Site

Visitation Umeå

2nd - 6th February 2002
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Section 1 – Introduction

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1.1 Introduction and General Description

The location of a dental education to Umeå in 1956 was the start of what was to become Umeå University. In the beginning (from 1956 to 1963) the dental students carried out part of their training in Umeå and part in Stockholm. In 1964, Umeå University was organised into three faculties of which the Faculty of Odontology was one. In 1999 the Faculty of Medicine and the Faculty of Odontology merged and the Department of Odontology became one of thirteen Departments within the Faculty of Medicine and Odontology.

In Sweden, the County Councils are responsible for all health care including dental care. The County Councils run the Public Dental Health Clinics in Sweden. From 1987 the County Council of Västerbotten is responsible for providing necessary premises, equipment and staff for the clinical training in the Dental School. To ensure access of patients for the dental students an agreement has been signed between the Swedish Government and the County Council of Västerbotten. The County Council also holds the responsibility for the dental care provided by the dental students and by the Specialist Staff in the Dental School, while the University is responsible for education and research. One part of the staff (professors, senior lecturers and research- and administrative staff) is employed by the University, while the County Council of Västerbotten employs clinical teachers, dental hygienists and dental nurses. This “double-authority” has caused tension between the organisations in pace with tightening of economy. Frustration among the staff related to what they experience as conflicting demands from the two authorities led to an overhaul of the organisation in 2000/2001. As a result a reorganisation process has just started.

The Department of Odontology comprises 12 units (cariology, clinical oral physiology, dental material science, endodontics, oral cell biology, oral microbiology, oral and maxillofacial surgery, oral radiology, orthodontics, paediatric dentistry, periodontology and prosthodontics). A board, led by a Prefect (Head of the Department) and comprised by elected representatives from teaching staff, research and administrative staff and students manages the Department. The Department provides undergraduate education for dental students, dental technician students and dental hygienist students. The Department also offers a large number of academic courses as continuing education for dentists, dental hygienists and dental nurses. Post-graduate education for a formal license in any of the eight dental specialities in Sweden (clinical oral physiology, endodontics, oral surgery, oral radiology, orthodontics, paediatric dentistry, periodontology, and prosthodontics) is also organized.

The Programme Committee of Odontology handles questions concerning undergraduate education. The committee is operating under the Board of the Faculty of Medicine and Odontology. Members are representatives for teachers, students and the Public Dental Health Service.

Umeå University is a quite young university and has grown rapidly during the past thirty-five years. It has become an important regional and national factor. Today, there are courses and study programmes in every academic field. Students come...
from all over Sweden, as well as from many other countries, to pursue their studies. Approximately 20,000 students each year study in more than 1000 courses and educational programs. The university campus is laid out according to the American campus model. Students, teachers and researchers from different fields of study work in close proximity to each other. This bears fruit in the form of academic cross-pollination and promotes interdisciplinary studies.

Dental student learning and training in Umeå has since the beginning been characterized by extensive clinical practice. The close cooperation with the Medical Faculty has been another characteristic of Umeå. It has contributed to give the students a high standard biomedical base and has been important for research collaboration. The Dental School in Umeå is of great importance for the region in terms of research and development, advanced specialist care and continuing education. Of utmost importance is that the School supplies the region with dentists, dental hygienists and dental technicians.

1.2 The Curriculum

The dental programme comprises 200 credits, i.e. 5 years of studies (one credit corresponds to one week of full-time studies). Each year is divided in two terms with a three months break during summer. Spring term starts in the middle of January and lasts until the beginning of June. Autumn term starts in the end of August and continues until the beginning of January. After graduation, the license to practice dentistry is issued by the National Board of Health and Welfare. There is no period of vocational training.

In 1994 the Board of the Faculty of Odontology decided on a new curriculum. The overall aim was a reduced number of lectures and an extended time for learning through individual studies and reflection. Short courses should be joined in larger blocks of subjects. A scientific paper should be written and presented. Biomedical and medical courses should be extended and some should also reappear later in the curriculum.

An integration between courses was recommended as well as an integration and a more holistic approach in the clinical work. Comprehensive care should be introduced. Since the hallmark of the earlier programme had been an extensive clinical training, this should be kept at the same level with a high number of supervisors and assisting nurses.

The government has laid down national aims of the dental education in Sweden. The student should:

- have acquired knowledge and skills fundamental to the dental profession and required for the unrestricted practice of dentistry,

- have acquired a medical and social holistic view on men and their situation,

- be prepared to be active in any area of dentistry and for this purpose be knowledgeable about preventive measures for individuals as well as for groups of patients, and about diagnoses and treatment of diseases and anomalies in teeth, oral cavity, jaws and surrounding tissues in patients of varying ages and with different needs,
- understand the relation between a patient's oral health and underlying factors, have learnt to respect the patient's integrity and developed an empathic ability,

- be able to collaborate with other personnel in the dental team and have developed an ability to act as a leader of this team,

- have learnt to think in economical terms and to contribute to assessment of a clinic and its activities, in particular quality development methods,

The Board of the Faculty of Odontology in Umeå added that the students also should:

- have developed a scientific attitude, i.e. an ability to contribute to critical analysis and evaluation

- have skills and knowledge to make a continuous contribution to professional development both academically and qualitatively

The programme starts with a spring term, when 40 students are admitted. The programme has a fixed course of study, i.e. subjects must be studied in the order stated in the curriculum. The programme starts with a basically pre-clinical period lasting for two years. The 1st year primarily contains teaching and learning of biomedical subjects, such as anatomy, biochemistry, cell biology, histology, microbiology, pathology, pharmacology and physiology. The 2nd year is more focused on the oral environment with courses in oral and craniofacial biology, oral infections, dental materials science, oral radiology, public health and legislation, oral pathology and clinical oral physiology.

In the 3rd year clinical treatment begins on patients with treatment needs owing to caries, marginal and apical infections, temporomandibular pain and dysfunction and partial to complete edentulousness. During this year the students study psychology/psychiatry, dental materials science, clinical oral physiology, endodontics, cariology, periodontology, scientific methods and prosthodontics.

The 4th year starts with mainly comprehensive dentistry and continues with oral surgery as well. The students begin to work with their scientific papers and continue this work until the last semester when the paper is presented to students and staff. The 5th year includes paediatric dentistry, orthodontics, comprehensive dentistry and elective courses.

The learning process is a concept of theoretical studies (literature studies, lectures), small group teaching (seminars, demonstrations, case presentations), preclinical and clinical training.

In the schematic presentation below, white areas represent individual time for literature studies, light grey areas represent seminars, lectures and examinations, dark grey areas represent preclinical or clinical time and dark dotted grey areas represent scientific work or electives. Black areas time for preparation for comprehensive examination. Each column represents one week and each row a half day (8.00-12.00 or 13.00-17.00).
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1.3 Significant Aspects of the Curriculum

- Biomedical courses designed for the needs of a dentist and a basis for further studies
- Comprehensive clinical training in all aspects of dentistry
- Strong emphasis on prevention
- Rotation of theoretical courses, preclinical work and clinical training
- Early contact with research and research methods
- A high standard of professional skill, competence and responsibility is emphasized in the general objectives of undergraduate training
- Comprehensive examinations

Section 2 – Facilities

Head of Administrative Office Britt-Marie Schönfeldt, County Council of Västerbotten
E-mail: brittmarie.schonfeldt.lt@vll.se

Most Departments are located in a building attached to the University Hospital and close to the University Campus. Even though the Department of Odontology does not occupy all floors of this building it will in the following be referred to as the Dental School.

