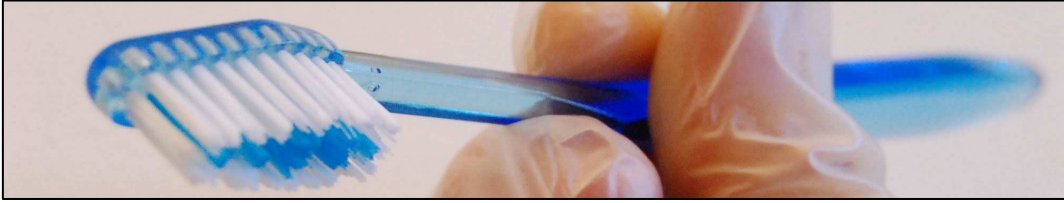


CURRICULUM FOR



BACHELOR OF DENTAL HYGIENE



DCD, FMD, UiB

2008

Approved by the Programme Committee for Dental Subjects

5th September 2008

## Contents

THE BACHELOR DEGREE PROGRAMME IN DENTAL HYGIENE .....	4
Goals and contents .....	4
Entrance Requirements .....	4
Learning Outcomes .....	4
Introductory topics .....	6
Subjects and specialisation.....	6
Course schedule.....	6
First Year.....	6
Second Year .....	6
Third Year .....	7
Credits .....	7
Assessment and credits in the bachelor programme in dental hygiene.....	10
Evaluation - grades.....	11
Teaching methods .....	11
Evaluation.....	12
Administration.....	12
Curriculum and programme committees for dental subjects .....	12
Course administration .....	13
Study progression requirements and absenteeism.....	13
Place of study for different subjects.....	13
Teaching languages .....	14
Working day - scheduling .....	14
Taking parts of the bachelor programme abroad .....	14
Study trip.....	15
Qualifications for further studies.....	15
Career opportunities .....	16
Authorisation.....	16
List of subjects .....	17
GENERAL DENTAL PRACTICE (TPBAALM) .....	18
EXAMINATION PHILOSOPHICUM (EXPHIL/MOSEM, EXPHIL/MOEKS).....	20
PHARMACOLOGY (TPBAFAR) .....	22
PREVENTIVE DENTISTRY (TPBAFOR-PROP, TPBAFORI/II, TPBAFOR-K1, TPBAFOR-K2, TPBAFOR-K3) .....	23

PRECLINICAL COURSE (TPBAFOR-PROP).....	23
INTRODUCTORY CLINICAL COURSE (TPBAFORI/II).....	23
TREATMENT OF PATIENTS – PREVENTIVE DENTISTRY (TPBAFOR-K1/K2/K3)..	24
PHYSIOLOGY AND NUTRITION (EUBIOTICS) (TPBAFYs).....	26
PHYSIOLOGY .....	26
NUTRITION (EUBIOTICS).....	28
GENERAL PATHOLOGY (TPBAPAT) .....	29
CARIOLOGY AND ENDODONTICS (TPBAKAR/END).....	30
CHEMISTRY AND BIOCHEMISTRY (TPBAKKBK).....	32
CHEMISTRY (- the study of properties, composition and reactions of substances) .....	32
BIOCHEMISTRY ( - the study of chemical substances and chemical processes in living organisms) .....	36
ORAL SURGERY AND ORAL MEDICINE (TPBAKOS) AND INFILTRATION ANAESTHESIA (TPBAINFIL) .....	39
ORTHODONTICS (TPBAKJE).....	41
DENTAL BIOMATERIALS/MATERIALS (TPBAMAT) .....	43
MICROBIOLOGY AND HYGIENE (TPBAMIKR).....	45
ODONTOPHOBIA (TPBAFOB) .....	46
PAEDODONTICS (TPBAPED).....	48
PERIODONTICS (TPBAPER).....	51
PROSTHODONTICS AND GERODONTOLOGY (TPBAPRO/GER).....	53
PROSTHODONTICS .....	53
GERODONTOLOGY .....	56
WRITTEN ASSIGNMENT (TPBAPROSJ).....	58
SCIENTIFIC WRITING W/LIBRARY COURSE.....	59
RADIOLOGY (TPBARØN).....	60
COMMUNITY DENTISTRY WITH EXTRAMURAL STUDIES (TPBASAM) .....	61
COMMUNITY DENTISTRY.....	61
COMMUNITY, LIVING CONDITIONS AND LIFE STYLE.....	64
EXTRAMURAL STUDIES.....	64

# THE BACHELOR DEGREE PROGRAMME IN DENTAL HYGIENE

The revised curriculum for the bachelor programme in dental hygiene of 2008 is designed to satisfy the requirements for curricula set out in "Regulations Relating to Standards and Criteria for Accreditation of Studies and Criteria for the Accreditation of Institutions in Norwegian Higher Education" issued by the National Body for Quality in Education on 25th January 2006, a standard for curricula at the University of Bergen (UoB) and "Profile and Competences for the European Dentist (ADEE September 2004). The programme assessor's two evaluations of the bachelor programme in dental hygiene: [Report I (17.02.06) "*Bachelorprogrammet i tannpleie generelt*" and: Report II (21.03.07) "*Oral surgery/oral medicine - KOS-block*")] at The Faculty of Medicine and Dentistry were also considered.

## **Goals and contents**

The bachelor programme for dental hygienists is a professional course leading to the university degree Bachelor of Dental Hygiene. The course takes three years (180 credits).

The bachelor programme should qualify dental hygienist for health promotion and disease prevention, as well as develop practical and clinical skills including the understanding of disease in a social, psychological and pedagogic context. The course should give the candidates a firm basis for life-long learning, specialisation and research training. The course should also provide society with professionals possessing the knowledge, attitudes and skills required to practise as a dental hygienist, and to qualify hygienists to serve as the first line of contact in the oral care services. This requires competence to assess oral health problems and to decide whether they should be treated by a dentist or a dental hygienist. The teaching should, as far as possible, be research based, current, socially relevant and in keeping with the need of the population for prevention of oral diseases and conditions.

The course should provide the dental hygiene students with opportunities to develop knowledge, skills and attitudes that make them capable of planning, implementing and evaluating their work in accordance with the patients' needs and political priorities.

The bachelor programme in dental hygiene qualifies the hygienists for co-operation with other oral health personnel and for establishing positive inter-sectorial working relationships with other relevant types of personnel.

## **Entrance Requirements**

General qualifications for higher education or equivalent prior competence.

## **Learning Outcomes**

On completion of the bachelor degree course in dental hygiene, the candidate is expected to have acquired broad basic competence in dentistry. This consists of theoretical knowledge in biomedical, para-clinical, clinical and a socio-behavioural understanding of disease , theoretical and clinical knowledge in behavioural disciplines as well as practical clinical skills; especially related to health promotion and disease prevention.

Relating to health promotion and disease prevention, the candidate shall

- acquire understanding of how individual and community attitude influences oral health; be able to assess pedagogic principals and methods employed in health promotion and disease prevention in public health to preserve or re-establish oral health and well-being, as well as understanding of different behavioural theories
- be able to communicate and co-operate with personnel in oral health -, health – and social services, as well as with administrators, the population and their elected representatives concerning oral health related issues
- know the epidemiology of the most important oral diseases and conditions as well as their aetiology
- be able to plan, implement and evaluate teaching of health personnel, pedagogic personnel and groups of patients in order for oral health to become an integral part of general health
- be able to work independently and function constructively in an oral health service team as well as with other relevant co-workers
- know current legislation, social and ethical norms
- have a sound academic foundation for further education at university

Clinically the candidate shall especially

- be able to perform preventive activities and employ appropriate instruments when treating diseases of the teeth and periodontal tissues and rely on scientifically accepted preventive and therapeutic methods and materials
- be able to diagnose dental caries, gingivitis, marginal and apical periodontitis, malocclusion, record anatomical abnormalities and be able to implement interceptive measures
- possess knowledge about medical conditions that may affect oral health and increase the risk of complications during treatment
- be able to plan, implement and evaluate individual preventive measures in accordance with the patient's need, oral status and life situation
- be able to provide relief of pain, e. g. by using surface and infiltration anaesthesia
- be capable of providing first aid and refer acute conditions for necessary treatment
- make sure that patients who are entitled to reimbursement/grant in aid from public or private arrangements are informed about their entitlements and are given assistance to ensure necessary documentation
- be cognizant of own competence and have an ethical and critical attitude to his/her professional activities

In administrative activities the candidate should especially:

- know the goals, organization and functions of the Public Dental Services as well as the organization and management of private practice
- be able to keep dental records in accordance with current rules and regulations
- be able to administer clinical treatment of patients and out-reach activities

## ***Introductory topics***

The Examination Philosophicum (ex.phil.) is required for the bachelor degree programme in dental hygiene. The students are introduced to general principles and basic problems of the university tradition. Ex.phil. presents the topics from a philosophical point of view, focuses on ethics, the philosophy of science, logic and theories of argumentation. The candidate is expected to develop a scientific and critical approach to the problems encountered in medicine and dentistry.

## ***Subjects and specialisation***

Students who are admitted to the bachelor degree programme in dental hygiene are expected to follow a mandatory curriculum and follow the subjects included in it at all times. A written assignment on an elective topic has to be completed during the third year.

## ***Course schedule***

The curriculum for the bachelor degree in dental hygiene is designed so that students have to follow a fixed schedule and sit examinations at set times during the course.

## **First Year**

Teaching in the autumn semester comprises ex. phil., a course in the use of the library, and of basic medical and dental subjects such as chemistry, biochemistry, dental and general anatomy. The preclinical course seeks to develop the dental hygiene students' manual dexterity. Early on in the autumn semester, the students spend one day in a Public Dental Health Service clinic to observe what it entails to be a dental hygienist. Towards the end of the semester, they start the introductory clinical course and are introduced to the treatment of patients and related problems.

In the spring semester, the students are taught physiology, nutrition (eubiotics), pharmacology, radiology, microbiology, dental materials, odontophobia and general pathology. Early on in this semester, the students start treating patients. They also attend weekly clinical and literature seminars to discuss professional and scientific issues.

## **Second Year**

In the autumn semester, the students study pharmacology, oral surgery and oral medicine (KOS-block), cariology/endodontics, periodontics, paedodontics/including a preclinical course, pedagogics/psychology and orthodontics. They are taught local anaesthesia. About half-way through the autumn semester, they spend three days in a Public Dental Health Service clinic. The clinical sessions are spent treating children, orthodontic and adult patients, as well as taking radiographs. Other subjects taught during this semester are community dentistry, general dental practice (in co-operation with dental students) and prosthodontics/including a preclinical course. The weekly clinical and literature seminars continue and some time is spent preparing for outreach activities (in institutions, nursery school, high risk groups, etc.). The students continue to treat children and adult patients, as well as general dental practice patients in co-operation with dental students.

## **Third Year**

The teaching of community dentistry continues in the autumn semester. The students are introduced to scientific writing (dental and dental hygiene students together) and a refresher course in the use of the library. During clinical sessions, students continue to develop clinical and pedagogic skills treating adult and geriatric patients as well as children (in co-operation with dental students). At the start of the autumn semester, the students spend one week working in a nursing home.

In the spring semester, lectures are given in gerodontology, work continues on the written assignment and the students continue to treat older adult patients at different clinics. Early on in the spring semester, the students spend four weeks at a Public Dental Health Service clinic. On their return, they present an oral and a written report.

## ***Credits***

The bachelor programme in dental hygiene consists of 180 credits, 30 credits per semester provided study progress is normal.

A detailed overview of credits according to subject is presented below under the heading Assessment and Credits.

The allotment of credits is in accordance with "Regulations for Degree Studies at the University of Bergen".

# MACROPLAN FOR THE BACHELOR PROGRAMME IN DENTAL HYGIENE

## AUTUMN SEMESTER 1<sup>st</sup> YEAR

	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
I n t r o d u c t o r y	Examination philosophicum																	
	Chemistry and biochemistry 25 (LS)																	
	Dental anatomy 9 (LS)									General anatomy 7 (LS)								
	Materials 7 (L)																	
	Preventive dentistry; Preclinical course												Preventive dentistry; Clinical introductory course part I					

## SPRING SEMESTER 1<sup>st</sup> YEAR

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Physiology and nutrition 20 (LS)												Pharmacology 9 (LS)										
	General anatomy 12 (LS)												General pathology 11 (LS)										
	Microbiology 8 (LS) + lab. course (20L)												(* Course i odontofobia, part I)										
	* Materials 9 (L)												Radiology 15 (L) + seminars (1 session every other week)										
	Preventive dentistry ; Clinical introductory course part II												Clinical seminars and literature seminars										
Preventive dentistry ; Adult dental care																							

## AUTUMN SEMESTER 2<sup>nd</sup> YEAR

	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	
P r a c t.  t r a i n i n g	Pharmacology 5 (LS)			Pedagogics and ...			psychology 8 (LS)											
	Oral surgery and oral medicine 11 (LS)			Anaesthesia 8 (LS) + 6t			Orthodontics 6 (F)											
	Cariology 12 (L)			Endodontics 8 (L)			cont.											
	Periodontics 8 (LS)						cont.											
	Paedodontics 11 (L)						cont.											
	Clinical seminars and literature seminars						cont.											
	Radiology (5 sessions per student)						Orthodontics 6 (L)											
	Oral surgery (7 sessions per student)						cont.											
	Paedodontics 17 (L)						cont.											
	Preventive dentistry ; ...						Adult dental care											

## SPRING SEMESTER 2<sup>nd</sup> YEAR

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Community dentistry 14 (LS)																						
	Pedagogics and psychology 17 (LS)																						
	Orthodontics 9 (L)																						
	Cariology 12 (L)												Periodontics 8 (FS)										
	Paedodontics 17 (L)																						
	Prosthodontics 11 (LS) + preclinical course (39t)																						
	Clinical seminars and literature seminars																						
	Orthodontics 9 (1)																						
	Paedodontics 20 (1)																						
	Preventive dentistry ; adult dental care																						
																							Gen. dent.

