	**Attendance time in h:** 16 **Practical Work in h:** 45
		Self-study in h: 67
Duration and frequency: 2 days 3. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - plan a surgical solution for distinct dysgnathia where orthodontic treatment alone would not be adequate - decide for which situations and patient ages orthognatic surgery is suitable - describe the whole procedure including the development of the therapy plan, orthodontic and dental pre-treatment, laboratory aspects and follow-up care - explain operation methods, such as the (bilateral) sagittal ramus split osteotomy by Obewegeser/Dal Pont, Le-Fort I osteotomy and surgical palatal expansion and commonly used screws and plates - understand the production and use of different surgical splints - foresee risks and complications of these operations - make use of conebeam orthodontics. - use modern devices with a lower radiation dose for imaging impacted teeth and for the planning and evaluation of a treatment - apply digital volume tomography and interpret the pictures	
Contents:	- orthognatic surgery - conebeam orthodontics - presentation of scientific articles	
Forms of teaching:	Lectures and practical exercise	
Type of learning:	Lectures and practical exercises in groups	

Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision - passed exam, duration of the examination 2h - in case of E-Learning: usage of all media available, 4-day release for exam
Applicability of the module:	No, specialized module
(Basic)-Literature:	- Askari, M., & Alexander, S. A. (2017). Atlas of Orthodontic Case Reviews. USA: Wiley-Blackwell. - Haggerty, C. J., & Laughlin, R. M. (2015). Atlas Of Operative Oral And Maxillofacial Surgery. USA: Wiley-Blackwell. - Kokich, V. G., & Mathews, D. P. (2014). Orthodontic And Surgical Management Of Impacted Teeth. USA: Quintessence Publishing. - Reyneke, J. P. (2010). Essentials Of Orthognatic Surgery. USA: Quintessence Publishing. - Swennen, G. (2017). 3D Virtual Treatment Planning Of Orthognathic Surgery: A Step-By-Stwp Approach For Orthodontists And Surgeons. Belgium: Springer. - Diedrich, P. (2000). PDZ-Studienausgabe KFO Paket: Kieferorthopädie I, II, III. München: Urban & Fischer Verlag/Elsevier GmbH. - Knak, S. (2003). Praxisleitfaden Kieferorthopädie. München: Urban & Fischer Verlag/ Elsevier GmbH. - Notzel, F., & Schulze, C. (2008). Leitfaden der kieferorthopädischen Diagnostik: Analysen und Tabellen für die Praxis. Köln: Deutscher Ärzteverlag. - Sander, F. G., Schwenzer, N., & Ehrenfeld, M. (2011). ZMK-Heilkunde - Kieferorthopädie. Stuttgart: Thieme. - Schmelzeisen, R., & Howaldt, H. P. (2015). Einführung in die Mund-, Kiefer-, Gesichtschirurgie: Für Studium, Examen und Weiterbildung. Köln: Deutscher Zahnärzte Verlag. - Schopf, P. (2008). Curriculum Kieferorthopädie - Band I und II. Berlin: Quintessenz. - Schulte, E., Schumacher, U., & Schünke, M. (2015). Prometheus- LernAtlas der Anatomie- Kopf, Hals und Neuroanatomie. Stuttgart: Thieme. - Schwenzer, N., & Ehrenfeld, M. (2010). ZMK-Heilkunde: Mund-Kiefer-Gesichtschirurgie. Stuttgart: Thieme.

Module: 21 & 22	**Module title:** Fixed techniques – Special cases I/II	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 4	**Type:** Compulsory module
Credit points: 5 ECTS	**Overall workload in h:** 128	**Attendance time in h:** 16 **Practical Work in h: 45**
		Self-study in h: 67
Duration and frequency: 2 days 4. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - treat clinical cases with a high degree of difficulty - solve complex orthodontic situations with an interdisciplinary team consisting of orthodontists, dentists, maxillofacial surgeons, speech therapists, physiotherapists and other disciplines - execute fixed techniques on a typodont	
Contents:	- practical exercises on typodonts with a high degree of difficulty - question-time for students - presentations	
Forms of teaching:	Lectures and practical exercise	
Type of learning:	Lectures and practical exercises in groups	
Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision, - passed exam, duration of the examination 2h - in case of E-Learning: usage of all media available, 4-day release for exam	
Applicability of the module:	No, specialized module	
(Basic)-Literature:	- Askari, M., & Alexander, S. A. (2017). Atlas of Orthodontic Case Reviews. USA: Wiley-Blackwell. - Diedrich, P. (2000). PDZ-Studienausgabe KFO Paket: Kieferorthopädie I, II, III. München: Urban & Fischer Verlag/Elsevier GmbH. - Sander, F. G., Schwenzer, N., & Ehrenfeld, M. (2011). ZMK-Heilkunde - Kieferorthopädie. Stuttgart: Thieme.	