2.1 Clinical Facilities

General Explanation
The clinics are located on the third, fourth, sixth, seventh and eighth floors of the Dental School. There are 106 units for students and 41 units for specialist treatment.

Strengths
The premises are spacious, well equipped and in good condition.

Weakness
Many of the units in the student clinic are old and need to be replaced by new modern equipment.

Innovations
Introduction of computerized patient records will start in 2002.

2.2 Teaching Facilities

General Explanation
On the ninth floor of the Dental School there are 7 lecture halls with a capacity for between 60-120 people. On the eighth floor there is a fully equipped examination room with video and telemedicine facilities. Dental students can also utilize lecture rooms within the university hospital and other parts of the campus. On every floor of the Dental School there are special group rooms that are spe-
cifically for the use of dental students. Within the university grounds there are several modern fully equipped auditoriums for larger conferences.

**Strengths**
Lecture rooms of various sizes are situated nearby and readily available.

**Weakness**
The facilities in the lecture halls vary in standard.

**Innovations**
Lecture halls can be booked by way of a computerized central booking system.

### 2.3 Training Laboratories

**General Explanation**
Preclinic laboratories are situated on the fourth floor of a building, which lies nearby the Dental School. There are facilities for up to 64 students. There are also preclinical laboratories situated on the 6th floor in the Dental School with facilities for up to 28 students.

**Strengths**
Spacious premises.

**Weakness**
Laboratory facilities are situated in another building. There is need for investment in new equipment.

### 2.4 Library

**General Explanations**
The university library – UB- is situated at the very heart of the university campus and is one of the most pleasant and lively meeting places. UB is considered one of the best university libraries in Sweden. It not only provides books but also newspapers and academic journals from all around the world. The library also offers access to a broad range of data bases and CD-ROM resources free of charge. The library is open 78 hours a week.

Within the university hospital there is a special library with reference books for the Faculty of Medicin and Odontology. This library has two copies of every book. One copy is for home loan and the other stays at the library for reference. In the autumn of 2002 this library is due to move to new and larger premises.

### 2.5 Research Laboratories

Senior lecturer Thomas Borén, DDS, PhD, Department of Odontology/Oral Microbiology
Email: thomas.boren@odont.umu.se

**General Explanation**
The main facilities for basic oral-biological research are situated at the 5th floor in the Dental School and contain laboratories and offices for the researchers. The
5th floor provides ample laboratory facilities for research groups from several sections such as Cariology, Clinical Oral Physiology, Endodontics, Oral cell biology, Oral microbiology and Periodontology.

**Strengths**
The main research facilities are made up of two extensive corridors, strategically located in the very center of the School, with a multitude of laboratories and offices, to house the many pre-clinical and clinical research disciplines.

**Conditions**
The two joint research corridors are exceedingly well equipped, with high tech protein chromatography/HPLC-equipment (Pharmacia/ BioRad), instruments for isotope-quantitation/analyses (Wallac), 4 modern Avanti (Beckman) centrifuges (including ultra-centrifuge), modern and well-equipped Leica research microscopes (one regular and one inverted) with full equipment for fluorescens, /interference, digital photography and image handling/processing. The inverted microscope is also equipment for micromanipulation, microinjection and time-lapse studies of continuous culture of cells. The research facilities also house modern equipment for molecular biology work, such as PCR/RealTime-PCR-machinery and (DNA) sequencing, in addition to bacterial culture in larger scale, microaerophilic incubators, anaerobe-incubators, and in addition an advanced sterile-hood that can also handle pathogenic/biohazard micro-organisms. Furthermore, there are several hoods available for handling of cells/cell cultures and primary cells, combined with cell-culture incubators. This resource center of front-edge equipments and know-how makes a major difference to facilitate for different researchers to participate in interdisciplinary projects and activities by access to apparatus/ equipment and skilled technical assistants. Thus, the facilities are excellent for conducting both basic and clinics-related odontological research of high international standards, which helps to create a dynamic and progressive interdisciplinary environment.

**Weaknesses**
Due to Departmental savings during the last 5 years several tech-assistants have been lost. The shortage of personnel makes it a demanding task to keep the infrastructure in top-shape.

**Best Practices and Innovations**
We have established conditions for studies of microbial binding/adherence to host tissue (based on cell/ biopsy-material), where adherence is registered by fluorescent microscopy and digital microphotography. The images are then by use of semi-automatic macro-functional techniques digitally computer analyzed, and microbial adherence is quantified in relation to surface/density. This is a setting that is both reproducible and fast and makes a substantial difference to the quality and level of the analyses.
Section 3 – Administration and Organisation

Professor Margareta Molin, Head of the Department
Senior lecturer Anders Wänman, Assistant Head of the Department
Mrs Britt-Marie Schönfeldt, Chief Administrator of Clinics
E-mail: margareta.molin@odont.umu.se, anders.wanman@odont.umu.se, brittmarie.schonfeldt.lt@vll.se

3.1 Organizational Structures

The University
The highest branch at Umeå University is the University Board of Directors. It is the responsibility of the Board to decide on, among other things, the distribution of resources within the University. The Board is made up of eight members who are appointed by the Swedish government. The board represents both community and business interests. Therefore, it is possible to have a Chairperson that is not a member of the University body.

The Faculty
A Dean, who is also the chairperson for their faculty’s respective Faculty Board, heads every faculty at Umeå University. The Faculty Board is responsible for scientific research, post-graduate education, as well as undergraduate education within the faculty. The Board’s members are elected to their posts, with exception of the student members.

Since July 1st 1999, the former Faculty of Odontology became one of 13 institutions within the Faculty of Medicine and Odontology. The organization of the Faculty is presented below.
Within the Faculty Board one board member represents the Department of Odontology. The Department also has board members in the Research Board, Educational Board and Board of Graduate Students. Each of the undergraduate programmes has one programme committee working with the special educational questions and strategies. The Department is also represented in almost all other committees concerning recruitment, ethics, information, internationalisation, and information technology. The term of office is 3 years and new Boards and Committees will be elected during the spring 2002 for the period first of July 2002 to 30th June 2005.

**Department of Odontology**

The basic unit of the University is the Department. The Department is the primary workplace, not just for students, teacher and researchers, but for other professionals as well as secretaries, janitors, technicians and instrument makers.

Department of Odontology is separated into 12 different units, each with a head. The units are:

- Cariology
- Endodontics
- Clinical Oral Physiology
- Oral and Maxillofacial Surgery
- Dental Materials Science
- Oral Cellbiology
- Oral and Maxillofacial Radiology
- Oral Microbiology
- Orthodontics
- Periodontology
- Paediatric Dentistry
- Prosthetic Dentistry

Preclinical and medical Departments including anatomy, histology, physiology, microbiology, chemistry, pathology, immunology, virology, pharmacology, etc supplies about 20% of the curriculum in the dental education programme.

The Department is responsible for the undergraduate curriculum, postgraduate curriculum and research activity.

The clinical organisation is managed by the head of clinical administration and by dentists responsible for the clinical activities in each unit. This organisation is presented below.
Undergraduate clinics

The undergraduate clinical training is carried out in special clinics separated from the specialist clinics. Paediatric dentistry and orthodontics are separated from the clinics for adults. All undergraduate clinical training in dentistry for adults is carried out in four multidisciplinary clinics. The clinical training starts in the beginning of the third year and continues through the final semester in the fifth year.

To ensure that the students are assigned suitable patients, careful selection of patients is necessary. This patient inventory is carried out of the clinic for general/comprehensive dentistry.

Multidisciplinary teams of staff members from different units are responsible for clinical supervision of the students and a guarantee for the patient security.