## AUTUMN SEMESTER 3<sup>rd</sup> YEAR

	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	
N u r s i n g h.	Ped./psy. 3			Project assignment - draft														
	Community dentistry 14 (LS)																	
	General dental practice 14 (LS)																	
	Clinical seminars and literature seminars												Gerodontology 6 (LS)					
	Patient Reception Clinic (4 sessions per student)																	
	Paedodontics 15 (2)																	
	Prosthodontics and gerodontology 9 (1 session every second week)																	
General dental practice 17 (1)																		
Preventive dentistry ; adult dental care																		

## SPRING SEMESTER 3<sup>rd</sup> YEAR

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Project- ... Community ... Gerod.	assignment																						
	dentistry																						
	cont. 8 (LS)																						
	* (* Course in odontofobia, part II)																						
	General - ...																						
	Case pres.																						
General - ... Prosthodontics and ... General - ... Preventive	Extramural course																						
	dentistry																						
	cont.																						
	gerodontology 18 (1)																						
	dentistry; adult dental care																						



TEACHING METHODS IN THE  
BACHELOR PROGRAMME IN  
DENTAL HYGIENE

	<b>L</b>	<b>LS</b>	<b>Course</b>	<b>Clinic</b>	<b>Notes</b>
<b>Subject/course:</b>					
Examination philosophicum	x				Lectures given by other faculty
Chemistry and biochemistry		x			
Dental anatomy		x			
General anatomy		x			
Materials	x				
Physiology and nutrition		x			
Microbiology	x				
General pathology		x			
Pharmacology		x			
Pedagogics and psychology		x			
Radiology	x				
Medical introductory package		x			
Oral surgery and oral medicine		x			
Course in infiltration anaesthesia			x		6 hour course
Course in odontophobia			x		Part I and II
Orthodontics	x				
Cariology/endodontics	x				
Dental bleaching			x		
Paedodontics	x				
Periodontics		x			
Prosthodontics	x				Clinical teaching in co-operation with gerodontology
Gerodontology		x		x	In addition: 1 week's visit to a nursing home
General dental practice		x			Selected lectures
Community dentistry		x			

	<b>L</b>	<b>LS</b>	<b>Course</b>	<b>Clinic</b>	<b>Notes</b>
<b>Subject/course:</b>					
Assignment		x	x		
Preventive dentistry:				x	2-3 sessions per semester from the 2nd semester
Preclinical course		x	x		
Preclinical course – prosthodontics		x	x		
Preclinical course – Paedodontics		x	x		
Clinical introductory course		x	x	x	
Extramural service – PDS			x		
Extramural clinic – extramural studies		x	x	x	
Clinical – Orthodontics		x	x	x	
Clinical – Surgery		x	x	x	
Clinical - Radiology			x	x	
Clinical – Dental hygiene			x	x	
Clinical – General dental practice		x			
Clinical seminars		x			
Literature seminars		x			
Case presentation					

*Footnotes:*

L = lecture of 45 minutes

LS = lecture/seminar of 2x40 minutes (mandatory teaching)

Course = number of course hours in laboratories etc. (mandatory teaching)

Clinic = number of clinical sessions (mandatory teaching).

## **Assessment and credits in the bachelor programme in dental hygiene**

Subject/course:	Test - Pass/ Failed	Examination - ECTS A-E	Notes regarding methods of evaluation	Credits
<b>1<sup>st</sup> semester:</b>				
Examination philosophicum		4 h		10
Dental anatomy (TPBAANA)	2 h			
Preclinical course (TPBAFOR-PROP)	2 h		Approved course	10
Clinical introductory course part I (TPBAFOR-I/II)	2 h		Approved course	
Chemistry and biochemistry (TPBAKBK)		4 h		10
				<b>= 30</b>
<b>2nd semester:</b>				
Odontofobia (TPBAFOB)			Approved course	
Clinical introductory course part II (TPBAFORI/II)	2 h		Approved course	5
Microbiology and hygiene (TPBAMIKR)		4 h		5
General anatomy (TPBAANA)		4 h		10
Materials (TPBAMAT)	2 h			
Physiology and nutrition (TPBAFYs)		4 h		5
General pathology (TPBAPAT)		4 h		5
				<b>= 30</b>
<b>3rd semester:</b>				
Pharmacology (TPBAFAR)		4 h		5
Diseases of the oral cavity (TPBAKOS)		4 h		10
Course in infiltration anaesthesia (TPBAINFIL)	2 h			5
Radiology (TPBARØN)		4 h		10
				<b>= 30</b>
<b>4th semester:</b>				
Prosthodontics and gerodontology – preclinical course prosthodontics (TPBAPRO/GER)			Approved	
Orthodontics (TPBAKJE)	2 h			5
Cariology and endodontics (TPBAKAR/END)		4 h		15
Periodontics (TPBAPER)		4 h		10
				<b>= 30</b>
<b>5th semester:</b>				
Pedagogics and psychology (TPBAPED/PSY)		4 h		15
Paedodontics – clinical (TPBAPED)			Pass/Failed	
Paedodontics (TPBAPED)		4 h		15
Written assignment – plan (TPBAPROSJ)			Approved	
				<b>= 30</b>
<b>6th semester:</b>				
Written assignment – completed (TPBAPROSJ)			Pass/Failed	10
Community Dentistry (TPBASAM)		4 h		5
Prosthodontics and gerodontology – gerod. clinic (TPBAPRO/GER)			Approved	
Prosthodontics and gerodontology (TPBAPRO/GER)		4 h		5
Practice in private practice – report (TPBASAM)			Approved	
Odontofobia (TPBAFOB)			Approved course	
Preventive dentistry (TPBAFOR-K3)			Pass/Failed	
General dental practice (TPBAALM)		4 h		10
				<b>= 30</b>

## **Evaluation - grades**

On 31<sup>st</sup> June 2006 (# 05/06) the Faculty Board of the former Faculty of Dentistry decided to introduce ECTS (European Credit Transfer System) with alphabetical grades from A-F (where F is failed) for theoretical examinations.

- The ECTS grades have been adopted for the bachelor programme in dental hygiene
- The grades Pass/Failed will be used when evaluating clinical performance and scheduled class tests
- The written assignment will be judged Pass/Failed.

Please consult, "Manual for Quality Assurance of University Study Programmes", University of Bergen 2006.

Quality assurance of the students' knowledge, skills, attitudes, professional understanding and ability to establish contact with patients is assessed continually throughout the course. Written examinations, mandatory assignments, scheduled tests and internal class tests are used to quality control the students' competency. Each student is assigned a *contact teacher* who is responsible for monitoring his/her progress.

Internal class tests may be arranged by the Department of Dental Hygiene (Section for preventive dentistry) on short notice but without consequences for the student's study progression. Following such a class test the student may request a follow-up or feedback from his/her *contact teacher*. Scheduled class tests are arranged in co-operation with the study administration office and, if not approved, may have consequences for study progression, cf. "Supplementary Regulations to the Regulations for Degree Studies at the University of Bergen - Faculty of Medicine and Dentistry".

A card showing a student's treatment of patients accompanies him/her in the different clinics. This record is used to assess the student's progression relative to specified qualitative and quantitative requirements.

The Faculty of Medicine and Dentistry employs external examiners for written final examinations in the bachelor of dental hygiene programme. This provides quality assurance of the programme and safeguards students' rights. An examination commission consists of an internal and an external examiner. External examiners are appointed for a period of five years. Internal examiners are used for scheduled internal tests.

Complaint procedures, arrangements and opportunities to repeat failed examinations or tests are outlined in "Regulations for Degree Studies at the University of Bergen – the Faculty of Medicine and Dentistry" and in "Supplementary Regulations to the Regulations for Degree Studies at the University of Bergen - Faculty of Medicine and Dentistry".

## **Teaching methods**

The teaching methods vary between subjects. The most common methods are lectures, seminars (LS), problem based learning (PBL) and group work. Oral and written presentations as well as information technology (special programmes) are widely used.

Preclinical/practical and clinical teaching constitutes a major part of the course. Efforts are made to integrate attitudes, theoretical knowledge and clinical skills. Teaching methods employed in the clinic include individual tuition and group discussion as well as clinical seminars. Individual supervision is necessary to meet preclinical/clinical teaching objectives.

## **Evaluation**

The students participate actively in the evaluation of individual subjects. Every semester, the students receive an electronic questionnaire from the Department of Clinical Dentistry. The forms contain questions about the educational environment, theoretical teaching and clinical tuition/practice. The subjects are evaluated every second year and the evaluation results are presented to the programme committee for dental subjects and to responsible sections. The teacher responsible for the subject is required to follow-up the report. A written summary assessment based on the reports from the sections is prepared every semester. Some sections also carry out a questionnaire evaluation of their own teaching.

The Faculty of Medicine and Dentistry employs an external programme examiner to monitor and assess its undergraduate study programmes (Faculty Board, # 26/05). The programme examiner is engaged for a four-year period.

The programme examiner is expected to:

- assess the overall standard of the study programme; compare it with corresponding programmes at other European universities and whether or not the examination and methods of assessment are appropriate and practised fairly
- comment on and give advice about contents, combinations, structure and methods of assessment
- comment on proposed final examination questions
- if possible, participate in the assessment of a sample of student examination answers
- meet with teaching staff at least once a year to discuss current issues and general questions concerning assessment of the students' performance
- engage in the scheduled 4-year, more extensive programme evaluation

In co-operation with the faculty, the programme examiner should concentrate on different aspects and problems of the undergraduate programmes and is expected to submit an annual report to the faculty.

## **Administration**

### **Curriculum and programme committees for dental subjects**

The Faculty Board is the governing body of the Faculty of Medicine and Dentistry. An advisory Programme Committee with special powers has been established with a mandate to “promote good teaching of all subjects and study programmes at the Faculty of Medicine and Dentistry”.

The Programme Committee for dentistry was established on 1st January 2008 to administer dental subjects. This entails among other duties to:

- Serve as Acceptance Committee for the programmes *bachelor of dental hygiene, master of dentistry and dental specialities* (final responsibility rests with the faculty)
- Decide placement of students/exemptions *and consider applications concerning study progression (repeats, etc.)*
- Propose change over arrangements for students who want to move to another teaching institution or another programme

- Consider the programmes and co-ordinate between them internally; including scheduling/adjustment of student work load in subjects taught concurrently
- Receive information from and provide information to new students
- Prepare for internationalisation and opportunities for student exchange.

The Programme Committee is chaired by the deputy chair person for teaching and its membership is comprehensive and representative.

## **Course administration**

The department and the faculty share responsibility for the implementation of the curriculum in co-operation with the Programme Committee for dental subjects.

The study administration of the department is primarily responsible for the scheduling of teaching and preparation of timetables with fixed teaching times for each semester. The planning tool of UoB (Syllabus +) is used and the schedules for each year of study are made available on My Page. General information about subjects and the teaching is made available on "Studentportalen", UoB.

## ***Study progression requirements and absenteeism***

Most subjects require mandatory attendance for lectures, seminars and clinical sessions. Students are required to have participated and have passed scheduled tests before they are allowed to continue clinical activities or present for the final examination in a subject. Clinical performance is assessed according to quantitative and qualitative criteria at the end of each semester after and including the third. All clinical activities must be approved before a student is permitted to move on to the next year. Mandatory attendance is 90 %.

Lectures are not mandatory but treatment of patients requires that students at all times are up to date with their studies. Lectures/seminars (FS) are mandatory.

For further information about formal requirements for study progression see "Supplementary Regulations to the Regulations for Degree Studies at the University of Bergen - Faculty of Dentistry".

Applications for short study leaves (1 day to 3 weeks) may be granted by Section for Preventive Dentistry cf. "Guidelines for Shorter Study Leaves". There is no reduction in course progression requirements because of study leave(s).

## ***Place of study for different subjects***

The Faculty of Medicine and Dentistry is responsible for the contents and administration of the teaching of all subjects. The teaching is carried out by teachers at the faculty, except for pedagogics/psychology, chemistry/biochemistry and physiology and nutrition. Most of the teaching (and clinical activities) takes place at the Section for Preventive Dentistry, Overlege Danielsens Hus, Årstadveien 21, 5009 Bergen. Some lectures and some clinical sessions (paedodontics, general dental practice, prosthodontics, orthodontics and surgery) take place in the Dental Building, ("Odontologen"), Årstadveien 17, 5009 Bergen. The venue for ex. phil. is the Building for Biological Subjects ("BB-building), Jonas Lies vei 91, 5009 Bergen.

Teaching and clinical practice in gerodontology is at Kalfaret Dental Clinic, Kalfarveien 20, 5009 Bergen. Parts of microbiology and pathology are taught in Armauer Hansen's Building, Haukelandsveien 28, 5009 Bergen.

### ***Teaching languages***

Most subjects are taught in Norwegian. Scientific literature may also be in other languages, especially other Scandinavian languages (Swedish and Danish).

### ***Working day - scheduling***

Each day has a 3-hour clinical session in the morning (08.00 – 11.00) and in the afternoon (13.00 – 16.00). Theoretical teaching is scheduled during the period between clinical sessions (11.00 – 13.00), except during the first semester of the course when theoretical teaching may take place during the morning and afternoon sessions.

Theoretical teaching is in the form of 45-minute lectures (L) or lecture/seminars (LS) lasting 2 x 45 minutes.

Efforts are made to give the student one day per week without teaching. However, this may not always be possible because the class receives lectures together with other groups of students.

### ***Taking parts of the bachelor programme abroad***

Stays at universities abroad provide the students with an opportunity to get to know teaching environments that may complement and strengthen their Norwegian education. Excellent financial arrangements are available to facilitate study abroad. Exchange stays are normally scheduled during the 5th semester when the students are able to work relatively independently. The stay may last for a period of 2 – 3 months. The student applies to a university with which the University of Bergen has a contract. If many students apply, then selection is based on their past performance in the bachelor programme. The stay has to be approved by the sections that are involved in teaching during the period abroad and it is accepted as a part of the bachelor programme.

As of June 2008, the Department of Clinical Dentistry, Faculty of Medicine and Dentistry had exchange agreements for students of dental hygiene with:

- Åbo Technical College (yrkeshøgskola)
- University of Århus
- University of Minnesota.