	- Schopf, P. (2008). Curriculum Kieferorthopädie - Band I und II. Berlin: Quintessenz. - Wichelhaus, A. (2019). Farbatlanten der Zahnmedizin: Kieferorthopädie - Therapie Band 2: Spezielle Behandlungskonzepte. Stuttgart: Thieme.

Module: 23	**Module title:** Fixed techniques – Treatment completion	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 4	**Type:** Compulsory module
Credit points: 5 ECTS	**Overall workload in h:** 128	**Attendance time in h:** 8 **Practical Work in h:** 50
		Self-study in h: 70
Duration and frequency: 1 day 4. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - successfully complete an orthodontic treatment - professionally remove the usually adhesively fixed elements, which is called “debonding” - clean teeth from remaining composite - avoid tooth damages like enamel fractures - chose the right instruments needed for professional debonding - make use of retention techniques to guarantee the treatment’s success - give the surrounding tissue time to adapt to the new situation and stabilize it - bend a retainer, which requires a certain degree of practise and skills	
Contents:	- debonding - retention - stability - practical exercise: bending a retainer	
Forms of teaching:	Lectures and practical exercise	
Type of learning:	Lectures and practical exercises in groups	
Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision - passed exam, duration of the examination 2h - in case of E-Learning: usage of all media available, 4-day release for exam	
Applicability of the module:	No, specialized module	

(Basic)-Literature:	- Huang, G. J. (2018). Evidence-based orthodontics. USA: Wiley-Blackwell. - Ikeda, K. (2014). TMJ 1st Orthodontics Concepts, Mechanics And Stability. Tokyo: Topnotch Kikau. - Katsaros, C., & Eliades, T. (2017). Stability, Retention and Relapse in Orthodontics. Berlin: Quintessenz. - Diedrich, P. (2000). PDZ-Studienausgabe KFO Paket: Kieferorthopädie I, II, III. München: Urban & Fischer Verlag/Elsevier GmbH. - Fischer-Voosholz, M., & Spenthof, U. (2002). Orofaziale Muskelfunktionsstörungen: Klinik - Diagnostik - Ganzheitliche Therapie (Praxiswissen Logopädie). Heidelberg: Springer. - Harzer, W. (2011). Checklisten Zahnmedizin: Kieferorthopädie. Stuttgart: Thieme. - Ihlow, D., & Rudzki, I. (2017). Kieferorthopädische Retention. Stuttgart: Thieme. - Sander, F. G., Schwenzer, N., & Ehrenfeld, M. (2011). ZMK-Heilkunde - Kieferorthopädie. Stuttgart: Thieme. - Schopf, P. (2008). Curriculum Kieferorthopädie - Band I und II. Berlin: Quintessenz. - Wichelhaus, A. (2019). Farbatlanten der Zahnmedizin: Kieferorthopädie - Therapie Band 2: Spezielle Behandlungskonzepte. Stuttgart: Thieme.

Module: 24	**Module title:** Fixed techniques – Aesthetic orthodontics	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 4	**Type:** Compulsory module
Credit points: 5 ECTS	**Overall workload in h:** 128	**Attendance time in h:** 8 **Practical Work in h:** 50 **Selbststudium:** 70
Duration and frequency: 1 day 4. semester	**Prerequisites:** - University degree in dentistry - Licence to practise dentistry - One year of experience in professional patient treatment	**Languages of teaching:** English, German
Qualification objectives. Competencies:	By the end of the module, students will be able to - apply special orthodontic techniques which have gained in importance in the past years due to the increasing aesthetical demands and age of the patients - implement aligner orthodontics that utilizes transparent splints which are changed after a certain period of time - explain basics, indications, advantages and disadvantages, (digital) planning and financial aspects - adhesively fix appliances on the lingual surfaces of the teeth with the lingual technique - describe the necessary laboratory and chairside steps and the differences to labial techniques	
Contents:	- aligner orthodontics - lingual techniques - presentations	
Forms of teaching:	Lectures and practical exercise	
Type of learning:	Lectures and practical exercises in groups	
Requirements for awarding credit points (module examination, extent and duration of the examination):	Compulsory participation (electronic check) - practical exercises under supervision - passed exam, duration of the examination 2h in case of E-Learning: usage of all media available, 4-day release for exam	
Applicability of the module:	No, specialized module	

(Basic)-Literature:	- Graber, L. W., Vanarsdall Jr., R. W., Vig, K. W., & Huang, G. J. (2016). Orthodontics: Current Principles And Techniques. USA: Mosby/Elsevier. - Proffit, W. R. (2018). Contemporary Orthodontics. USA: Mosby. - Schupp, W., & Haubrich, J. (2015). Aligner Orthodontics: Diagnostics, Biomechanics, Planning and Treatment. Berlin: Quintessenz. - Scuzzo, G., & Takemoto, K. (2010). Lingual Orthodontics: A New Approach Using Stb Light Lingual System & Lingual Straight Wire. UK: Quintessence Publishing. - Tai, S. (2018). Clear Aligner Technique. USA: Quintessence Publishing. - Wichelhaus, A. (2019). Farbatlanten der Zahnmedizin: Kieferorthopädie - Therapie Band 2: Spezielle Behandlungskonzepte. Stuttgart: Thieme.