Specialist clinics

Professors and lecturers appointed by the University and consultants appointed by the County Council work together in the specialist clinics. The speciality fields covered today are endodontology, clinical oral physiology, oral and maxillofacial surgery, oral and maxillofacial radiology, orthodontics, periodontology, paediatric dentistry and prosthetic dentistry. Each speciality has its own clinic. Dentists in the Public Dental Health, private practice and/or medical practitioners refer patients to the specialist clinics. The clinics also provide postgraduate education within the different speciality fields.
3.2 Information Technology

Students access to IT
The dental students have access to computer facilities in "Datorium", a center shared with the medical students. They also have access to PC's at the faculty library, the university library and at the various clinical units and at the laboratory.

University administrative systems:
Web-based course information for the students in all the programmes.
Documentation of student progress:
Ladok - National student records database that is used by all Swedish universities. Students data and progress can be followed throughout their undergraduate as well as postgraduate/research courses.
Raindance - commercial financial system
Primula - human resource management
Salut – central booking system for lecture halls

County Council administrative systems:
Prodent – patient administrative system
Devis – financial system
Respons – personnel administrative system
Linda – internal system for personnel information
Friend and Maximo – administrative systems for purchase and equipment

Section 4 – Staff
The Department of Odontology, Umeå University, has in all 100 employees and Västerbottens County Council has 170 employees. Women predominate among dental chairs side assistants (100%), laboratory assistants (100%) and administrative staff (100%). Women comprise 53% of the academic staff.

In the Department of Odontology there are 13 professors, of whom 4 are women. There are 11 senior lecturers of which 4 are women. About 52 % of the total staff employed by the University has academic degrees.

The mean age of the staff is:
Professors ........................................ 55 yr
Senior lecturers .................................. 48 yr
Administrators .................................... 53 yr
Junior lecturers .................................. 51 yr
PhD-students ..................................... 35 yr
Consultants ..................................... 50 yr
Assistant Consultants .......................... 40 yr
Dental Nurses ................................. 50 yr
Hygienists .................................... 42 yr

HEAD OF DEPARTMENT OF ODONTOLOGY
Margareta Molin
Professor, DDS, PhD
Head of Department of Odontology
Full Time Academic Staff employed by Umeå University:
Professors .....................................................13
Senior lecturers .............................................11
Junior lecturers ................................................8

Other Staff
Student Administration/
Technicians/Administrators .........................24
Research assistants
and Project assistants ..................................18
PhD-students ..................................................18

Total .....................................................................92

Full Time Staff employed by County Council of Västerbotten:
Head of Administrative Office .......................1
Consultants ....................................................50
Postgraduate students ....................................12
Technicians/Administrators/Photograph ............18
Dental Nurses/Hygienists .............................89

Total .....................................................................170

Units and staffing at Dental School (PhD includes Dr Odont, Dr Med and Dr Med Sci).

Cariology
Nicklas Strömberg  Professor, DDS, PhD
Ingegerd Johansson  Professor, DDS, PhD (leave of absence)
Ulrika Funegård  Consultant *, DDS, PhD
Pernilla Lif-Holgersson  Ass Consultant *, 20%
Åke Nordlund  Consultant *, Lic Odont
Mats Ryberg  Consultant *, DDS, PhD
Monika Öberg  Ass Consultant *, 20%, DDS
Ebba Sörensen  Ass Consultant *, DDS
Christina Lindh  Ass Consultant *, 30%, DDS
Vuokko Loimaranta  Post doc
Lars Frängsmyr  Post doc
Mirva Lohilahti  PhD-student
Liza Danielsson Niemi  PhD-student
1,5 Laboratory Technicians/Administrators
7 Dental Nurses *

Endodontics
Göran Sundqvist  Professor, DDS, PhD
Ulf Sjögren  Consultant *, DDS, PhD
Hans Ingridsson  Ass Consultant *, DDS, postgraduate student
Carola Höglund-Åberg  Ass Consultant *, 20%, DDS
Malin Brundin  Ass Consultant *, DDS, postgraduate student
David Figdor  PhD-student
5 Dental Nurses *
1,5 Laboratory Technicians/Administrators
Clinical Oral Physiology
Per-Olof Eriksson  Professor, DDS, PhD
Anders Wänman  Senior lecturer, DDS, PhD
Hans Holmquist  Consultant *, DDS
Thomas Kieri  Ass Consultant *, DDS
Susanna Marklund  Consultant *, DDS
Catharina Österlund  DDS, Postgraduate student *
Birgit Häggman Henriksson  DDS, PhD-student
1,5 Laboratory Technicians/Administrators
5,5 Dental Nurses/Hygienists *
Jan Nilsson  Ass Consultant 20% *
Pontus Jansson  Ass Consultant 25% *

Oral Surgery
Stefan Lundgren  Professor, DDS, PhD
Elisabeth Nyström  Consultant *, DDS, PhD
Carina Lundqvist  Consultant *, DDS, PhD
Mats Sjöström  Consultant *, DDS, PhD-student
Sven Öberg  Consultant *, DDS, Lic Odont
Sofia Lundgren  Ass Consultant *, DDS, postgraduate student
Magnus Brechter  Ass Consultant *, DDS, postgraduate student
Sten Andersson  Ass Consultant *, DDS
Johan Nilsson  Ass Consultant *, DDS
1,5 Laboratory Technicians/Administrators
13,5 Dental Nurses and Nurses *

Dental Materials Science
Berit Ardlin  Senior lecturer, PhD
Göran Sjögren  Senior lecturer, DDS, PhD, Consultant
Berit Andersson  Instructor Dental Technician
Ingrid Westberg  Instructor Dental Technician
Rolf Olofsson  Engineering
6 Laboratory Technicians/Administrators

Pharmacology
Stig Jacobsson  Lecturer, PhD
0,5 Laboratory Technicians/Administrators

Oral Cell Biology
Ulf Lerner  Professor, DDS, PhD
Maria Ransjö  Senior lecturer, DDS, PhD
Pernilla Lundberg  DDS, PhD
Anna Brechter Bernhold  PhD-student
Py Palmqvist  PhD-student
Emma Persson  PhD-student
Monica Brage  PhD-student
3,5 Laboratory Technicians/Administrators

Oral and Maxillofacial Radiology
Annika Isberg  Professor, DDS, PhD
Jan Ahlqvist  Consultant *, DDS, PhD
Fredrik Bryndahl  Consultant *, 50%, PhD-student
Eva Levrings Jåghagen  Consultant 50% *, senior lecturer, 50%, DDS, PhD
Per Erik Legrell  Consultant *, DDS, PhD
Tore Nilsson  Consultant *, 50%, PhD-student 50%
1.5 Laboratory Technicians/Administrators
6 Dental Nurses and Maxillofacial Radiology Nurses *

Oral Microbiology
Sirkka Asikainen  Professor, DDS, PhD
Thomas Borén  Senior lecturer, DDS, PhD
Marina Hurtig  PhD-student
Jafar Mahdavi  PhD-student
Johan Ögren  PhD-student
Susanne Vikström  Researcher
Anna Arnqvist  Researcher
Rolf Claesson  Researcher
George Belibasakis  PhD-student
2.5 Laboratory Technicians/Administrators

Orthodontics
Maurits Persson  Professor, DDS, PhD
Ronny Fors  Ass Consultant * (deputy 1/2 time), PhD-student
Marie Marklund  Ass Consultant *, DDS, PhD
Mats Bernholdt  Consultant *
Gerhard Renfors  Consultant *, 50%
Mats Carlén  Ass Consultant, DDS, postgraduate student *
Lena Rasmusson  Ass Consultant, DDS, postgraduate student *
Gunilla Carlsson  Ass Consultant, DDS, postgraduate student *
1.5 Laboratory Technicians/Administrators
7.5 Dental Nurses *