Further information about the exchange programme is available from the student advisor. The deadline for application for exchange during the following semester is 15<sup>th</sup> February (1<sup>st</sup> February for Minnesota).

### ***Study trip***

The students may be granted leave for a study excursion lasting one week during their 3-year course. To avoid interruption of clinical duties towards the end of the course, the trip should be arranged no later than the 6th semester and preferably during weeks when there is no scheduled teaching.

The students are required to present a relevant professional programme for the trip. The plan is submitted to the Programme Committee for approval. The students report back to the Programme Committee about possible benefits from the trip. This report is presented to the Programme Committee and fellow students shortly after their return to Bergen.

### ***Qualifications for further studies***

After obtaining the degree Bachelor of Dental Hygiene the candidate may apply for acceptance for a variety of master programmes at a university or college, including institutions abroad.

A master degree in dental hygiene is not available at the University of Bergen but there are a number of other opportunities for candidates with a bachelor degree in dental hygiene at the University of Bergen.

Applications for master programmes in health-related subjects should be received by the 15<sup>th</sup> April (Department of Social Medicine).

The application deadline for other master programmes at UoB is 1st June. An application should be submitted via the application website (log in on studentweb). Examination certificates/documents should be forwarded at a later date.

- Master in health subjects, Department of Social Medicine, UoB: – health promotion/health psychology
- Master in health subjects, Department of Social Medicine, UoB:– genetic counselling
- Master in human biology, Department of Biomedicine, UoB (20 credits in chemistry/biochemistry and 15 credits in human biology are required in addition to the bachelor of dental hygiene)
- Master in human nutrition, Department of Social Medicine, UoB: (30 credits in chemistry and biochemistry are required in addition to the bachelor of dental hygiene)
- Master in international health, Centre for international health, UoB

- Master in Dental Hygiene, University of Minnesota, USA.

At present, there is no university based programme leading to a clinical speciality in dental hygiene.

### ***Career opportunities***

Work as a dental hygienist is challenging. Most hygienists are employed in the public sector (60 %) or in private practice. They are authorised to run their own practice but may also work in a dental health team. For further information, consult the home page of the Norwegian Dental Hygienist Association.

The green paper no. 35 (2007) [St.meld. nr. 35 (2007)] describes different roles and some career opportunities for dental hygienists. There will be opportunities in primary oral health care and their future sphere of interest will be broadened to include public health (surveillance of general health, smoking habits, eating disturbances, overweight, diabetes, psychiatry, etc.).

Dental hygienists may also engage in teaching, research and administration.

### ***Authorisation***

Candidates who have completed the bachelor degree in dental hygiene may apply for authorisation to practise as a dental hygienist in the EU/EE area. Authorisation is granted by the Norwegian Registration Authority for Health Personnel, (Statens Autorisasjonskontor for helsepersonell, SAFH), Postboks 8053 Dep., 0031 Oslo. The Faculty of Medicine and Dentistry co-operates with SAFH to provide the documentation required to obtain authorisation.



## ***List of subjects***

<b>Subject</b>	<b>Subject code</b>
<b>General dental practice</b>	<b>TPBAALM</b>
<b>Anatomy: Dental anatomy and general anatomy</b>	<b>TPBAANA</b>
<b>Examination philosophicum</b>	<b>EXPHIL/MOSEM</b> <b>EXPHIL/MOEKS</b>
<b>Pharmacology</b>	<b>TPBAFAR</b>
<b>Preventive dentistry</b>	<b>TPBAFOR-PROP</b> <b>TPBAFOR-I/II</b> <b>TPBAFOR-K1</b> <b>TPBAFOR-K2</b> <b>TPBAFOR-K3</b>
<b>Physiology and nutrition</b>	<b>TPBAFYS</b>
<b>General pathology</b>	<b>TPBAPAT</b>
<b>Cariology and endodontics</b>	<b>TPBAKAR/END</b>
<b>Chemistry and biochemistry</b>	<b>TPBAKBK</b>
<b>Oral surgery – oral medicine</b>	<b>TPBAKOS</b>
<b>Infiltration anaesthesia</b>	<b>TPBAINFIL</b>
<b>Orthodontics</b>	<b>TPBAKJE</b>
<b>Dental materials</b>	<b>TPBAMAT</b>
<b>Microbiology and hygiene</b>	<b>TPBAMIKR</b>
<b>Odontofobia</b>	<b>TPBAFOB</b>
<b>Pedagogics and psychology</b>	<b>TPBAPED/PSY</b>
<b>Paedodontics</b>	<b>TPBAPED</b>
<b>Periodontics</b>	<b>TPBAPER</b>
<b>Prosthodontics and gerodontology</b>	<b>TPBAPRO/GER</b>
<b>Written assignment</b>	<b>TPBAPROSJ</b>
<b>Radiology</b>	<b>TPBARØN</b>
<b>Community dentistry w/extramural studies</b>	<b>TPBASAM</b>

## **GENERAL DENTAL PRACTICE (TPBAALM)**

---

### **Contents**

Through theoretical and clinical teaching as well as the general dental practice sessions, the students should acquire knowledge about most aspects of care of adult patients encountered in general dental practice in EU. Treatment includes assessment of patients, history taking, diagnosis, treatment planning, prevention/prophylaxis, maintenance and follow-up.

The course in general dental practice provides integrated teaching in clinical disciplines to encourage the candidate to adopt a holistic approach to patients. The core subjects of the course are cariology, endodontics, periodontics, prosthodontics and gerodontology and it also includes aspects of oral surgery/oral medicine, biomaterials, orthodontics, oral radiographic diagnosis, odontophobia and community dentistry. The need for a thorough understanding of these subjects is because dental hygienists are expected to provide wide reaching and clear information to different groups of adult patients, both as individuals and/or as groups. In addition, the members of the dental team require understanding of each other's duties.

### **Expected Learning Outcomes**

The bachelor candidate should acquire and internalize theoretical knowledge and manual skills to enable them to undertake an overall assessment of patients, diagnose and describe present status, plan and carry out certain types of treatment of adults. These treatments are specified in the educational objectives of other clinical subjects.

### **Teaching Methods**

*Teaching and supervision:* Clinic: Co-operation with a dental student at Section for General Dental Practice under the supervision of clinical teachers.

Theory: Lectures in general dentistry, participation in seminars and case presentations in general dental practice in co-operation with dental students.

### **Quality Assurance**

*Work requirements:* All dental hygiene students are required to treat two patients in co-operation with a dental student. All clinical sessions are compulsory and the clinical staff keeps attendance records.

*Quality assurance of teaching:* Questionnaire surveys ("REFLEKS") are regularly carried out to improve the teaching and scheduling, especially for the bachelor degree students.

*Evaluation:* Clinical performance is judged Pass or Failed by the teaching staff. A 4-hour written examination is arranged at the end of the course.

## **ANATOMY: DENTAL ANATOMY AND GENERAL ANATOMY (TPBAANA)**

---

### **Contents**

Anatomy includes literature and teaching of the following topics:

*General anatomy and cell biology:* Cells and tissues, skin, blood and its constituents, the circulatory system, the lymphatic system, the respiratory tract, the digestive tract, the urinary tract, the endocrine system, the nervous system, the skeleton, joints and muscles.

*Anatomy of the head and neck:* Structures and growth of the cranium, muscles, tongue, palate, pharynx, temporomandibular joint, blood vessels, lymphatic drainage and nerve supply.

*Oral biology and embryology:* Dental tissues, periodontium, odontogenesis, salivary glands, oral mucous membranes and the most common congenital malformations of the face and oral cavity.

*Dental anatomy:* The deciduous and permanent dentition, nomenclature, eruption and exfoliation.

### **Expected Learning Outcomes**

The principal purpose of the teaching of anatomy is that the candidate should acquire knowledge of the normal anatomical structures of the body, the different cells, tissue types and organs. Special attention is paid to dental anatomy, the anatomy of the head and neck and oral biology.

#### *Knowledge*

The student shall be able to describe:

- The normal structures of the body generally at cell-, tissue- and organ level
- The normal anatomy of the head and neck as well as adjacent areas in some detail
- The nerve supply of teeth in detail as the basis for the safe administration of local infiltration anaesthesia
- The normal structures of oral and dental tissues
- The normal morphology of the human dentitions
- The normal development of teeth, their eruption and exfoliation as well as the most common congenital malformations of the face.

#### *Skills*

The student shall be able to

- identify and name human deciduous and permanent teeth
- communicate anatomical names and concepts to the health team as well as to the general public

## Teaching Methods

The teaching is by lectures, a practical course and seminars as well as group discussions led by third year dental students.

## Quality Assurance

Following the dental anatomy course, the students are required to pass a 2-hour practical and theoretical test before being allowed to sit the final anatomy examination.

Final evaluation is by a 4-hour written examination.

The students are encouraged to give their views of the anatomy teaching in an electronic evaluation at the end of the course.

## **EXAMINATION PHILOSOPHICUM (EXPHIL/MOSEM, EXPHIL/MOEKS)**

---

### Contents

Examination philosophicum consists of two parts, Exphil-alfa and Exphil-beta.

The goal of *Exphil-alfa* is to give an introduction to some of the main aspects of Ancient philosophy and modern Western philosophy without pretending to cover the history of philosophy exhaustively. The first part focuses on ontology and epistemology and the topic is presented with a view to relate it to medical thinking through the ages (topics 1 and 2, approx. 5 seminars/lectures). The second half focuses on two philosophical issues of particular interest, namely the relationship between body and soul, and the concept of normality.

The goal of *Exphil-beta* is to provide an introduction to fundamental aspects and problems relating to the sciences on which medicine and dentistry are based. Both classic and more recent issues relating to medicine and health-related activity necessitate different forms of philosophical endeavour, at the same time as the philosophical tradition often proves to be an adequate approach to the understanding of medical and health-related issues. This part of Exphil will therefore often approach philosophical questions employing medical or health-related examples.

The Faculty of Arts is responsible for the course and sets the syllabus.

### Expected Learning Outcomes

*Examination philosophicum* gives the students at the University of Bergen an introduction to the university's intellectual traditions, to its reasoning, working and writing. *Exphil* is meant to provide a philosophical perspective on academic culture and education. The medical and dental version of the course teaches students the philosophical, and to some extent the historical foundation of medicine and health-related subjects, both through philosophy of science-based analysis of practice, research and through the study of important contributions to Western philosophy which are relevant to the practise of medicine.

## Teaching Methods

*Examination philosophicum* may be obtained either by following the “seminar model” or the “examination model”.

a) The seminar model consists of:

- 2 x 2 hours of lectures per week for 9 weeks
- 2 x 2 hours of seminars per week for 9 weeks
- The writing of an assignment for each of the two parts of the course under individual academic supervision.

Students who choose the seminar model are assigned to a group which is the same for both part-courses. Each seminar group has its own leader who is responsible for the teaching and supervision.

b) The examination model consists of:

- 2 x 2 hours of lectures per week for 9 weeks.

Tuition in the two models may be scheduled differently during the semester.

## Quality Assurance

*The Seminar Model* – If the seminar model is chosen, there is no written examination. You are required to write an assignment for each part-course during the semester. These written assignments are submitted in a folder and assessed as the student’s examination work. The following requirements must be satisfied during the semester for the folder to be assessed.

Students who follow the seminar model must:

- Take part in at least 75% of the seminars in each part-course, i. e. absence in excess of two seminar sessions in each part-course, *irrespective of reason*, will result in the folder not being assessed
- Attend individual supervision appointments
- Give an oral presentation in each seminar sequence
- Submit a seminar assignment of approximately 1,500 words in each part-course
- Take part in a 45-minute broad-based test at the end of each part-course (“multiple choice”). Both part-courses must be passed.

Transfer of accepted work requirements from one semester to the next is not allowed.

*The Examination Model* – You will only have to attend lectures if you choose the examination model. These lectures are common to students following both *Examination philosophicum* models. Attendance is not recorded.

The examination model concludes with a 4-hour written examination towards the end of the semester. It consists of analytical questions from the two part-courses of *Examination philosophicum*. Both part-courses must be passed.

## **PHARMACOLOGY (TPBAFAR)**

---

Pharmacology is the study of interactions between medicines and the living organism.

### **Contents**

The candidate shall be able to explain basic pharmacological definitions and concepts.

Furthermore, he/she should be able to describe pharmacological properties of the medicaments most widely used in dentistry.

### **Expected Learning Outcomes**

General pharmacology:

1. *Pharmacodynamics*: Proteins as targets of medicaments; receptor, agonists, anti-agonists and the dose-response curve
2. *Pharmacokinetics*: Absorption, distribution, metabolism; excretion, half-life, transport across membranes and therapeutic effects
3. *Interactions*: Synergism and antagonism.

Local anaesthetics: Methods for inducing local anaesthesia, uses, effect on different types of nerve fibres, action mechanisms, chemical properties, kinetics, types of esters, types of amides, Bupivakin, Lidocaine, Mepivacaine, Articaine, pH, pKa, lipid solubility, protein binding, astringents and side effects.

Analgesics: Types of pain, opioid analgesics, antipyretic analgesics, secondary analgesics, morphine, codeine, acetylsalicylic acid, paracetamol, NSAIDs, WHO's pain scale, choice of analgesics in dentistry.

Antimicrobial agents: Living organisms, protists; eucaryotes, procaryotes, antibacterial, antimicrobial and antiviral agents.

Sedatives/psychopharmaca: General anaesthesia, sedation, volatile anaesthetics, nitrous oxide (laughing gas) and benzodiazepines.

Psychopharmaca: Uses, mental disease and psychopharmaca.

Drugs for coronary heart disease/blood:

Diseases of the heart and circulation, heart failure and medicaments, angina pectoris and medicaments, hypertension and medicaments, arrhythmia and medicaments, antithrombotic and fibrinolytic medicaments, INR and Marevan.

Other topics: Drug induced xerostomia, gerontopharmacology, prescription of drugs, use of pharmacopoeia ("Felleskatalogen").

### **Teaching Methods**

The lectures and seminars are designed to give basic knowledge in pharmacology.

Medicaments used in dentistry and those that may influence oral health are considered.