Module: 25	**Module title:** Master thesis and defence	
Module coordinator: PD. Dr. med. dent. Martin Sander		
Qualification level: Master	**Semester:** 4	**Type:** final thesis
Credit points: 30 + 10 ECTS	**Overall workload in h:** 1.150	**Attendance time in h :** 12 **Thereof practical Work in h**: 12
		Self-study in h: 1.138
Duration and frequency: 1 semester, 4. semester	**Prerequisites:** - at least 60 ECTS	**Languages of teaching:** English, German
Qualification objectives. Competencies:	The master thesis must represent a recognizably autonomous research contribution to a clearly-defined and distinguishable research question. A critical discussion with a position statement to the state of research should be included. The current state of research has to be processed systematically in order to find out what has already been worked out and published about the topic. On that basis the students can express their own ideas and theories. Opinions always have to be marked as such and need to be substantiated with valid arguments. By the end of the module, students will be able to - descriptively demonstrate and document the structure of a typical treatment process – from the patient's first consultation over (surgical) pre-treatment, removable or fixed orthodontic appliances to retention and follow-up care - understand the applied orthodontic techniques and case-specific problems - present and discuss the aspired outcome and alternative treatment methods	
Contents:	scientific work and writing	
Forms of teaching:	final thesis and defence	
Type of learning:	self-study, mentoring	
Requirements for awarding credit points (module examination, extent and duration of the examination):	master thesis graded 4.0 or better defence graded 4.0 or better	

Applicability of the module	No, specialized module
(Basic)-Literature:	- Droese, Katharina: Informationsverhalten im Kontext wissenschaftlicher Arbeit Bibliothek Forschung und Praxis, Vol. 36, Nr. 1, pp. 93-102, https://doi.org/10.1515/bfp-2012-0011, 2012 - Eco, Umberto: Wie man eine wissenschaftliche Abschlussarbeit schreibt - Doktor-, Diplom- und Magisterarbeit in den Geistes- und Sozialwissenschaften, 14. Auflage der deutschen. Ausgabe, Heidelberg, Verlag Müller, 2020 - Horn Werner: Wie schreibe ich eine wissenschaftliche Arbeit? Institut für Medizinische Kybernetik und Artificial Intelligence, Universität Wien, Freyung 6, A-1010 Wien, werner@ai.univie.ac.at, https://www.leischner.inf.h-brs.de/ lehre/alt/PDF/wiss-arbeiten.pdf, 2011 - Kuhn, T.S.: Logik der Forschung oder Psychologie der wissenschaftlichen Arbeit? in: Lakatos, I., Musgrave, A. (eds) Kritik und Erkenntnisfortschritt. Wissenschaftstheorie Wissenschaft und Philosophie, Vol 9. Vieweg+Teubner Verlag, Wiesbaden. https://doi.org/10.1007/978-3-322-90613-7_1, 1974 - Nitsch, Verena; Buxmann, Peter: Auswirkungen von Digitalisierung und KI auf die wissenschaftliche Arbeit. in: Künstliche Intelligenz in der Forschung, S. 127-146, Springer, Berlin, Heidelberg, 2022. - Richter, Sylvia: Wissenschaftliche Arbeit - Informationstheorie und SchriftLanguage of teaching, Potsdam, http://www.sylviarichter.de/images/uni/wissenschaftliche_arbeit.pdf, 2006 - Ritschl, V., Baciu, L., Stamm, T.: Aufbau einer wissenschaftlichen Arbeit, in: Ritschl, V., Weigl, R., Stamm, T. (Hrg.) Wissenschaftliches Arbeiten und Schreiben. Studium Pflege, Therapie, Gesundheit. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-662-49908-5_13, 2016 - Spandl, Oskar Peter: Die Organisation der wissenschaftlichen Arbeit, Springer Vieweg Verlag, 2013. - Standop, Ewald, Meyer, Matthias L. G.: Die Form der wissenschaftlichen Arbeit - Grundlagen, Technik und Praxis für Schule, Studium und Beruf, 18. bearbeitete und erweiterte Auflage, Wiebelsheim, Quelle & Meyer, 2008

	- Wohlgenannt, R.: „Was ist Wissenschaft?“ in: Was ist Wissenschaft? Wissenschaftstheorie Wissenschaft und Philosophie, Vol. 2. Vieweg+Teubner Verlag, Wiesbaden. https://doi.org/10.1007/978-3-322-99161-4_4, 1969