Periodontology
Lennart Häström  Senior lecturer, DDS, PhD
Ulf Folkesson  Consultant *, DDS
Bertil Lindgren  Consultant *, 50%, DDS
Thomas Lind  DDS, PhD, postgraduate student *
Carola Högberg-Åberg  Ass Consultant, 75% *, DDS, PhD-student
1.5 Technichians/Administrators
6.5 Dental Nurses/Hygienists *

Paediatric Dentistry
Svante Twetman  Professor, DDS, PhD
Birgitta Bäckman  Senior lecturer, DDS, PhD
Christina Stecksén-Blicks  Consultant *, DDS, PhD
Ingrid Andersson-Wenckert  Consultant *, 50%, Lic Odont, PhD-student
Eva Borssén  Consultant *, 50%, DDS, PhD-student
Carin Pilebro  Consultant *, DDS
Ylva-Britt Wahlin  Consultant *, 25%, DDS, PhD
Karin Sunnegårdh-Grönberg  Ass Consultant *, 50%, DDS
1,5 Laboratory Technicians/Administrators
5,5 Dental Nurses/Hygienists*

**Prosthetic Dentistry**
Margareta Molin  Professor, DDS, PhD
Johan Gunne  Professor, DDS, PhD
Kenneth Borg  Consultant *, DDS
Göran Nordström  Consultant *, DDS, PhD
Lars Pohl  Consultant *, DDS
Per Tidehag  Senior lecturer, DDS, PhD
Hans Nilsson  Consultant *, DDS,
Stig Eriksson  Ass Consultant *, 50%, DDS
1,5 Laboratory Technicians/Administrators
8 Dental Nurses/Hygienists*

**Public Dental Health Clinic**
Anna-Lena Olofsson  Consultant, Head of unit *, DDS
Majid Ebrahimi  Consultant *, DDS
Åsa Lindberg  Consultant *, DDS
Måns Bylund  Consultant *, DDS
Ulla Folkesson  Consultant *, DDS
Bengt Ahlgren  Consultant *, DDS
Lena Mårell  Consultant *, DDS
Marie-Loise Åkesson  Consultant *, DDS
Jan Nilsson  Ass Consultant *, 30%, DDS
Eva Hellström  Ass Consultant *, 20%, DDS
18,5 Dental Nurses/Hygienists *

**Hospital Dental Care**
Ylva Britt Wahlin  Consultant, 75% *, DDS, PhD
1 Dental Nurses *

* Employed by Västerbotten County Council
Section 5-16 – The Dental Curriculum

Section 5 – The Biological Sciences

5.1 Introduction to Dental Studies

Senior lecturer Per Stål, DDS, PhD, Department of Integrative Medical Biology
E-mail: per.stal@anatomy.umu.se

1. Introduction
The course introduction to dental curriculum covers the first two weeks of the dentistry programme. Additional two days are given later in the first semester.

2. Primary Aims
The overall aim is to introduce and prepare the students for academic studies.

3. Main objectives
- Introduce the students to the university environment.
- Inform about rules, obligations and privileges for university studies.
- Discuss the concepts of knowledge, teaching and examination from an academic point of view.
- Learn about study technique.
- Introduce the students to medical terminology
- Participate in and discuss various forms of teaching and examination.
- Increase the understanding for pre-clinical knowledge in dentistry studies.
- Give basic instructions in computers and library use.
- Inform about the nature and various branches of dentistry as a profession.
- Inform about postgraduate research and education in the Faculty of Medicine and Odontology.

4. Hours in the Curriculum
The course covers 2,5 weeks. Two days of the course are given as group sessions later in the first semester.

5. Method of learning/teaching
The course is given as lectures and seminars. Interactive computer programs are introduced and used. Individual case projects are presented as seminars.

6. Assessment methods
To pass the course the students have to attend all obligatory moments, pass a written test about medical terminology and be involved in a viva voce presentation at the end of the course.

7. Strengths
The major strength of the course is that the students at an early stage receive useful information on university studies. The course will also motivate and give understanding for future studies. During the course students can ask and discuss different kinds of questions about the university, teaching, learning and examination.
8. Weaknesses
Student’s previous knowledge varies. Some parts of the course might be too basic for students with previous experience, but some students may not have enough experience to discuss some of the objectives.

9. Innovations and Best Practices
The early introduction of the academic environment of the university, and in this light to consider the concepts of knowledge, teaching and examination

The information about rules in the university and students obligations and privileges

The information on research in faculty of medicine and odontology and the visit to an experimental physiological laboratory.

Individual case projects presented as seminars

All students receive an e-mail address of their own and a password for Internet. The students have access to computers for use of interactive teaching programmes, Internet and e-mail. Guidance in different kinds of computer questions is given during the course.

10. Plans for future changes
We hope to expand the introduction of interactive computer programs and to find a lecturer in history of medical terminology. Moreover, a part of the course will be placed at the university cottage in the mountain area in order to increase group dynamics.

11. Visitors Comments
5.2 Biochemistry

Senior lecturer Lars Bläckberg, MD, PhD, Department of Medical Biochemistry and Biophysics
E-mail: lars.blackberg@medchem.umu.se

1. Introduction
The course in Biochemistry and Cellbiology (10 credits) is given in the first term. It runs parallel to the Introductory Course.

2. Primary Aims
- Give an overall view of the cell and its activities.
- Learn about the life processes on a molecular level.

3. Main objectives
- Establish a foundation in basic chemistry, i.e. organic and physical chemistry.
- Structural and functional properties of different biomolecules.
- Properties of the facilitators required for cellular processes (enzymes, hormones, receptors etc).
- The normal metabolism of the cell.
- The metabolic interplay between different organs.
- Structure and function of different cell organelles.
- Principles for cellular functions, i.e. division, differentiation, motility and secretion.

4. Hours in the Curriculum
140 h

5. Method of learning/teaching
Teaching: Lectures, practical sessions, laboratory sessions.
Learning: Lectures, practical sessions, laboratory sessions, questions and discussion with the teachers, reading recommended literature.

6. Assessment methods
Written examination which they correct themselves in order to get a preliminary result and an opportunity to review their answers. This is followed by a traditional correction by teacher.

7. Strengths
Experienced teachers give lectures and exercises at a reasonable speed. In addition, since the teachers are also researchers in different fields of biochemistry, they are all encouraged to apply novel aspects of current research to relevant topics in their lectures. The number of students is sufficiently small to allow for a good dialogue between students and teachers.

8. Weaknesses
It is difficult to find literature suitable to the scope and length of the course. Integration between biochemical and cellbiological aspects could be improved.
9. Innovations and Best Practices

10. Plans for future changes
Try to improve the integration between different parts of the course. Initiate a discussion about the pedagogical approach aiming at making the students more active.

11. Visitors Comments
5.3 Genetics

Professor Maurits Persson, DDS, PhD, Department of Odontology/Orthodontics
E-mail: maurits.persson@odont.umu.se

1. Introduction

Cytogenetics as well as molecular and biochemical genetics are integrated within courses in Chemistry and cellular biology (1st semester) and Microbiology, immunology and virology (2nd semester). The field clinical genetics, the application of genetics to diagnosis and patient care, touched upon in relation to various courses in clinical dentistry during the 5th to 9th semester, is in the new curriculum to be supplemented with a 1 credit course during the 10th semester.