### **Quality Assurance**

*Evaluation* is by a 4-hour written examination.

**PREVENTIVE DENTISTRY (TPBAFOR-PROP, TPBAFORI/II, TPBAFOR-K1, TPBAFOR-K2, TPBAFOR-K3)**

---

**PRECLINICAL COURSE (TPBAFOR-PROP)**

**Contents**

The instruments and equipment used are demonstrated in a practical course which provides a multidisciplinary approach to diagnosis, treatment, professional attitude and the clinical skills necessary to qualify dental hygienists for independent practice.

**Expected Learning Outcomes**

Practical skills needed by dental hygienists.

*Knowledge:* The candidate shall

- know the instruments used in a clinical dental hygiene practice
- be able to use hand and rotating instruments (e. g. scalers, rotating polishing equipment, etc.)
- know how to ensure support when employing instruments for examination and treatment

*Skills:* Have acquired the manual skills necessary to carry out dental hygiene treatment.

*Attitudes:* Acknowledge existing norms for sound technical practice and realise that all equipment needs control and maintenance.

**Teaching Methods and Quality Assurance**

The course is scheduled during the 1<sup>st</sup> semester and teaching is by lectures, laboratory work and clinical exercises on fellow students under the supervision of clinical teachers (dental hygienists and dentists). A written test has to be passed before the student may continue the dental hygiene course.

**INTRODUCTORY CLINICAL COURSE (TPBAFORI/II)**

**Contents**

The candidate is taught the procedures of patient care; obtaining patient history; how to carry out an intraoral examination; how to address the patient; how to maintain instruments, etc.; a multidisciplinary theoretical approach to dental hygiene treatment as well as theoretical knowledge about health promotion and disease prevention.

## **Expected Learning Outcomes**

Improvement of the skills needed to practice dental hygiene. The candidate shall know the main disciplines of clinical dental practice.

*Knowledge:* The candidate should be

- able to complete a dental chart including patient history, information about dental health behaviour (diet/eating habits/oral hygiene/smoking, etc)
- able to carry out clinical and radiographic examination of mucous membranes, teeth, periodontium, diagnose anatomical anomalies and diseases of the oral cavity, problems of occlusion, defects of dental fillings and other restorations
- able to collect samples for saliva tests
- able to take clinical photographs and impressions for study models
- familiar with different personal oral hygiene aids
- able to handle dental equipment, including data programmes for electronic record keeping and radiographs

*Skills:* The candidate shall understand the role of the therapist and the need for good technical ability.

*Attitudes:* The candidate should accept that diseases of the oral cavity are preventable and recognise their role in health promotion and in the dental health team.

## **Teaching Methods and Quality Assurance**

The course runs during the 1<sup>st</sup> and 2<sup>nd</sup> semester. It consists of lectures, laboratory exercises and clinical practice on fellow students under the supervision of clinical teachers (dental hygienists and dentists). A written test has to be passed before the student may continue the dental hygiene course.

## **TREATMENT OF PATIENTS – PREVENTIVE DENTISTRY (TPBAFOR-K1/K2/K3)**

### **Contents**

The candidate continues to practise treatment procedures; how to motivate patients to break habits (bad habits) that have a negative effect on oral health; how to plan and carry out treatment of individual patients and – based on theoretical knowledge about health promotion and disease prevention – how to plan and implement measures for groups of people.

### **Expected Learning Outcomes**

An important goal of preventive dentistry for the individual is to empower people to take care of and improve their own oral health by facilitating the performance of oral health promoting actions and abstention from behaviour with potentially negative consequences.



The candidate should know how oral diseases may be prevented (in individuals and groups) and be able to distinguish between diagnoses that require treatment by a dentist (or other health service personnel) or a dental hygienist. They must be able to establish contact with the different parties involved in dentistry, communicate with, motivate, instruct and treat people of different ages and stages of development with health promotion efforts.

The candidate should be familiar with the organization of the oral health services of the community and the patients' entitlement to reimbursement of dental expenses from national health insurance.

*Knowledge:* The candidates shall

- be able to establish good communication with their patients or other members of the public health-/oral health services
- be able to produce a legally adequate dental record containing the patient's history and information about oral health behaviour
- be able to perform necessary clinical and radiographic examination of the mucosa, teeth, periodontium, and to diagnose anatomical abnormalities, oral diseases, malocclusions as well as defective fillings and other restorations
- possess an understanding of disease in a social, psychological and pedagogical context

*Skills:* The candidate shall be able to

- plan, carry out prophylaxis and necessary treatment such as removal of plaque, calculus, overhangs on fillings, polish teeth and dental fillings, treat uncomplicated periodontal cases, interceptive caries treatment and insert temporary fillings; the candidate should also inform about, motivate for and instruct patients in oral health promoting behaviour and the use of suitable mechanical and chemical aids to oral hygiene
- motivate patients to break habits (bad habits) which are deleterious to oral health
- get patients to accept and acknowledge their own oral health status and ensure that they receive adequate assistance (e. g. against eating disturbances, smoking, obesity, diabetes, mentally ill, etc.)
- document changes/diagnoses
- apply fluorides where indicated and recommend the use of fluorides
- assess the need for assistance and refer cases with complaints beyond the dental hygienist's field of competence
- communicate knowledge about health promotion and disease prevention to other health service personnel and to risk groups
- develop strategies to identify risk patients and for prevention and treatment of risk groups

*Attitudes:* The candidate should acknowledge that improvement of public health is of general interest to all health service personnel. The candidate should understand that the dental hygienist is in a unique position to diagnose and discuss diseases other than those evident in the oral cavity. The dental hygienist may be the first contact, often with "healthy" people (medically speaking), have the opportunity to discuss lifestyle related health behaviour and to accept responsibility for understanding aetiological factors behind the patient's condition and be able to recommend further treatment if necessary.

## **Teaching Methods and Quality Assurance**

The teaching goes on from the 1<sup>st</sup> to 6<sup>th</sup> semester in the form of lectures, laboratory and clinical exercises, literature seminars (2<sup>nd</sup> to 6<sup>th</sup> semester), clinical seminars (2<sup>nd</sup> to 6<sup>th</sup> semester), case presentations (5<sup>th</sup> to 6<sup>th</sup> semester), out reach activities (4<sup>th</sup> semester), radiographic diagnosis (cases) (2<sup>nd</sup> to 6<sup>th</sup> semester) and clinical practice (2<sup>nd</sup> to 6<sup>th</sup> semester).

The clinical sessions are led by a senior dental hygienist or a stand in (dental hygienist or dentist) and attendance is mandatory (absenteeism is recorded). Each student is assigned a group teacher.

Current clinical problems or dental literature (papers from recognised scientific journals) are discussed in weekly seminars either by the whole class or in smaller groups. All seminars have been developed by clinical teachers (dental hygienists/dentists) or scientific staff members of the section.

A test is arranged during the 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> semester.

Clinical performance is assessed based on the time spent treating patients, the quality of interaction with patients and the volume of treatment. There is a list of “minimum requirements” for clinical performance. Satisfactory clinical performance, participation in clinical and literature seminars is a prerequisite for progression to the next year of study. Approved clinical performance is also required to be allowed to enter for the final examination in general dental practice.

Absenteeism from mandatory teaching is first taken up with the student orally then in writing.

The course w/clinical performance is assessed as Pass/Failed.

## ***PHYSIOLOGY AND NUTRITION (EUBIOTICS) (TPBAFYS)***

---

Dental hygienists are expected to understand and be able to communicate basic knowledge about physiological and nutritional functions. They should also be able to assess their own need for further information, find and interpret it and thereby acquire new insight into human physiology, nutrition and related subjects. They should especially acquire the competence necessary to assess critically popularised information.

It is expected that the dental hygienist, on the basis of textbooks and other literature (journals, library, media, etc.) shall be able to provide guidance to patients, teach or lecture on basic physiological and nutritional topics.

## **PHYSIOLOGY**

Physiology includes literature on and teaching of the following topics: From cells to the body, the nervous system, the senses, the endocrine system, muscles, circulation, blood, immune system, respiratory system, digestive system, metabolism of carbohydrates, proteins and lipids, temperature regulation, and the kidneys.

## Contents

The candidates should be able to

- explain the organization of the nervous system, reflex arches and negative feedback as the principle for regulation of optimal internal environment for homeostasis and function, including the autonomous nervous system
- explain the principles of nerve transport, synaptic transmission and understand how information is translated, transmitted, and interpreted by the nervous system, knowledge which facilitates the understanding of sensory physiology
- explain how physical changes in the environment may activate the nervous system and how they are perceived by the senses; the candidate should also know how we perceive sense stimulation, where on the body it originates, its duration and intensity; know the basic physiology of taste and smell
- explain the neurophysiologic background of pain, perception and modulation of pain as well as variation in reactions to pain and possible reasons for this; understand that pain is sometimes difficult to localise, e. g. angina, headache and sinusitis (referred pain), sciatica and trigeminal neuralgia (neurogenic pain)
- explain the structure of muscle cells, the mechanism of muscle contraction, the development of muscle strength, as well as give examples of stress induced muscle tension
- describe blood cells, blood coagulation mechanism and the role of blood cells in immunity
- describe the heart and the function of the peripheral circulation; the candidate is expected to be able to explain the regulation of blood flow and blood pressure in the circulatory system as well as in relation to the transport needs of individual organs; understand the importance of exchange of tissue fluid to maintain an ideal environment for the cells (homeostasis), and describe diet related disease states of the heart and circulation
- describe the ventilation of the lungs with special emphasis on the main structures and muscles involved in respiration with examples of what occurs under suboptimal conditions, e. g. COLS and fibrolytic pulmonary disease
- describe the transport of gases (respiratory), red blood cells, the function of haemoglobin and the regulation of ventilation, understand advantages/disadvantages associated with training at high altitudes
- describe endocrine glands, their hormones and their action mechanism in homeostasis with special reference to the regulation of calcium balance and vitamin D; the interplay between insulin and glycogen will also be emphasised in relation to nutrition; the students should also know the reasons for hormone disturbances, too little or defective receptors
- describe the functions of the digestive system and give an overview of the metabolism of carbohydrate, fat and proteins, as well as explain the regulation of the blood sugar level
- describe the production of urine, have knowledge about body fluids and their composition; as well as be able to explain the acid-base balance and how the body normalises it

- describe the regulation of body temperature, know that man is endothermic and homeothermic; be able to use this as an example of homeostasis and reflex arch with feedback loop; adaptation to hot and cold environments will also be discussed briefly

## **Expected Learning Outcomes**

The teaching of physiology shall integrate knowledge of anatomy, chemistry and biochemistry to provide understanding of how the organs interact to ensure that all cells at all times live in an optimal environment. The students should also be able to show how homeostasis (the internal environment) is controlled 24 hours a day and adjusted by nervous and hormonal reflexes. They should understand that this surveillance is necessary in order for the body to function normally. This knowledge is the basis for the teaching of nutrition and facilitates understanding of subjects such as caries prevention and pharmacology.

## **NUTRITION (EUBIOTICS)**

The teaching of nutrition covers the following topics:

Energy turnover, energy supplying nutrients, digestion, absorption, metabolism, minerals, vitamins, nutrient- and dietary recommendations, nutrition and diet for special groups, nutrition and health (including oral health), sources of dietary advice, the Norwegian diet and food policy.

## **Contents**

Nutrition includes literature on and the teaching of the following topics:

- Energy turnover in order that the students understand the importance of energy balance for growth and maintenance
- The energy rich nutrients are described with special reference to carbohydrates and fats
- The importance and functions of vitamins, minerals and trace elements are described with special reference to the dose-response-curve using fluoride as an example
- Digestion, absorption and metabolism are considered known from physiology and biochemistry and are treated summarily. The synthesis pathways of omega-3 and omega-6 fatty acids and the production of eicosanoids are outlined
- The student shall understand the role of balanced nutrition for health and recognise the importance of nutrition in the development of lifestyle diseases, for example coronary heart disease, cancer, dental caries and diseases of the alimentary tract. Efforts are made to include the latest research findings
- The students should be able to use the Norwegian nutritional recommendations when advising children and adolescents about the importance of a balanced diet
- The students should know how the Norwegian diet has developed with special emphasis on findings from the latest national nutrition surveys
- The students are told about sources of information about nutritional and dietary recommendations, reports and updating from nationally accessible web resources such

as "Matporten", the Scientific Committee for Food Safety and the Directorate of Health's website

- The research methods used to study nutrition and diet are demonstrated by practical exercises.

### **Expected Learning Outcomes**

The students shall acquire knowledge in general nutrition and gain insight into the interaction between nutrition and health. They are expected to recognise that the nutritional advice pertaining to oral health is also relevant to general health. The student should know how and where to find the latest national guidelines, reports and nutritional survey findings and thereby encourage them to adopt a healthy and balanced diet.

### **Teaching Methods – Physiology and nutrition**

The teaching consists of lectures, group work with presentations or the submission of written assignments.

### **Quality Assurance – Physiology and nutrition**

Evaluation is by a 4-hour written examination.

## ***GENERAL PATHOLOGY (TPBAPAT)***

---

### **Contents**

Pathology is the study of disease and disease processes, their development, causes, structural changes in cells and tissues as well as the effect of disease processes on bodily functions.

### **Expected Learning Outcomes**

*Knowledge:* The candidate shall be able to describe:

- Basic disease processes and tissue reactions to injury
- The most common systemic diseases and diseases of the organs that occur in humans
- Causes of disease and what may be done to prevent them
- Consequences of diseases for the patient.

*Attitudes:* The candidate should become aware of the dental hygienist's role as a member of the health team and understand the importance of oral health as part of general health.

### **Teaching Methods**

Teaching is by lectures/seminars (LS).

## **Quality Assurance**

Evaluation is by a 4-hour written examination.

## **CARIOLOGY AND ENDODONTICS (TPBAKAR/END)**

---

### **Contents**

The theoretical teaching should result in increased understanding of the oral ecosystem and its importance in the development of disease and damage to hard and soft dental tissues. The aetiology, pathogenesis and diagnosis of injuries are studied, as are disease activity, prognosis, prevention and reparative treatment. Cariology will also contribute to increased understanding of the importance of lifestyle, state of general health, social and cultural factors with respect to oral health.

Endodontics is concerned with the prevention and treatment of infection in teeth and surrounding bone. Disease of teeth and supporting tissues is a consequence of developmental defects, caries and trauma to the teeth and the periodontium.

### **Expected Learning Outcomes**

The candidate is expected to acquire the knowledge, skills and attitudes necessary to diagnose, prevent and treat disease. He/she should also be able to assess the prognosis of disease and treatment as well as communicate this to the patients.

*Knowledge:* The candidate should be able to describe:

- Tooth formation and developmental defects of the teeth
- Histopathological changes in dental hard tissues (associated with pathology)
- The function of the oral ecosystem, including the role of diet in oral health and dental disease
- The composition, functions and variation of saliva
- The importance of general health, mental health, medication and lifestyle to oral health/disease (for example eating disorders)
- Dry mouth associated with disease, use of drugs, substance abuse (narcotics, and alcohol) and radiation therapy (examination, diagnosis and possible treatment/palliative measures)
- Principles of and methods for chemical and mechanical plaque control
- The caries inhibiting mechanism of fluoride and the most common fluoride agents, their use in prevention and treatment, as well as the possible negative effects of fluoride

- Differential diagnosis of different hard tissue injuries such as caries, tooth wear (erosion, abrasion, attrition), their aetiology, prevention and possible reparative treatment
- The clinical, radiographic and histological appearance of caries in enamel, dentine and cementum
- Dental pain associated with caries, tooth wear, and other dental hard tissue injuries as well as treatment/relief of pain
- The factors involved in the assessment of caries activity: plaque index, diet, saliva tests, past caries experience, acute/chronic carious lesions, caries progression and caries indices
- The principles of restorative treatment, knowledge about cavity preparation and the clinical use of dental materials
- The complications and possible sequelae of caries therapy, filling defects, and indications for the replacement of restorations
- The causes of discolouration of the teeth and treatment options (e. g. bleaching/microabrasion)
- The aetiology and pathogenesis of endodontic problems
- Endodontic forms of intervention
- Endodontic diagnoses and be capable of carrying out endodontic follow-up controls
- The patient's need for endodontic therapy.

### *Skills*

The candidate should be able to:

- Obtain a relevant clinical history
- Carry out clinical, radiographic and other necessary examinations (e. g. saliva tests and dietary history)
- Arrive at a diagnosis and write patient records
- Make an overall assessment of the patient, assess disease activity and prognosis
- Prioritise treatment needs, plan and carry out causal preventive treatment, know the criteria for restorative treatment, cavity preparation and clinical use of dental filling materials
- Assess the result of treatment, prognosis and appropriate recall interval
- Communicate constructively with patients, dental and other health personnel
- Recognise his/her limitations and know when to seek assistance.

### *Attitudes*

The student should develop a positive and responsible attitude to the maintenance of a functional and aesthetically satisfactory natural dentition.

## Teaching Methods

The teaching of cariology and endodontics is partly subject specific and partly integrated into the teaching of General Dental Practice in the third year. Knowledge, skills and a responsible attitude shall be achieved through lectures, seminars and clinical activities.

## Quality Assurance

Research based teaching is assured by lectures given by academic staff.

*Evaluation* is by one written examination in the 4th semester and another in the 6<sup>th</sup> semester as part of General Dental Practice. Internal and external examiners are employed on both occasions.

## CHEMISTRY AND BIOCHEMISTRY (TPBAKBK)

---

### Contents

Knowledge of chemistry and biochemistry is a prerequisite for the study of physiology, nutrition (eubiotics), microbiology, immunology and pharmacology. These are core subjects of the bachelor degree in dental hygiene and it is of paramount importance that the students acquire the level of understanding of chemistry and biochemistry necessary for the study of these subjects.

### Expected Learning Outcomes

#### CHEMISTRY (- the study of properties, composition and reactions of substances)

##### *The atom*

The student shall

- know the most important concepts of atom physics and be able to define them
- understand the structure of the atom
- understand the principle of electrostatic attraction/repulsion
- know about the electron distribution of substances

##### *Elements of the periodic table*

The student shall

- know the structure of the periodic table
- be able to define a group and a period
- be able to describe common features of elements belonging to the same group and the same period
- know the different groups



- know of transitions metals, half-metals and non-metals

### *Chemical bonding*

The student shall

- know the drive of substances towards stability
- be able to define and understand the octet rules
- know the most important principles of chemical bonding
- understand the principle of ionic bonding and be able to give examples
- understand the principle of covalent bonding and be able to give examples
- be able to define electro negativity
- be able to estimate type of bonding based on the difference in the electronegative value of substances
- understand that there is a gradual transition between different types of bonds
- understand the principle of metal bonding
- know the bonding ratio of certain substances (especially water)
- know of weak bonds such as van der Waals forces and hydrogen bonds
- know of aggregate states

### *Redox reactions*

The student should be able to

- define and understand a reduction
- give example of a reduction
- define and understand oxidation
- give example of an oxidation

### *Solutions/colloids/suspensions*

The student shall

- know about different types of solutions
- be able to compare different types of solutions
- understand why different solutions are formed
- be able to give examples of different types of solutions

### *Solvents*

The student shall

- be able to define and understand what a solvent is
- understand the principle that like dissolves like
- be able to define and know of polar and non-polar solvents
- know the composition of soap

- understand the action mechanism of soap

#### *Transport mechanisms*

The student shall

- understand the principle of osmosis
- understand the principle of diffusion
- know the importance of these transport mechanisms in living organisms and be able to give examples
- understand the terms hypertonic, isotonic and hypotonic solutions

#### *Chemical reaction equations*

The students should be cognisant of

- the principle of the constant mass of elements
- the principle of balanced reactions and be able to apply it
- the concepts substrate, product and reaction arrow

#### *Mass relation – concentration*

The students shall

- know the most important/common units and terms of quantitative chemistry
- understand the concepts compound weight, mass and concentration
- be able to define and know the term mol
- be able to define and use formulas  $M = \text{mol/dm}^3$  (molarity is equal to mass divided by volume)
- generally be able to carry out some calculations in quantitative chemistry

#### *Acids/bases*

The students shall

- be able to define an acid and a base
- understand the reaction principles of acids and bases as well as demonstrate them by reaction equations
- know that an acid solution always has an excess of oxonium ions ( $\text{H}_3\text{O}^+$ ) and that a basic solution always contains an excess of hydroxyl ions ( $\text{OH}^-$ )
- understand the difference between strong and weak acids
- understand the difference between strong and weak bases
- understand the principle of neutralisation and be able to give examples
- be aware of the proteolysis of water
- be able to define and know the term pH
- be able to employ the pH concept
- know the main uses of acids and bases as well as their commonest harmful effects

### *Buffers*

The students shall

- be able to define a buffer and give examples using chemical reaction equations
- understand the importance of the body's acid/base balance
- understand the principle of regulation of the acid/base level of the body
- know some important body buffers

### *Energy*

The students shall

- know the principle/law stating that energy cannot be generated or disappear, only change from one form to another
- know joule (J) as the unit of measurement of energy
- be able to define exothermic reactions and provide example
- be able to define endothermic reactions and provide example

### *Chemical reaction rate*

The students should know that

- The speed of chemical reactions depends on factors such as temperature, concentration and catalysts.

### *Chemical equilibrium*

The students shall

- know that some chemical reactions may go both ways
- understand the concept reversible and irreversible reactions
- be able to give examples of reversible and irreversible reactions

### *Important elements/inorganic chemistry*

The students shall

- be able to define inorganic chemistry
- know the properties, occurrence and uses of some substances (especially of living organisms)

### *Organic chemistry*

The students shall

- be able to define organic chemistry
- be aware of the diversity of organic chemistry
- be familiar with the main groups of organic chemistry and their functional groups
- recognise the main groups and name them
- understand how oxidation of primary alcohol may give an acid and illustrate this by an example

- understand how oxidation of a secondary alcohol may give a ketone and illustrate this by an example
- know the properties and uses of some organic compounds

## **BIOCHEMISTRY ( - the study of chemical substances and chemical processes in living organisms)**

### *The cell*

The students shall

- know what characterises life
- know important groups of substances found in cells
- know the difference between prokaryote and eukaryote cells
- acquire knowledge about the structures and functions of cell organelles of animal and plant cells
- know different types of cells

### *Proteins*

The students shall

- know the different functions of proteins
- know that amino acids are the building blocks of proteins
- be able to show the general structure of an amino acid by its structural formula
- understand that it is the side/lateral groups of amino acids that determine their specificity
- know that the amino acids are classified according to their side/lateral groups
- be able to demonstrate how a peptide bond is formed
- know the concepts monoamide, diamide and polyamide
- know the uses of diamides as sweeteners
- understand the concepts amino acid sequence, primary, tertiary and quaternary structure
- know the type of bonds of the different structures
- understand the difference between fibrillar and globular proteins
- understand that proteins may be inactivated by denaturation and be reactivated by renaturation

### *Enzymes*

The students shall

- be able to define an enzyme
- understand their structure and action mechanism

- know the concepts substrate, active site and enzyme-substrate complex
- understand the principle of an enzyme catalysed reaction and give the form of reaction
- know that enzyme catalysed reactions often depend on co-factors
- know that enzyme activity depends on environmental conditions such as pH, temperature, etc
- understand the difference between reversible and irreversible inhibition
- understand the important role of enzymes in biosynthetic and breakdown processes
- know that enzymes play an important part in medical diagnostics

### *Carbohydrates*

The students shall

- be familiar with the general structure of carbohydrates
- know mono-, oligo- and polysaccharides
- know that the building blocks of polysaccharides are monosaccharides
- be able to show how a glycoside bond is formed
- understand the difference between aldoses and ketoses
- know about sugar alcohols as sweeteners
- know about dextrans and fructans as constituents of dental biofilm
- know about glycolipids and glycoproteins
- know about the functions of carbohydrates in living organisms

### *Lipids*

The students shall

- know that lipids are a diverse group and be able to give examples
- know and be able to demonstrate the general structure of fatty acids
- understand the difference between saturated and unsaturated fatty acids
- know and be able to show the structure of the triglycerols
- know different lipids such as waxes, terpenes, vitamin A and steroids
- know the different functions of lipids in living organisms

### *Nucleic acids*

The students shall

- be able to define a nucleic acid
- know the general structure of nucleotides
- know about the two nucleic acids DNA and RNA as well as the difference between them
- know the names of organic bases
- know that hydrogen bonds may form between the organic bases

- know the general structure of a polynucleic chain
- understand and be able to demonstrate the principle for the formation of double helix DNA
- understand the concept of the double helix DNA
- understand the concept nucleotide sequence
- be able to define a gene
- understand the main principle of DNA replication
- be able to define mutation and outline how a mutation may occur
- be able to give examples of mutation
- understand the main principles of the transcription process
- know the different types of RNA
- know the concept genetic code
- understand the main principles of protein synthesis
- know the main principles of gene technology and their applications

### *Metabolism*

The students shall

- be able to define autotrophic and heterotrophic organisms
- be able to define the concepts metabolism, catabolism and anabolism
- know about biosynthesis (anabolism) and destructive processes (catabolism) as two "reaction principles" of living organisms
- understand how ATP works as the battery of living cells
- know the principles of catabolism
- know the principles of anabolism
- know about acetyl CoA as a central metabolite
- know how compounds are digested in the digestive tract and how they are taken up by the cells
- know that hydrogen carriers such as NAD and FAD are involved in oxidation processes in living organisms
- understand the principles of glycolysis
- be able to show the most important reactions of glycolysis
- know the difference between aerobic and anaerobic combustion
- understand the principles of the citric acid cycle
- understand the principles/purpose of oxidative phosphorylation
- know that glucose-6-phosphate may follow different reaction pathways and that the pathway taken depends on the status of the cell

- know the principle of oxidation of fatty acids
- understand that effectivity is the major principle for living cells and that exact co-ordination of metabolism is required

### **Teaching Methods**

The teaching is by lectures/seminars (LS).

### **Quality Assurance**

Evaluation is by a 4-hour written examination.

## **ORAL SURGERY AND ORAL MEDICINE (TPBAKOS) AND INFILTRATION ANAESTHESIA (TPBAINFIL)**

---

The sections involved in the teaching of these subjects are: Section for Oral Surgery and Oral Medicine, Department of Clinical Dentistry and Gade's Institute.

### **Contents**

The teaching covers diseases, pain, malformations and injuries of the oro-maxillo-facial region and has three main topics:

- Diseases of oral mucous membranes
- Diseases of the jaw
- Local anaesthesia (infiltration anaesthesia).

### **Expected Learning Outcomes**

*Knowledge of oral surgery and oral medicine*

The students shall

- have detailed knowledge of the normal anatomy of the oral cavity and the face, including commonly occurring variations
- know of acute and chronic diseases/conditions, traumas and congenital/acquired defects of the mouth, jaws and face
- know the most common surgical considerations and problems/operation techniques of dento-alveolar surgery
- know the most common postoperative complications and their treatment
- be able to judge the health status of patients for the purpose of assessing the risk associated with the diagnosis of oral conditions and common treatment procedures carried out by dental hygienists
- know about surgical asepsis/hygiene principles and practice

- know about conditions and complications associated with treatment of cancer in the oral cavity

*Knowledge in local anaesthesia and medical patient assessment*

The students shall

- know the pharmacology of local anaesthetic agents
- be able to describe local anaesthetics and their use
- know the principles for local anaesthesia in the oral cavity on the basis of anatomical and physiological constraints
- know general medical conditions that may constitute a risk when administering local anaesthesia

*Knowledge in oral pathology*

The student shall

- know the functions of oral pathology in relation to oro-maxillo-facial conditions
- know the terminology of pathology in order to understand the description of biopsies
- know the histology of the most common diseases of the oro-maxillo-facial area

*Skills in oral surgery and oral medicine*

The student shall

- be able to take a patient history, carry out extra- and intraoral clinical examinations and arrive at preliminary diagnoses
- be able to assess the need for radiographic examination
- be able to recognise the need for referral to a dentist/specialist
- be able to provide follow-up of patients who have been treated for diseases, injuries and malformations of the oro-maxillo-facial area

*Skills in local anaesthesia*

The student shall

- acquire practical skills in the use of surface and local infiltration anaesthesia in the mouth
- be able to recognise and cope with general and local complications of local anaesthesia in the mouth

*Attitudes*

The students shall develop ethical attitudes so that they, as qualified dental hygienists, will care for and show empathy with their patients in compliance with the requirements of the health authorities and the patients' expectations.