2. Primary Aims

The aim of the 1 credit course is:

- to illustrate how basic genetics is used in diagnosis and treatment of diseases and disorders in dentistry as well as in medicine.
- to make the students aware of ethical and other issues related to the rapid development of knowledge in molecular biology.

3. Main objectives

- to get an updated knowledge in classification of genetic disorders, briefly characterized
- to achieve a coherent picture of the role of genetics in dental and oral diseases
- to get an insight into distribution of genes in the population and how the frequencies of genes and genotypes are maintained and changed.
- to understand ethical issues in genetic diagnosis and genetic counselling, and possible effects of the recent advances in genetics.

4. Hours in the Curriculum

1 credit. Under planning, see point 8 and 9.
5.4 Anatomy (Morphology)

Professor Per Lindström, MD, PhD and Senior lecturer Per Stål, DDS, PhD,
Department of Integrative Medical Biology
E-mail: per.lindstrom@histocel.umu.se, per.stal@anatomy.umu.se

1. Introduction
This course covers 6.5 credits (6.5 weeks) of the first semester for dentistry students. It is an integrated course based on anatomy, histology, and cell biology. It deals with the structural organisation of tissues and organ systems.

2. Primary Aims
The primary aim of the course is to provide students with solid knowledge on the normal organisation and function of tissues and organs in the human body. This knowledge is fitted into a holistic view of man. The studies shall also provide students with trust in the scientific basis of odontology and medicine, and an understanding that criticism and re-evaluation are inherent aspects of the progress.

3. Main objectives
- Providing understanding of general human anatomy.
- Providing basic knowledge on human tissue histology. Emphasis is on epithelial, connective, muscle, and nervous tissues.
- Understanding on haematopoiesis and blood histology
- Understand the relation between structure and function. Emphasis on organs related to oral health problems.
- Basic aspects of methodology to be able to understand the importance of the fundamental underlying theory, and the precision and sources of error in the tools used for gathering knowledge.
- Basic training in light microscopy to achieve ability to identify cells, tissue types, and organs. One important aspect is to provide basic training in the analytical diagnostic process and practical applications of theoretical knowledge.
- Dissection of animal organs to get practical applications of theoretical knowledge

4. Hours in the Curriculum
The course covers 6 weeks. Each week has an average of 10 – 15 scheduled lecture hours, and 8 – 12 hours of scheduled group sessions.

5. Method of learning/teaching
The teaching methods are based on lectures for the entire student group and guidance in small groups of 6 – 8 students. The students spend a substantial number of hours at the Department practising microscopy, studying anatomical models, dissecting animal organs and using interactive computer programs. A number of students present individual projects as seminars.

6. Assessment methods
All students pass a written exam on part of the course before they enter the final examination. The final examination consists of a 4 hour written test with a mixture of short essays and more itemised questions. There is also a microscopy exam where the ability to identify tissues in different histological microslides are tested.
7. **Strengths**
The strength of this course is the integration of two closely related subjects (anatomy and histology), which provide the students with a unified knowledge on human body structure and function. Highly qualified staff members present the course. The students learn both by studying textbooks and through practical work, which makes the learning process more thorough. The courses during the first three semesters in the dental programme are designed as one unit with different parts. This concept is facilitated by the fact that parts of the histology, cell biology and anatomy subjects are taught during other courses with teachers from our Department.

8. **Weaknesses**
It is a mass of information to deal with during a limited time. It is sometimes difficult to delineate what in this subject is most important for the dental students to be acquainted with. The integration of the course and interdisciplinary communication could be strengthening.

9. **Innovations and Best Practices**
Dissection of animal organs

An introduction to working with individual projects

Microscopy training

10. **Plans for future changes**
We hope to carry the integration between subjects further to be able to reduce the workload of our students, allowing time for in-depth studies and reflection.

11. **Visitors Comments**
5.5 Physiology

Professor Kurt Å Olsson, DDS, PhD, Department of Integrative Medical Biology/Physiology
E-mail: kurt.a.olsson@physiol.umu.se

1. Introduction
Medical physiology is introduced at the beginning of the second semester and is taught together with pharmacology (see: Pharmacology). This entire course of Physiology (4 weeks) and Pharmacology (2 weeks) corresponds to 6 credits.

2. Primary Aims
The primary aims of the medical physiology course are:

- to introduce the main general features of integrative biology with an emphasis on mammalian physiology.
- to present known general principles and mechanisms regulating the individual organ systems and their balances i.e. homeostasis.

3. Main objectives
The students learn fundamental principles and facts concerning the general physiology of:

- the nervous system
- the muscles (smooth)
- the cardiovascular system
- the gastrointestinal system
- the endocrine system
- the renal system
- the respiratory system
- the acid-base regulation

4. Hours in the Curriculum
In total 144 h, out of which are allocated

- 30 h for lectures
- 6 h for laboratory work
- 14 h for written pre-tests and seminars
- 2 h for presentations of projects (subgroup)

5. Method of learning/teaching

- Whole class lectures generally present overviews and guidance for own active literature studies.
- Laboratory experiments.
- The students are being prepared for life-long learning.

6. Assessment methods (one paragraph)

- Mandatory written pre-tests (n=3) followed by seminars.
- Rewards and recognition for achievements as motivation to learn.
- Written final examination (6 h) based on essay questions in both physiology and pharmacology.
7. **Strengths**
   - The course has a critically prepared curriculum and is integrated with pharmacology.
   - The course is organised and mainly presented by staff members having both dental clinical and basic science experiences.
   - The staff has positions at the Department of Integrative medical biology, comprising sections of anatomy, histology and physiology and cell- and molecular biology.

8. **Weaknesses**
The allocated time for the course in medical physiology should be extended, especially so if a true integration under way with the education of basic principles of pharmacology should be fruitfully accomplished (see Pharmacology).

9. **Innovations and Best Practices**
   - Integration of subjects belonging to the basic sciences.
   - The combined pre-test and seminars.
   - Student-centred active learning including development of interactive computerised simulation program e.g. demonstration of the membrane- and action potentials.

10. **Plans for future changes**
    Further promotion of integrative physiology, vertically and horizontally, to strengthen the dental profession with respect to a perspective conductive to comprehensive medically oriented vision.

11. **Visitors Comments**
5.6 Oral and Craniofacial Biology

Professor Kurt Å Olsson, DDS, PhD, Department of Integrative Medical Biology/Physiology
Senior lecturer Per Stål, DDS, PhD, Department of Integrative Medical Biology/Anatomy
E-mail: kurt.a.olsson@physiol.umu.se, per.stal@anatomy.umu.se

1. Introduction
This course is given during the first ten weeks of the 3rd semester. It is an integrated course on Anatomy, Histology, Cellbiology, Physiology, Pharmacology, Dental Radiography and Radiology, Orthodontics, Prostodontics and Dental Material Sciences.

2. Primary Aims
The primary aims are:
- to introduce the main features of oral and craniofacial biology and behaviours.
- to present current understanding of principles and mechanisms regulating oral and craniofacial tissues, organ systems and their integrative functions.

3. Main objectives
The students learn about integrative oral and craniofacial biology by studying:
- cellbiology (58 h)
- embryology and development (18 h)
- morphology and topography (50 h)
- dental radiography and radiology (10 h)
- physiology (23 h)
- pharmacology (4 h)
- prosthodontics (1 h)
- dental materials sciences (16 h)
- tooth morphology and occlusion (11 h lectures and 20 h laboration)

4. Hours in the Curriculum
In total 364 h, out of which are allocated
- 124 h for lectures and
- 54 h for demonstrations, laboratory work, microscopy practise, dissections etc.

5. Method of learning/teaching
- Whole class lectures generally present overviews and guidance for active literature studies.
- Demonstrations etc (see 4) generally involve groups of different sizes depending on topic (see 3) and strategies used by the staff members (see 12).
- Laboratory work often includes written reports.

6. Assessment methods
- Mandatory written pre-tests (n=4) generally followed by seminars.
- Rewards and recognition for achievements as motivation to learn.
- Written final examination (6 h) with a mixture of graded essay and some more itemised questions.

7. **Strengths**
   - Exceedingly integrated and focusing on a detailed understanding of oral and craniofacial biology.
   - Carefully prepared curriculum
   - Taught by a highly qualified staff active within the basic sciences and/or at the clinical level as specialists.
   - The pedagogic engagement of the staff is major.

8. **Weaknesses**
Generally this challenging course has proved to be successful, however, there is a need to further strengthen the horizontal and vertical interdisciplinary communication.

9. **Innovations and Best Practices**
   - This course represents a unique effort and no doubt represents best practices with respect to several innovative topics of the present curriculum.
   - Structural integration of clinical and “non-clinical” subjects has been introduced.
   - The students are indeed at the centre of the educational process.

10. **Plans for future changes**
   - Further promotion of the integrative process with increased interdisciplinary engagement.
   - Continued development and evaluation of the curriculum and the teaching methods.
   - The manual training of dental morphology to be cared for by another more suitable course.

11. **Visitors Comments**
5.7  Scientific Methods

Senior lecturer Thomas Borén, DDS, PhD, Department of Odontology/Oral Microbiology
Email: thomas.boren@odont.umu.se

1. Introduction
The aim of this interdisciplinary course is to teach scientific/academic know-how in the fields of Odontology and Medicine. The course is located in the curriculum as an integrated part of clinical studies beginning at the 5th semester with an introduction to scientific principles, which is then followed-up on semester 8-9-10, with a total period of 10 weeks of experimental or clinical scientific project, alternatively by a documentary litterateur research project.

2. Primary Aims
- To make the students familiar with how to write and critically read scientific papers
- To make the students perform/evaluate their own independent scientific work

3. Main Objectives
At Semester 5, the students are presented with introductions and discussions about:
- critical scientific reading
- medical statistics
- library- and Internet- based search strategies for literature and data
- experimental research
- clinical research
- scientific writing
- current research projects at/or associated with the Dept. of Odontology

At semester 8 and 9, the students perform a total of 10 weeks of independent scientific work, at one of the Sections of the Dept. of Odontology, or associated Departments within the joint Medical-Dental-Faculty. The results are presented in manuscript form by the end of semester 9, and orally presented at semester 10.

4. Hours in the Curriculum
During the 5th semester:
The course comprises a series of lectures as specified above. In addition, students attend the presentations of experimental and clinical research projects by dental grad.-students, “the Grad-students’ day”, i.e., a full day of scientific presentations. By the end of the course, the faculty members at/or associated with the Dept. of Odontology present their current research projects, which makes up a total of 25 hours, or 1 week/credit.

During the 8th and 9th semester;
The students perform independent scientific experimental or clinical work, equivalent to 10 full weeks (10 credits).
5. Method of learning/teaching
The first part of the course is based on lectures and demonstrations, in combination with homework, such as Internet-based search tasks. In addition, the students are trained to comprehend scientific writing, and are asked to summarize scientific papers into abstracts, which are then reported to and discussed with members of the faculty.
The scientific project performed during semester 8-9 is performed in dental research labs/units where the students perform their research projects under supervision of laboratory technicians, and with academic guidance from graduate students, post-Docs and faculty members.

6. Assessment methods
All the lectures during semester 5 are of compulsory nature. Members of the faculty, through individual discussion based tutoring, support the training in reading and comprehension of scientific papers.
The scientific project performed during semester 8-9 is summarized/written up in the form of a scientific report/paper. All the materials/reports are then orally presented/defended by the students in a series of approx. 60 minutes sessions, during semester 10, where students and faculty members are invited to participate and critically analyze the materials, which collectively makes up a total of close to 20 presentations (for the presentations, a total of 6x4 hours are allocated, which corresponds to six half days). The written report, the oral presentation and the corresponding opposition are then collectively graded "fail", "pass", and "distinction".

7. Strengths
Our main strengths for the course in "Scientific methods", recede in the research power of the Department of Odontology. Here, almost all of the lecturers hold Ph.D level in research experience and most faculty members participate in research projects at the Sections of the Department, or affiliated Departments within the joint Medical-Dental-Faculty. In addition, the technical personnel are extremely experienced and consistent, which facilitates the student's experimental training.

8. Weaknesses
The full course has only been given twice yet (from Semester 5 to Semester 10), so it is under constant updating, revision and supervision. There is also a considerable workload on all faculty members, since several students carry out their research project at each Section each year, which requires considerable practical and intellectual guidance.

9. Innovations and Best Practices
Due to the continuous development in current dental research and the corresponding research group at the Departments, the students will be presented with updated results and opinions from the different sections, and thus will be more prepared to meet the changes in clinical dentistry.

10. Plans for future changes
We intend to increase the teaching in medical statistics to help the student to better process and interpret their results in semesters of statistical significance for clinical and experimental research. Starting this year, the research reports will be
written in English (by the students) in the format of manuscripts for the "Journal of Dental Research".

11. Visitors Comments
Section 6 – Pre-Clinical Science

6.1 Dental Materials Science

Senior lecturer Berit Ardlin, PhD, Senior lecturer Göran Sjögren, DDS, PhD, Department of Odontology/Dental Materials Science
E-mail: berit.ardlin@odont.umu.se, goran.sjogren@odont.umu.se

1. Introduction
The course and the timing are reported in connection with main objectives.

2. Primary Aims
The course aims to provide
- theoretical knowledge of dental materials’ basic structure, composition and properties, their clinical and technological handling, and their interaction with the biological environment, and
- practical education in preparation techniques, in the correct handling, insertion and design during restoration of damaged dentitions and teeth, and in the design of replacements for total lack of teeth.

3. Main objectives
The course in Dental Materials Science takes place over four semesters as follows:

Semester 3: Basic structure of dental materials, their chemical composition and physical properties; mechanics of materials and the theory and practice in mechanics of cutting. Preclinical operative caries therapy, direct filling materials.


Semester 5: Preclinical crown- and bridge-prosthetics, removable prosthetics with chemical and physical properties of the materials. Side effects of dental materials.


4. Hours in the Curriculum
Each student takes approximately 540 hours to achieve the above aims.

5 and 6. Method of learning/teaching and assessment methods
Lectures, practical demonstrations, laboratory work and preclinical training are the learning /teaching methods used. Each item is assessed by written and practical tests. An oral examination is ending the course.
7. **Strengths**
The dental students have a high amount of preclinical training integrated with their theoretical learning. The students get familiar with various techniques used by dental technicians and they make a number of dental prostheses, i.e. cast inlays, crowns, bridges, metal-ceramics and removable prostheses.

8. **Weaknesses**
Some of the rooms at the Department are not suitable for their task, and some equipment is almost worn out.

9. **Innovations and Best Practices**
The course develops continuously to meet the changes in clinical dentistry.

10. **Plans for future changes**
To develop and integrate the students' knowledge of dental biomaterials with preclinical and clinical training. To reconstruct some of the rooms and furnish them with new equipment.