## **Teaching Methods**

*Teaching methods:* Oral Surgery and Oral Medicine: Integrated multidisciplinary lectures by teachers of oral surgery and oral medicine and oral pathology.



Local anaesthesia and medical assessment of patients: Lectures and clinical course in infiltration anaesthetics.

Clinical teaching at Section of Oral Surgery and Oral Medicine: Seven sessions of 3 hours per student.

## **Quality Assurance**

*Oral surgery and oral medicine:* A four-hour written examination.

*Local anaesthesia and medical assessment of patients:* A separate written test.

## **ORTHODONTICS (TPBAKJE)**

---

### **Contents**

Orthodontics is concerned with the growth of the head, face and jaws, the development and function of the dentition, examination and diagnosis of disturbances of growth, occlusion and eruption as well as how to prevent and treat such conditions.

### **Expected Learning Outcomes**

The candidates shall know about normal and abnormal crano-facial growth, development of the occlusion and eruption as well as be able to diagnose disturbances of growth, occlusion and eruption at different stages of development (ages).

They should acquire skills and knowledge about the prevention of disturbances of eruption and occlusion and be able to differentiate between conditions that require referral to a specialist and local disturbances that a general dental practitioner may treat. They should be able to communicate with and refer cases needing treatment to a specialist in orthodontics.

They need to know how orthodontic services are organised and the patients' entitlement to reimbursement from national insurance of costs of treatment for malocclusions.

They should be able to plan and implement preventive measures for children, adolescents and adults receiving orthodontic treatment.

#### *Knowledge*

The candidate shall

- know the aetiology of crowding and malocclusion and their occurrence in the population
- be able to describe in general terms the postnatal growth and development of the head and jaws
- be able to describe broadly the development of the occlusion and occlusal variations.
- be able to diagnose disturbances of eruption and refer the patient for treatment

- be able to assess the need and indications for extensive orthodontic treatment and, when appropriate, refer to an orthodontic specialist
- know the biological reactions associated with movement of teeth
- know the effect of fixed appliances
- know the risk factors and side effects of orthodontic treatment
- be able to plan and implement preventive measures for patients due to receive or receiving orthodontic treatment
- be able to assess stability after orthodontic treatment and maintain retention appliances
- be able to describe the principles for correction of serious dental and occlusal deviations by an interdisciplinary treatment approach

### *Skills*

The candidates shall

- be able to carry out the clinical examinations needed to diagnose disturbances of eruption, and occlusion at different ages
- be able to inform patients and next of kin about the need (no need) for orthodontic treatment and when it ideally should be started
- be able to explain what the treatment entails and about possible side effects
- be able to refer patients who need treatment to a dentist or an orthodontic specialist and communicate and co-operate about preventive measures during treatment
- be able to inform patients about reimbursement of costs of orthodontic treatment
- be able to motivate patients to break habits (bad habits) which are harmful to the occlusion and thereby prevent the development of malocclusion
- be able to plan and implement preventive measures for patients who are to receive treatment with orthodontic appliances

### *Attitudes*

The candidate should know his/her role in the dental services and feel obliged to ensure that every patient receives a qualitatively satisfactory diagnosis and treatment of crowding and malocclusion.

## **Teaching Methods**

Orthodontics is taught during the third and fourth semester (2nd year). The teaching consists of seminars, lectures and clinical practice.

- Lectures for the whole class are mainly given by the scientific staff
- Compulsory attendance applies for seminars and clinical teaching in smaller groups
- All seminars are prepared by scientific staff and are partly led by them or by dental specialists from the different sections. The clinical sessions are used to practise diagnosis of crowding and malocclusion in school children and to co-operate with specialist candidates treating patients using fixed orthodontic appliances

- The candidates work independently on patients who require extra preventive measures during orthodontic treatment.

### **Quality Assurance**

- All seminars and clinical teaching is compulsory and absenteeism is recorded. High level of absenteeism may first result in an oral, then a written warning
- All clinical and seminar teaching requirements must be fulfilled before a student is permitted to sit the final test
- The course finishes with a 2-hour written test which is assessed as Pass/Failed
- The teachers of the section participate in internal and external courses arranged by the section.

### **DENTAL BIOMATERIALS/MATERIALS (TPBAMAT)**

---

#### **Contents**

Dental biomaterials are concerned with materials employed in dentistry (dental biomaterials, dental materials). This includes description of the different types of materials and how they should be handled. The biological and clinical aspects of materials are considered and formal questions relating to the choice of materials are also discussed.

#### **Expected Learning Outcomes**

The dental hygienist shall

- acquire knowledge about materials found in the patient's mouth in order to be able to take adequate precautions when treating patients
- be able to choose and handle the materials used by dental hygienists
- be able to engage in meaningful professional discussion of questions concerning materials
- possess sufficient general knowledge about dental materials to be able to answer questions from individuals, groups or the mass media satisfactorily

*Requirements of dental materials:*

The biological; technical (physical/chemical) and clinical requirements (duration, handling properties, etc.); interaction between biomaterials and the organism will be considered.

*General properties of materials:*

Metals, alloys; ceramic materials; polymer materials; side effects and unwanted reactions will be discussed.

*Material testing the basis for choice of materials:*

Methods and procedures for testing materials; product specifications; formal requirements and guidelines for the choice of materials; responsibility and record keeping relating to dental materials.

### *Filling materials:*

General requirements concerning the properties of filling materials; plastic filling materials; glass ionomer cements; amalgam; mercury exposure; indirect fillings, for example gold inlays and ceramic inlays; sealants and cavity lining materials.

### *Impression and model materials*

General requirements; hydrocolloid materials, mainly alginates; elastomer impression materials; model materials, plaster of Paris will be considered.

### *Prosthetic materials*

Casting alloys; facet materials; ceramic crown materials/porcelain; cements for crowns and bridges; prosthetic materials, acrylics; lining and repair materials; metals used in removable prostheses; production of prostheses (a brief description).

### *Materials for special purposes (a brief overview):*

Endodontic materials; wound packs; orthodontic materials; implant materials.

### *Cleaning- and polishing methods:*

Polishing of dental materials; tooth pastes and tooth brushes.

## **Teaching Methods**

Teaching consists of 16 lectures and some demonstrations/practical exercises.

### *Work requirements, including requirements for in depth studies/specialisation:*

In certain topics, the students are given assignments to work on between lectures.

## **Quality Assurance**

A compendium with supplementary references covering the most important topics of the syllabus is available. Records of attendance are kept.

*Progression:* A written test is arranged half-way through the course to assess progression and learning.

*Evaluation:* A final 2-hour written test is arranged and assessed Pass/Failed.

## **MICROBIOLOGY AND HYGIENE (TPBAMIKR)**

---

### **Contents**

The dental hygienist shall acquire the knowledge of microbiology, immunology and infection control necessary to qualify and motivate them for a career in dental hygiene.

### **Expected Learning Outcomes**

Theoretical teaching

- Of general and oral microbiology so that the student understands the role of microorganisms in infection and infectious diseases with special reference to dental caries and periodontal diseases.
- Necessary to understand unspecific and specific mechanisms that protect us against infection and infectious diseases.
- That provides the basis for understanding and recognising the importance of personal hygiene, motivates patients for adequate oral hygiene and protects them and the dental hygienist against transmission of infection.

Practical laboratory exercises to facilitate learning and understanding of the subject (theory):

- Whereby the students work with bacteria and fungi
- Whereby the students examine the occurrence of bacteria in dental biofilm from their own teeth
- By demonstrating basic microbiological principles.

### **Teaching Methods**

The teaching consists of 14 lectures and a laboratory course of about 20 hours where attendance records are kept. Teaching material is available on the web (“Studentportalen”).

Question time, repetition of difficult topics and discussion of past examination questions are arranged about one week before the final examination.

### **Quality Assurance**

*Work requirement:* The students keep laboratory records which are submitted for approval.

*Evaluation* is by a 4-hour written examination.

## **ODONTOPHOBIA (TPBAFOB)**

---

### **Expected Learning Outcomes**

The main purpose of the teaching about odontophobia is to heighten the dental hygienists' knowledge of the psychology of the treatment situation and their communication skills. The students are expected to become aware of the importance of good communication for the patients' feeling of control, general satisfaction and compliance with all types of dental care. On completion of the course, the student should have acquired sufficient understanding of the mechanisms leading to the development of fear and anxiety and thereby be able to prevent odontophobia.

### **Teaching Methods**

Odontophobia is taught in two compulsory parts, during the 2nd semester before the students get their first patient and the 6th semester immediately after their outreach period. The teaching is by lecture/seminars (LS).

### **Quality Assurance**

*Evaluation:* Final approval occurs at the end of part 2 of the course.

## **PEDAGOGICS AND PSYCHOLOGY (TPBAPED/PSY)**

---

### **Contents**

Pedagogics and psychology are separate subjects but are seen as mutually supportive disciplines in the bachelor programme in dental hygiene. While pedagogics emphasises teaching, how we learn and change our behaviour, psychology stresses the fundamental human psychological structures and forces.

Both disciplines contribute towards reaching the following goals and to increased understanding of central topics of pedagogics and psychology.

### **Expected Learning Outcomes**

The students shall

- increase their understanding of own and other people's reactions
- develop their communication skills and skills to resolve conflicts between individuals as well as between groups
- develop co-operation and team work skills
- acquire increased understanding of how individual and population attitudes may affect oral health and recognise the importance of preventive efforts

- acquire knowledge and skills in planning, implementing and evaluating the instruction and teaching of individuals and groups

*General human understanding:* The topic is the basis for the meeting with patients in different situations and phases of life. It involves development of self-perception (attitudes/reactions) and understanding of the circumstances and reactions of patients. An important subtopic is basic knowledge about *social perception* which should give insight into how we perceive ourselves and others. Another important topic is *personality psychology* which aims to give insight into what characterises patients in different phases of life from early childhood to old age. Some knowledge of developmental problems and personality disturbances will also be considered under this heading. A third subtopic will provide basic knowledge about *human needs and motivation* as a prerequisite for prevention and treatment.

The above topics are the basis for situations in which dental hygienists and patients contribute to the treatment through mutual understanding.

*Communication and conflict resolution:* The main topic contributes towards establishing a positive encounter with patients and is especially important when, for a variety of reasons, difficulties arise during treatment. The topic is also important in relation to communication and team work. Through theory and exercises, basic knowledge is provided about what promotes and what may hinder open communication. Conflicts and conflict resolution in relation to patients, colleagues and other institutions are important ingredients of this topic.

*Attitudes, attitude development and attitude influence:* Work with oral health involves attitudes and change of attitudes both for preventive and interventional purposes. An introduction is given to the structure and function of attitudes, what is required to establish desirable attitudes and what is needed to influence individual as well as community attitudes. This theme is closely related to the next topic.

*Group psychology and group processes:* The main theme deals with the interaction between the individual and groups as well as important prerequisites for establishing successful teams. The topic includes the dynamics and development from dyads (groups of two) to larger groups. The understanding of personal roles and functions in a group/team and insight into the special dynamics that develop in groups will be stressed. This theme may also contribute to the understanding of the other main topics.

*Learning, instruction and teaching:* The main theme is instruction of individual patients and factors that may hinder or promote learning. Also important is the planning and teaching of different groups such as nurseries, school classes, care personnel in institutions for the elderly and the handicapped.

The main themes will be presented against a background of ethical and professional considerations.

## **Teaching Methods**

Teaching is by lecture/seminars (LS), group work, and exercises. As part of the theme teaching methods, the students are individually or in pairs responsible for the presentation of self-selected topics.

## **Quality Assurance**

*Evaluation* is by a 4-hour written examination.

## **PAEDODONTICS (TPBAPED)**

---

### **Contents**

Paedodontics is concerned with oral health problems of children 0 to 18 years of age. The bachelor course in dental hygiene focuses mainly on diagnosis, disease prevention, risk assessment, non-invasive treatment and follow-up controls.

*The main topics are:* Behavioural aspects of children's dentistry (clinical communication, anxiety, control of pain), cariology (caries, dental decay) traumatology (physical injuries to teeth and their supporting tissues), disturbances of development and eruption, treatment of handicapped and ill patients, community aspects of children's dentistry (the multicultural society, risk factors associated with low social status, neglect, child abuse, etc.).

Paedodontics is an all encompassing dental subject based on knowledge from other disciplines. These other disciplines are taught earlier or parallel with the course in paedodontics and it is assumed that the students will depend on them for paedodontic purposes.

### **Expected Learning Outcomes**

The primary objective of the teaching is that the candidate should acquire the necessary knowledge and practical/clinical skills to take responsibility for disease prevention and health promotion among children and adolescents. The candidate shall acquire the knowledge and skills necessary to record caries, other diseases and developmental defects in order to decide whether or not a treatment need exists.

#### *Knowledge about growth, development and behaviour*

- Know normal development regarding growth and physical ability (dexterity) of 0 – 18-year-olds as well as be familiar with the most common childhood diseases and immunisation programmes in Norway
- Be familiar with normal language and mental development of children and adolescents from birth to 18 years of age
- Know the occurrence of fear, anxiety and non-cooperation as well as the principles for coping with children with these problems, including the principles of treatment under sedation and general anaesthesia
- Be familiar with the problems related to child abuse and neglect
- Know oral anatomy, including the primary and the young permanent dentition
- Know about normal tooth eruption and aberrations.