11. **Visitors Comments**
6.2 Clinical Introductory Courses

Senior lecturer Anders Wänman, DDS, PhD, Department of Odontology/Clinical Oral Physiology, Senior lecturer Lennart Hänström, DDS, PhD, Department of Odontology/Periodontology, Åke Nordlund, DDS, Lic Odont, Department of Odontology/Cariology
E-mail: anders.wanman@odont.umu.se, lennart.hanstrom@odont.umu.se, ake.nordlund@odont.umu.se

1. Introduction
The course is scheduled to the 1st (1 credit), 2nd (1 credit), 3rd (2 credits) and 4th (3 credits) semesters.

2. Primary Aims
- To give insight into dentistry and provide knowledge of laws and regulations.
- To give basic training in communication and how to keep dental records.
- To give principles for prevention.

3. Main objectives
- To teach the students basic cross-infection control principles.
- To learn and practice methods of oral hygiene.
- To learn sampling of saliva and registration of plaque.
- To teach students clinical routines, how to handle the dental unit etc.
- Provide practice in taking a case history, clinical examination and keeping of a dental record.
- Laws and Legislation.

4. Hours in the Curriculum
Lectures 60 hours
Clinical practice 160 hours

5. Method of learning/teaching
Learning by experience
Auscultations in the Public Health Clinics.
Assist senior students.

6. Assessment methods
Written examination (4th semester).

7. Strengths
The students learn how to keep dental records in agreement with the regulations by the Swedish National Board of Health and Welfare.

8. Weaknesses
The course on the 3rd semester when the students are supposed to assist senior students 4 hours each week has not fallen out as expected since many students have chosen not to attend to the clinic.
9. Innovations and Best Practices

10. Plans for future changes
Evaluation will be the basis for future changes.

11. Visitors Comments
Section 7 – Para-Clinical Sciences

7.1 Pharmacology

Senior lecturer Gunnar Tiger, MD, PhD and Senior lecturer Stig Jacobsson, PhD, Department of Pharmacology
E-mail: gunnar.tiger@pharm.umu.se, stig.jacobsson@pharm.umu.se

1. Introduction
Pharmacology is taught and trained as an integrated subject and the course and timing in the curriculum is reported in connection with objectives.

2. Primary Aims
The primary aims are to provide knowledge about:
- the pharmacodynamic effects of groups of drugs frequently used in oral health care, and general pharmacokinetics including absorption, distribution, and elimination of drugs.
- how to adequately apply pharmacotherapeutic methods in dental practice and how to write a legal prescription for the dental patient.

3. Main objectives
The education in pharmacology takes place over five semesters as follows:

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester 2:</td>
<td>Basic principles in pharmacology. Introduction to autonomic pharmacology. Basic pharmacology of local anaesthetics, fluoride and some antibacterial drugs used in dentistry.</td>
</tr>
<tr>
<td>Semester 3:</td>
<td>Drugs and salivation. Basic pharmacology of non-opioid and opioid analgesic drugs.</td>
</tr>
<tr>
<td>Semester 8:</td>
<td>Repetition of pharmacodynamic and pharmacokinetic principles. Clinical pharmacology of the importance of drug interactions in dental practice, clinical use of antibiotics in dental practice, and drug treatment of the elderly.</td>
</tr>
<tr>
<td>Semester 9:</td>
<td>Clinical pharmacology of pain control and conscious sedation. Basic pharmacology of benzodiazepines.</td>
</tr>
<tr>
<td>Semester 10:</td>
<td>Clinical pharmacology of conscious sedation, nitrous oxide/oxygen sedation, oral and rectal administration of benzodiazepines.</td>
</tr>
</tbody>
</table>

4. Hours in the Curriculum

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester 2:</td>
<td>80 hours in total (of which 40 h is formalised as lectures and laboratory work)</td>
</tr>
<tr>
<td>Semester 3:</td>
<td>5 hours</td>
</tr>
<tr>
<td>Semester 8:</td>
<td>7 hours</td>
</tr>
<tr>
<td>Semester 9:</td>
<td>6 hours</td>
</tr>
<tr>
<td>Semester 10:</td>
<td>10 hours</td>
</tr>
</tbody>
</table>

5. Method of learning/teaching
Lectures and some laboratory experiments

6. Assessment methods
Written examination
7. **Strengths**

The staffs have their offices at the Pharmacology Unit in close connection to the staff members of Medical and Clinical Pharmacology. This provides for a stimulating scientific environment for both students and staff alike.

8. **Weaknesses**

The 2nd semester is not the ideal time to give the main part of the pharmacology course. The students’ basic knowledge is not sufficient which means that for some of the less well-motivated students, there are obvious difficulties in understanding pharmacology. This could be helped by increasing the duration of the course. However, a more effective remedy would be to give this basic course later when the students have sufficient background knowledge in general pathology and medicine.

9. **Innovations and Best Practices**

The constructive collaboration with the physiology unit and the lectures in clinical pharmacology during the later semesters.

10. **Plans for future changes**

If it were not possible to give the course during later semesters, a useful approach would be to integrate suitable parts more efficiently in the physiology course. In addition, the amount of pharmacology taught to the students should be increased, but only in a manner that is fully integrated with other courses during the clinical period. An examination, whereby the students’ knowledge in basic and clinical pharmacology during their last semester is evaluated, would be a way of guaranteeing the ability of the profession to prescribe drugs according to evidence based dentistry.

11. **Visitors Comments**
7.2 Microbiology, Immunology, Virology

Senior lecturer Annika Nordstrand, PhD, Department of Microbiology
E-mail: annika.nordstrand@micro.umu.se

1. Introduction
The course is given during the second semester. As the oral flora and human pathogens continuously encounter parts of the defense mechanisms of the host during colonisation, microbial ecology and the immune system are intimately coupled. Therefore, we have combined microbiology, immunology, and virology in one course, to transfer the understanding of this interplay, and its relevance to the clinical situation.
Effort is also being made to put the knowledge of medical microbiology in a dental perspective, covering the oral microflora, commensalism and opportunistic infections that are relevant to dentists. The corresponding effort is being made with the laboratory work, covering e.g. effects of different antibiotics, transfer of antibiotic resistance traits between bacteria, diagnosis, and how to limit transfer of infective microbes.

2. Primary Aim
Knowledge of microorganisms and viruses and their interplay with the human body

3. Main objectives
The students learn about:
- Bacterial morphology and metabolism, factors that govern growth and death of bacterial populations, genetic information of bacteria and changes within this information.
- Bacteriophages
- Bacterial sensitivity and resistance to antibiotics and antibacterial substances
- Reasons for bacterial pathogenicity and identification of pathogenic bacteria
- The medical significance of viruses, based on knowledge of viral composition and synthesis, and the interplay between virus and host during acute and life-long infections
- Applications in protecting against viral infections, in chemotherapy, and in identifying viruses.
- The interplay between different microorganisms and the human body, by learning the basics of the structure and function of the immune system, about how cell-mediated and humoral immune responses are regulated, and about hypersensitive reactions and the protective effector mechanisms of the body.
- Oral microbial ecology

4. Hours in the curriculum
The course comprises 7 weeks: Approximate figures are: Lectures, 90 hours; demonstrations, 3 hours; laboratory work, 33 hours. The distribution is approximately: Microbiology, 4 weeks; immunology, 1.5 weeks; virology, 1.5 weeks. Lectures in the different subjects are not given in separate blocks, but mixed, to facilitate an understanding of medical microbiology that is based on combining knowledge of the three different areas.
5. **Method of teaching/learning**
Teaching is in the form of lectures and laboratory work. Apart from own laboratory work, a part of the laboratory experience is given by a tour of the laboratories at the Departments of clinical bacteriology, immunology, and virology at the hospital.