#### *Knowledge about oral diseases and developmental defects*

- Know the occurrence of caries, caries aetiology, appearance and progression of caries in children and adolescents
- Know the most common forms of treatment of caries in children and adolescents, including restorative materials



- Know the reasons for and symptoms associated with diseases of the dental pulp as well as the principles of endodontic treatment of the deciduous and young permanent teeth
- Know the action mechanism of fluorides and possible side effects with special relevance for children and adolescents. Know about fluoride agents used in Norway, their fluoride concentration and toxic doses that may cause side effects at different ages
- Know of the most common pathological conditions of oral mucous membranes and gingivae of children and adolescents as well as the treatment of these conditions
- Know the occurrence, diagnosis, causes and prevention of erosions
- Know the occurrence, possible causes, clinical appearance and treatment of common developmental defects, including mineralization defects
- Know about the diagnosis and treatment of traumatic injuries and their possible prevention
- Know what characterises dental care of children with rare medical conditions
- Know the symptoms and characteristics associated with tobacco and substance abuse.

#### *Knowledge about dental health services*

- Know the organization of the public dental services in Norway and the rights of children and adolescents
- Know about the division of labour between dental and health centre personnel concerning the dental health of young children.

#### *General skills*

- Be able to obtain the history, acquire knowledge about dental records and record keeping in accordance with current rules and regulations, write a correct dental record and consider available information
- Be able to establish contact with children and their parents/guardians as well as show interest and willingness to manage different situations
- Be able to practise adequate work hygiene, cf. current hygiene guidelines, maintain a tidy working place and use available time according to professional and satisfactory patient care
- Be able to develop, implement and evaluate an individual treatment plan within the dental hygienists' field of competence, discuss referral, recall intervals, risk assessment, obtain informed consent, including discussion of treatment option, prevention and division of responsibility
- Be able to manage different forms of behavioural problems (non-cooperation) and implement systematic training programmes.

#### *Clinical examination*

- Be able to record plaque and calculus, differentiate between healthy and inflamed gingivae and discover loss of attachment
- Be able to carry out an intraoral radiographic examination, including BW and periapical exposures

- Be able to record caries clinically and radiographically according to recognised and accepted grading of caries
- Be able to record disease of gingival and periodontal tissues as well as changes in the oral mucosa
- Be able to record dental erosions, arrive at probable cause, give information about and provide preventive treatment of the condition
- Be able to record normal occlusion and common malocclusions
- Be able to record developmental defects of both dentitions
- Be able to record and classify dental trauma, refer all injuries that require emergency treatment and give appropriate advice to the patient and parents/guardians.

#### *Clinical prevention and therapy*

- Be able to give individual information and instructions in prevention (diet, oral hygiene, fluorides) based on established knowledge and accepted methods
- Be able to perform clinical oral hygiene, remove plaque and calculus, carry out professional prophylaxis, including for patients with orthodontic appliances
- Be able to provide appropriate dental health information to expectant mothers, parents of young children and personnel at health centres
- Be able to administer local infiltration anaesthesia
- Be able to apply rubber dam, matrix and restorative materials in co-operation with a dentist
- Be able to implement non-invasive preventive and therapeutic measures against early stages of caries (interceptive therapy), including fissure sealants
- Be able to clean and polish fillings.

#### *Attitudes*

Develop a professional attitude to the practice of dental hygiene among children and adolescents. This implies primarily respect for the patients as growing and developing individuals with different needs and abilities. At the same time, it is important to have an open and constructive dialogue with parents/guardians. Furthermore, it is necessary to recognise personal limitations in dental hygiene, to seek advice or assistance and refer patients when required. This presupposes acceptance of the need for continual updating and quality assurance of knowledge and skills.

### **Teaching Methods**

*3rd semester:* Introduction to clinician teaching (1 day), clinical teaching: 1 session (à 3 hours) per week.

Lectures: Ca. 12

*4th semester:* Clinical teaching: 1 session (à 3 hours) per week.

Lectures: Ca. 13

*5th semester:* Preclinical course: 2 sessions, mainly in preparation for 4-handed co-operation with dental students.

Clinical teaching: 1 session (à 3 hours) per week (partly 4-handed working with dental students).

## **Quality Assurance**

Attendance records are kept for courses and clinical teaching. Clinical teachers approve treatments carried out by students and keep records of treatment volume in relation to clinical requirements. In addition, oral and written evaluation is arranged during the course. The teachers meet to discuss the quality of teaching, the progress of individual students and routines exist for student feedback.

*Evaluation* is by a 4-hour written examination at the end of the 5th semester.

## **PERIODONTICS (TPBAPER)**

---

### **Contents**

- Diagnosis/examination/classification of periodontal disease
- Treatment planning/assessment of prognosis /modifying factors
- Case presentation, communication and motivation
- Periodontal diseases, general health, risk factors – smoking
- The hygiene phase – goals and methods
- Oral hygiene training – methods/injuries
- Information – ”role play” (case presentation/hygiene phase)
- Manual and mechanical scaling/cleaning
- The anatomy and physiology of the periodontium
- Periodontal disease – aetiology and pathogenesis
- Periodontal surgery – healing and follow-up treatment
- Periodontal maintenance treatment/risk assessment – smoking
- Periodontal regeneration treatment
- Dental implants – principles and maintenance
- Special gingival conditions – necrotising periodontal disease, HGS, hyperplasia
- Furcations
- Periodontal abscesses
- Periodontal disease in children/aggressive periodontal disease
- Epidemiology of periodontal disease
- Question time.

## Expected Learning Outcomes

The dental hygienist shall

- be able to describe the structure and function of the periodontium and the mechanisms behind the development of periodontal disease
- be able to describe the aetiology and risk factors for developing periodontal disease, including in relation to general health
- be able to describe the classification of periodontal disease, including conditions associated with dental implants
- be able to describe the prevalence and extent of periodontal disease
- know the principles of and aids to periodontal diagnosis, including radiographic examination and laboratory tests, as well as differential diagnosis, conditions and diseases
- know the indications for periodontal treatment and prevention and acquire detailed knowledge of methods for prevention, treatment, follow-up and evaluation
- be able to describe routines, precautions, risk assessment and follow-up during maintenance therapy
- be able to describe how health behaviour in general and tobacco in particular may affect periodontal disease and be able to communicate this to patients
- be able to communicate with patients to obtain their history, observe, examine and record findings in writing as a basis for the planning of appropriate treatment
- on the basis of clinical and radiographic findings, be able to formulate a preliminary treatment plan, including the prognosis and inform the patient in order to obtain his/her informed consent
- be able to carry out conventional mechanical treatment of patients with or without local anaesthesia and consider the need for supplementary treatment with antibacterial agents as well as carry out effective maintenance therapy, including for implants
- in co-operation with the dentist, participate in the surgical phase of periodontal treatment in view of the need for follow-up care
- acknowledge personal limitations in periodontology, seek advice or refer treatment beyond the competence of dental hygienists to a dentist
- know about current insurance and support arrangements to make sure that the patients get their rightful entitlement to reimbursement of treatment costs
- have developed attitudes that make the dental hygienist accept responsibility to contribute towards solving the oral health problems of the individual and of the community in which he/she works and conveys this to the public
- acknowledge and accept the need for updating and renewal of knowledge as well as to be critical of available literature and other sources of information in order to be fit to practice dental hygiene

## Teaching Methods

Lectures are given during a period of two semesters.

## Quality Assurance

*Evaluation* is by a 4-hour written examination.

## **PROSTHODONTICS AND GERODONTOLOGY (TPBAPRO/GER)**

---

## PROSTHODONTICS

### Contents

*Prosthodontics* is the part of dentistry concerned with the consequences of hereditary or acquired absence of oral tissues and with methods and considerations whether more harm than good would be done by insertion of artificial appliances made of alloplastic materials.

Comment: *The above description* shows that indications for and production of prosthetic replacements should be considered in relationship to oral health. This approach indicates acceptance of the fact that prosthodontic treatment often involves intervention on oral tissues and chances of harm. Consequently, the advantages of prosthodontic replacements must always be balance against the possible damage they may cause. Therefore, prosthetic replacements are only indicated when the advantages outweigh the potential negative effects of treatment. The potential for harmful effects may be significantly reduced by control and hygiene measures.

The syllabus includes theoretical knowledge and some practical skills in the treatment methods listed below. The retention of prosthetic appliances may be dental, implant or mucosal:

- Dentally retained replacements
- Fixed prostheses (crowns and bridges)
- Removable prostheses (partial prostheses)
- Combined prostheses (fixed and removable prostheses combined in one appliance)
- Implant retained replacements
- Mucosa retained prostheses
- Complete dentures.

### Expected Learning Outcomes

On completion of the course, the dental hygienist should be able to record and assess problems associated with prosthetic replacements, treat the conditions considered to be within

their field of competency and refer other conditions to a dentist or other health service personnel.

This means that on completion of the course the dental hygienist should have acquired *knowledge* about

- the principal goals of prosthetic treatment
- the terms and concepts related to the most common forms of prosthetic treatment
- the communication of prosthetic treatment alternatives to patients
- the principles behind means and methods of preventive and therapeutic treatment associated with dental prosthodontics
- the materials most commonly employed in prosthetic treatment
- short and long term effects of prosthetic treatment
- advantages of prosthetic treatment
- side effects associated with properties of the materials used
- side effects associated with the making of prostheses
- side effects associated with the wearing of prostheses
- methods and means of preventing or reducing such harmful effects
- the functioning of removable prostheses
- retention and stability
- vertical and horizontal relation
- occlusion and articulation
- habituation issues
- the factors that determine patient satisfaction with prostheses
- the treatment principles for oral implants
- assessment and maintenance treatment of oral implants in clinical practice
- the principles of design of commonly occurring types of prostheses and implant retained prostheses

The dental hygienist should on completion of the course have acquired necessary *knowledge and skills* to be able to

- explain accepted preventive hygiene measures so that the patient will accept and implement the regimen
- motivate the patient for and instruct them in the use of accepted hygiene aids designed for use with dental prostheses and implants
- record the most commonly occurring mucosal changes related to use of removable dental prostheses
- decide whether or not these changes require referral to a dentist or other health service personnel for diagnosis and treatment

- carry out simple corrective, hygiene or chemotherapeutic treatment of the mucosal conditions mentioned above
- correct obviously overextended prostheses associated with ulceration or limited denture hyperplasia
- treat atrophic denture stomatitis and angular cheilosis by hygiene measures and the use of chlorhexidine
- evaluate the outcome of the above mentioned treatments
- record the most commonly occurring problems associated with removable prostheses (unsatisfactory retention, stability, vertical dimension, unbalanced occlusion, fractures of the denture, discolouration and porosities of the denture base, etc.)
- decide whether or not these conditions may be treated by a dental hygienist or require referral to a dentist or other health service personnel for diagnosis and treatment
- carry out simpler forms of corrective treatment of removable prostheses
- correct *obvious* lack of fit by relining (indirect technique – i. e. to co-operate with a dental technician)
- correct *obvious* unsatisfactory occlusion by occlusal grinding (premature contacts, cuspal interference)
- carry out small reparations (replacement of lost teeth by the direct technique, small fractures of the denture base, adjustment and possible replacement of fractured clasps by the indirect technique)
- rebase dentures with a midline fracture
- take impression for extension of an existing denture
- make temporary crowns

## Teaching Methods

*Theoretical teaching:* The theoretical teaching is in the form of lectures and as part of a laboratory course.

*Clinical teaching:* The clinical teaching is compulsory and is given extramurally at Kalfaret Dental Clinic and other institutions in the Bergen area in co-operation with gerodontology. The students are divided into groups of six during the 6th semester.

## Quality Assurance

The teachers assess the students' progress continually during the preclinical and clinical courses as well as at the end.

Approved clinical course requires documented attendance at laboratory/clinical sessions and the performance of one or more of the above mentioned corrective treatments.

*Evaluation* is by a 4-hour written examination together with gerodontology.

# GERODONTOLOGY

## Contents

Gerodontology is the part of dentistry concerned with knowledge, attitudes and clinical skills required for the treatment of older adults with different nursing and treatment needs. “Older adults” has no specific chronological limit but refers to adults affected by biological, physical, social and/or psychological changes associated with aging – with or without concurrent disease. Thus gerodontology is a multidisciplinary (scientific), clinical subject concerned with dental care of the older patient.

The candidates should acquire necessary knowledge and practical/clinical skills to be able to assume responsibility for the oral health care and treatment of older adults.

## Expected Learning Outcomes

The candidate should be able to describe normal aging and the age related changes in the individual’s relationship to society and environment. The candidate should be able to describe the association between oral health and general health of older adults as well as the age related variation in oral diseases, treatment and prevention. It is important that the candidate is able to describe the roles of the different members of the multidisciplinary team involved in the care of older adults. The candidate is expected to acquire the knowledge and skills needed to diagnose and prevent disease in the mouths of both healthy (functionally independent) and functional compromised older adults.

The students shall independently be able to

- examine, diagnose, assess the prognosis and understand prevention of recurrence in healthy as well as functionally compromised older adults
- examine, diagnose, plan treatment, assess the prognosis and implement dental care to prevent recurrence among older dental risk patients (e. g. older adults exhibiting high caries risk and/or high caries activity)
- assess behavioural problems of mentally compromised older adults in the dental treatment setting
- assess medical risk factors associated with dental treatment of older adults
- provide preventive dental care of the individual older person as well as under different living conditions (own home, sheltered housing, nursing home)

The students should have knowledge about and some experience of

- the activities at a geriatric clinic
- dental care of older people with serious physical and/or mental disease or handicap
- dental care of elderly medical risk patients

The students should have theoretical knowledge about

- demography: Age distribution and population trends
- gerontology: Biological, psychological and social aspects



- geriatrics: The aging patients' disease panorama and geriatric diseases that may affect dental treatment
- pharmacology: Drugs and the elderly
- nutrition: Diet and the elderly
- oral health, treatment need and use of dental services among older adults in the past, present and a future perspective
- the aging process as it affects the mouth and the dentition
- the functional aging of the oral cavity and dysfunction: saliva, taste and swallowing
- oral rehabilitation of the elderly patient
- dental care of the geriatric ill patients
- the legislation and guidelines governing health and dental health services for the elderly, their organization, personnel and financing
- communication with the elderly and with health service/care personnel
- the role of the dentist and dental hygienist in the multidisciplinary team
- outreach dental care for the elderly

## **Teaching Methods**

The teaching takes place during the 3rd year. It consists of four components:

- One week as a visiting student at a nursing home
- A didactic component (theoretical course)
- An extramural component (outreach dental care of the elderly)
- A clinical component (treatment of patients) at Kalfaret Dental Clinic.

The teaching consists of lectures, seminars, screening visits to nursing homes and clinical activities at public dental clinics under the supervision of Public Dental Health Service staff, "Odontologisk klinik" and the Department of Clinical Dentistry. Attendance records are kept for all teaching. Notification of excessive absenteeism is given in writing. The absolute minimum work/procedure requirement is not specified because of the heterogeneous population of patients.

## **Quality Assurance**

Research based teaching is ensured by

- the clinical teaching duties of scientific staff
- the participation of clinical dental hygienist/dentist teachers in at least two sessions per semester to discuss dental topics
- the dental hygienist/dentist clinical teachers are involved in research publications
- the dental hygienist/dentist clinical teachers give seminars which have been prepared by the scientific staff

- teacher/staff meetings at least twice a semester to discuss a clinical case for the purpose of calibration

New teachers are assigned a teacher mentor to learn the routines and expected standard of student performance before being allowed into the clinic. The students' skills are assessed continually and extra clinical duties and/or seminars are arranged for students who do not satisfy specified requirements. The teachers meet to assess whether or not the students' clinical performance is acceptable. Approved clinical course is a prerequisite for being allowed to sit the final written examination in gerodontology.

*Evaluation* is by a 4-hour written examination with prosthodontics in the 6th semester.

## **WRITTEN ASSIGNMENT (TPBAPROSJ)**

---

### **Contents**

The written assignment of the bachelor course in dental hygiene consists of four parts:

Part 1: Biostatistics (integrated in community dentistry, cf. separate description)

Part 2: "Course in scientific writing" w/library course (cf. separate description)

Part 3: Report from the extramural practice period (report writing and oral presentation)

Part 4: Project assignment.

The project assignment is written on the basis of a research project, a literature review or as a case report. The assignment represents 10 credits, corresponding to 6.7 working weeks (1 working week = 40 hours teaching/individual studies = 1.5 credits).

### **Expected Learning Outcomes**

The candidate should acquire basic abilities in dental research methods, training in critical evaluation of the scientific literature and experience in written and oral presentation of results.

*Knowledge:* The candidate shall

- know the structure of a scientific paper
- understand the ethics governing research
- (preferably) develop their own research topic and hypotheses
- develop a critical and positive attitude to research
- be able to collect necessary literature from different sources

*Skills:* The candidates should be able to

- work independently on the project (or 2 students in co-operation) under the supervision of a member of the scientific staff
- employ accepted dental and medical research methods
- study the chosen problem in depth

- communicate correctly and clearly (in writing and orally) their own findings as well as those of others

*Attitudes:* The candidate should recognise that increased knowledge about research and research methods leads to a more critical and selective attitude to different fields of research and contributes to a sound public knowledge base. Evidence based knowledge is an essential foundation for sound decisions and proposals. This may prevent individual actors from acquiring a knowledge monopoly.

## **Teaching Methods and Quality Assurance**

The day reserved for individual studies during the 5<sup>th</sup> and 6<sup>th</sup> semester defines the time frame for the assignment.

The students work on the assignment either alone or in pairs. They are expected to contact relevant departments (possible supervisors) and present a preliminary title for the assignment. The research group leader of the department is obliged to facilitate the inclusion of the student(s) in existing research projects or propose an alternative assignment title and supervisor from the section.

A written contract between student(s) and supervisor(s) is required. A member of the academic staff (Dr. degree/PhD) signs the contract as the main supervisor. The supervision contract defines the rights and duties of the candidate and of the supervisor. PhD students are encouraged to take an active part in supervision and assist the main supervisor.

An internal examiner and the supervisor assess the project assignment. The examiner should be a member of the academic staff, preferably from another department. The candidate receives feedback within 3 weeks after submission of the assignment. The assignment is formally considered an examination and is judged Pass/Failed. The title of the assignment is included in the student's certificate.

The project assignment is presented to fellow students, teachers and any invited guests at the end of the 6<sup>th</sup> semester.

## **SCIENTIFIC WRITING W/LIBRARY COURSE**

### **Contents**

The candidate should acquire understanding of the process leading to a successful written assignment by employing a traditional approach to the presentation of research findings (IMRaD). The library part of the course deals with the use of the library, literature search and an optional course in the use of the library data base programme EndNote.

### **Expected Learning Outcomes**

The candidates should know the main sections (IMRaD) when presenting a research report and be able to express themselves precisely and lucidly; an approach intended to increase the attention to how a scientific text is produced. The candidates should understand the relationship between supervisor and student as far as expectations, honesty and responsibilities are concerned. The candidates should also be able to find relevant literature from different sources.

*Knowledge:* The contents of the different sections (IMRaD) and clear precise text are stressed. Repeatability (validity/reliability); representativeness; ethical considerations in research, the relationship between supervisor and student, knowledge about search options and words are also important issues.

*Skills:* The candidates should develop and improve their writing skills and ability to analyse a text through discussion in seminars, get started earlier with the assignment by focusing on writing exercises and heightened awareness of the research process and ability to locate relevant literature.

*Attitudes:* The candidates should recognise that research results are best presented in a stringent and neutral text without personal opinions. Research ethical issues must be adequately considered.

## **Teaching Methods and Quality Assurance**

The teaching is integrated for dental hygienist and dental students in an introductory seminar for the project assignment during the 5th semester.

Teaching is compulsory and a supervisor may refuse to supervise a student who has not completed the course.

## **RADIOLOGY (TPBARØN)**

---

### **Contents**

Dental radiographic diagnosis is based on knowledge about radiation physics, chemistry, anatomy, general and special pathology and a thorough radiographic examination of the oral cavity and adjoining areas as part of the overall examination of the patient.

### **Expected Learning Outcomes**

The dental hygienist should

- be able to produce technically good radiographs through training in intraoral exposure technique and darkroom procedures
- be able to describe intraoral radiographs, recognise normal anatomical structures, diagnose caries, marginal periodontitis and marginal bone loss at implants, identify film fault and know viewing requirements
- know about biological radiation problems, radiation hygiene regulations and protection against radiation

*Physical basis of radiographic diagnosis:* Production of roentgen rays; the construction and functioning of the x-ray machine; the most important properties of the x-ray beam; the interaction of the x-ray beam with matter (absorption, scatter).

*Radiographic materials:* The x-ray film and its handling; darkroom equipment and furnishing; the composition and action mechanism of the chemicals used; film development; artefacts and how to avoid them, and digital images.

*Examination technique:* Important principles of radiographic projection; technical aids; training in intraoral radiography.

*Image analysis:* Technical equipment; mounting and filing of radiographs; normal radiographic anatomy; the radiographic appearance of caries, marginal and apical periodontitis; practical image analysis.

*Radiation biology, radiation protection:* The human radiation environment; units of radiation quantity; the biological effects of radiation; radiation sensitivity; somatic and genetic damage; risk of radiation damage; Institute for Radiation Hygiene; the most important regulations governing the use of dental radiographic equipment; the daily responsibility for radiation hygiene; indications for radiographic examination; radiation protection in practice; characteristics of the x-ray machine; protection of the patient; protection of the operator and radiation dose control.

## **Teaching Methods**

The teaching comprises 15 systematic lectures, altogether 39 hours of seminars, demonstrations and clinical practise taking radiographs and image analysis.

## **Quality Assurance**

*Evaluation* is by a 4-hour written examination.

## **COMMUNITY DENTISTRY WITH EXTRAMURAL STUDIES (TPBASAM)**

---

### **COMMUNITY DENTISTRY**

Community dentistry is the multidisciplinary scientific basis for actions to promote, maintain or restore the oral health of populations.

Comment – The definition implies that community dentistry is concerned with oral health and oral health care services as group phenomena, on a scientific basis and in a social perspective. Multidisciplinary means that community dentistry not only relies on traditional preclinical and clinical dental subjects but also on a number of non-dental disciplines.

## Contents

Important community dentistry topics are: Epidemiology with biostatistics and research methods, demography, social and behavioural subjects, health promotion and disease prevention, health-, social- and oral health services, laws and regulations, administration/management and the extramural course ("Praksisstudiet").

## Expected Learning Outcomes

Overall teaching objective: On completion of the community dentistry and the extramural course, the candidate should be able to assume responsibility for the oral health of the population and practise dental hygiene in accordance with current dental knowledge, the needs, wishes and expectations of the population, laws, regulations and economic resources available.

This entails that the candidate shall

- know the epidemiology of the most important oral diseases/conditions and their determinants
- know and be able to use basic epidemiological research methods to analyse, plan and evaluate oral health care services
- know and be able to use descriptive statistical methods and know what inductive statistics implies
- be able to assess and interpret dental literature on community dentistry topics
- know and understand the goals, organisation, resources and functioning of the health-, social- and oral health care services
- know about different models for dental care, how dental programmes – including health promoting and disease preventive measures – may be planned and evaluated
- be familiar with and able to assess the goals, organisation, resources and functioning of the oral health services
- know current legislation, social and ethical norms
- be able to communicate and co-operate about oral health issues with personnel of the oral health-, health- and social services as well as the administration and the elected representatives of the population
- be able to describe and understand the problems faced by patients and oral health service personnel
- realise and accept that knowledge needs maintenance and renewal

*Epidemiological knowledge:* The candidate shall

- know the most important epidemiological terms
- know the most important uses of epidemiology
- know the most important types of epidemiological studies
- know the methods/indices and problems associated with measurement of oral conditions
- know the methods used to assess treatment need

- know the epidemiological situation for the most important oral diseases/conditions and their determinants
- be able to employ research methods to study knowledge, attitudes, behaviour, etc in the population

*Skills:* The candidate shall be able to use basic epidemiological methods when planning, implementing and evaluating oral health programmes.

*Biostatistical knowledge:* The candidate shall know the different types of statistical samples and how they may be drawn.

*Skills:* The candidate should be able to organise, present and describe oral health data, analyse and draw conclusions based on them and to apply basic statistical principles when reading the dental literature.

*Demographic knowledge:* The candidate shall

- be able to define demography and know important demographic terms
- know the size and distribution of the Norwegian population according to age, sex, occupation and geography
- be familiar with the most important determinants of population trends

*Skills:* The candidate should be able to employ demographic knowledge in their professional practice.

*Laws and regulations:* The candidate shall

- know the most important laws and regulations governing the health-, social- and oral health care services
- know about and understand the basis for current social and ethical norms as well as rules of collegiality

*Skills:* The candidate shall be able to adhere to the laws and regulations of the Ministry of Health and Care Services and the Ministry of Education and Science when practising dental hygiene.

*Organisation and administration of health-, social- and oral care services:* The candidate should be familiar with

- the organisation of health-, social- and oral health care services, their goals, structure, personnel and functioning
- the problems related to setting of priorities and the distribution of resources in the health-, social- and oral health care services
- the principles of planning and be able to plan and evaluate oral health care services

*Skills:* The candidate should be able to assess the goals, organisation, resources and functioning of oral health care services.

*Health economics:* The candidate shall know

- the financing of the health-, social- and oral health care services
- the basics of cost-benefit and cost-effectiveness analysis

*Skills:* The candidate should be able to allow for economic constraints when practising dental hygiene.

## **COMMUNITY, LIVING CONDITIONS AND LIFE STYLE**

### **Contents**

The aim is to consider oral health care in a wider health context and provide a basis for general understanding and communication of health.

### **Expected Learning Outcomes**

*Knowledge:* On completion of the course Community, Living Conditions and Lifestyle, the candidate should

- be able to describe and understand the terms health and quality of life in view of the extended concept of health as defined by the World Health Organization
- know about and be able to define prevention and health promotion as two principal strategies
- be familiar with different methods used to prevent and promote health
- know different theories employed to explain behaviour and behavioural change

*Skills:* The candidate should be able to

- discuss advantages and disadvantages of different strategies employed in health promotion
- explain health status/quality of life as a function of personal factors (lifestyle), environment and social structures
- understand reasons for health behaviour/lifestyle in a social perspective, i. e. analyse behaviour as a function of individual and environmental factors employing the HEMIL-model
- assess individual and environmental preventive measures designed to affect behaviour/lifestyle
- present group work to demonstrate the defined skills

### **Teaching Methods and Quality Assurance**

The teaching is by lectures during the 5/6 semester, in parallel with the last part of the course in community dentistry.

## **EXTRAMURAL STUDIES**

### **Contents**

The extramural studies should prepare the dental hygiene student for practice and facilitate the transition from student to a practising dental hygienist.



## **Expected Learning Outcomes**

*Knowledge:* On completion of the extramural course, the candidate shall

- be able to describe and understand the problems faced by patients and oral health care personnel
- have acquired a certain level of understanding of most types of oral care services
- acknowledge the need for a preventive oral health care profile
- acknowledge and understand the need for effective communication with patients, auxiliary personnel, colleagues and other relevant partners
- acknowledge the importance of knowledge about legislation and ethics
- have acquired insight into the organisation, administration, financing and running of oral health care services
- have demonstrated ability to observe and critically assess oral health care services during the extramural course

*Attitudes:* The candidate shall

- understand the importance of developing a positive attitude to interventions designed to maintain or improve the oral health of individuals and populations
- accept that knowledge needs to be maintained and renewed

## **Teaching Methods**

The teaching is scheduled during the 3rd, 4th and 5<sup>th</sup> semesters. The extramural part of the course is during weeks 6 – 9 in the 5<sup>th</sup> semester.

*Teaching methods:* The extramural course consists of lectures, seminars, assignments and reporting (orally and in writing), a seminar for students and supervisors as well as 4 weeks stay/practice in the Public Dental Service.

## **Quality Assurance**

Attendance records are kept for all teaching in the extramural course. A written evaluation in the form of questionnaires is completed by students and supervisors.

*Evaluation:* The evaluation consists of presentation of group work during the course Society, Living Conditions and Lifestyle, written and oral presentations from the extramural stay as well as a 4-hour written examination.