6. **Assessment methods**
A non-mandatory pre-test is given in the middle of the course. Obligatory parts are the laboratory work, including the practical work and written reports, and a written exam at the end of the course. The exam is mainly comprised of separate questions in the three main subjects, but we also include a few questions where the subjects are combined. At the written test the grades "fail", "pass", and "distinction" are used.

7. **Strengths**
By combining microbiology, immunology, and virology during the course, the students get a fuller understanding of the interplay which leads to infection and different outcome of infection of a host.

9. **Weaknesses**
The students are to learn the basics of three complicated subjects and are also expected to be able to combine these subjects to a fuller understanding. However, the limited time makes this task rather challenging for the students.

11. **Visitors Comments**
7.3 General Pathology

Senior lecturer Karin Nylander, DDS, PhD, Department of Medical Biosciences/Pathology
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1. Introduction
The course is given at the end of the 2nd semester, and starts with general subjects as inflammation, tumour development, followed by organ specific pathology. In the respective organ areas, the clinical side is also included and lectured by experienced clinicians in Internal Medicine within the respective fields.

2. Primary Aims
To give an overview of the different fields within general pathology.

3. Main objectives
See under 2.

4. Hours in the Curriculum
Lectures, 77 hours and demonstrations with microscope, 12 hours.

5. Method of learning/teaching
Lectures and slide demonstrations at the microscope.

6. Assessment methods
Written exam at the end.

7. Strengths
Gives a complete overview of the general pathology “spectra” including both pathology and clinic.

8. Weaknesses
Should also include oral pathology, as the mouth is a part of the body.

11. Visitors Comments
Section 8 - Human Diseases

8.1 Human Diseases

Included partly in the course of General Pathology and partly in the course Care of special needs patients in the 7th semester. Human diseases is presented in lectures (24 h).

8.2 Anaesthesiology

See 13.1 Oral surgery.

8.3 Oral Infectious Diseases

Professor Sirkka Asikainen, DDS, PhD, Department of Odontology/Oral Microbiology
E-mail: sirkka.asikainen@odont.umu.se

1. Introduction

The course on Oral Infectious Diseases (semester 3) is given in the form of lectures, demonstrations and laboratory exercises. It is located in the curriculum as part of the preclinical studies. The clinical education in this area is given later during courses in cariology, endodontics and periodontology. The course on Oral Infectious Diseases is an extension of the course on Microbiology, Immunology, and Virology (semester 2). It deepens and expands the students’ understanding of the specifics of the oral ecosystem and of oral microbiota and related immune responses in health and disease. This knowledge forms the basis to gain insight to mechanisms underlying oral infectious diseases as well as to their prevention, diagnostics, and treatment. The course also brings up various aspects on the role of oral infections as source of infection in the body.

2. Primary Aims

The aims of the course are to give the students

- a basic understanding of oral cavity as a unique ecosystem in the human body
- a broad introduction to the etiology and immunopathology of oral infectious diseases

3. Main objectives

The course discusses

- mechanisms governing bacterial colonization and survival in the oral cavity
- composition of oral microflora in relation to age, oral health and disease
- virulence characteristics of oral bacteria
- immune response in oral health and disease
- acute and chronic oral infections
- oral cavity as source of infection
- dental plaque as biofilm formation
- aetiopathogenesis of caries and periodontal diseases
- aetiopathogenesis of pulpitis and periapical infections
- mechanisms for remodelling of bone tissue
4. Hours in the Curriculum
The course gives 3.5 credits. It comprises 65 hours of lectures, and per student, approximately 7 h of demonstrations and 8h of laboratory exercises.

5. Method of learning/teaching
The teaching mainly consists of lectures. For demonstrations and laboratory exercises, the groups include 8-10 students.

6. Assessment methods
After the course, a 4-hour examination is given. The examination includes approximately 15 essay-type questions from various aspects of the course.

7. Strengths
The students get a broad overview of various aspects of oral infectious diseases. The fact that several teachers are involved in the teaching of this course, each in their own expertise area, certifies that the students receive high-level, up-to-date education in oral infectious diseases.

8. Weaknesses
As regards the broad contents of the course the time allocated in the curriculum is relatively short. The course is too early in the curriculum.

9. Innovations and Best Practices

10. Plans for future changes
To help the learning process of the students, plans have been made 1) to more efficiently utilize the excellent facilities of Clinical Oral Microbiology Laboratory in Umeå University for practical demonstrations and laboratory exercises during the course, 2) to enhance coordination in the contents of the lectures by various teachers, and 3) to invest further effort in preparation of teaching material e.g. by computer-based technology.

11. Visitors Comments
Section 9 – Orthodontics and Paediatric Dentistry

9.1 Orthodontics

Professor Maurits Persson, DDS, PhD, Department of Odontology/Orthodontics
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1. Introduction

Normal development and growth of the face, jaws and dentition is given within
the Craniofacial biology course (3rd semester) while morpho-functional deviations
in these structures, their etiology, prevention and treatment within the field of
orthodontics is given during the last two semesters of undergraduate training (9th
and 10th semester).

2. Primary Aims

The primary aims of the studies in Orthodontics are that the students in their roles
as dentists in general dental practice
- will have the enthusiasm for the care of morpho-functional oral health in
children as well as adults
- have the knowledge of and expertise in orthodontics in their role as
dentists in general practice.

3. Main objectives

To have the knowledge and expertise
- to diagnose deviation of a morpho-functional nature in the dentition of
both children and adults
- to take preventive measures against, and limit the development of, maloc-
clusions
- to assess the need for, and independently carry out uncomplicated ortho-
dontic treatment.
- to judge more complicated cases and arrange for them to receive special-
ist evaluation and treatment

4. Hours in the Curriculum

3rd semester: Within the Craniofacial biology course: lectures 6 hours, demon-
stration 2 hours on Development and growth of the face and jaws, and Develop-
ment of the dentition and occlusion.

9th semester: 4 hours/week for patient care and clinical demonstrations with focus
on diagnosis and assessment of treatment needs. In total 20 hours of lecturing.
10th semester: 4 hours/week for 20 weeks for patient care with focus on intercep-
tive treatment methods. In total 20 hours of lecturing.

5. Method of learning/teaching

Whole class lectures as well as an early study of textbook facts to allow for early
meaningful participation in the clinic, to cover specific subjects not given in text-
books, and to assist in the achievement of an orthodontic communication skill as
well as bringing the student our view on good care. Case discussions with tutors
in groups of 8-12 students for identification of problems and possible solutions,
clinical training on patients of their own but under the supervision of 1-2 tutors
and dental assistants, supported by group demonstrations and technical exercises.

6. Assessment methods
Written examination within the Craniofacial biology course (3rd semester). Written examination during early 9th semester on textbook facts needed for a participation in and to stimulate reflections upon patient care; continuing evaluation by tutors and assistant and a final oral and clinical examination (late 10th semester) by the professor in a group of 6-8 students, in which higher conceptual ability as well as diagnostic skill are evaluated. Oral examination is carried through as discussions between the professor and the student as parts in clinical situations (dentist-parent, dentist-consultant, dentist–team-member, dentist-the authorities etc.)

7. Strengths
The students are given extensive hands on training on patients with developmental and occlusal problems that the students will later face as general practitioners (the student clinic fulfils a role within the Public dental health care for children).

8. Weaknesses
Shortage of experienced specialists as tutors due to shortage of orthodontists nationally, which restrict our efforts for planned integrated training with Paediatric Dentistry.

9. Innovations and Best Practices
- Auscultations together with a specialist at his/her visits at clinics as an orthodontic consultant – provides to the students an early experience of knowledge and skill needed in their future duties.
- Co-operation with Paediatric Dentistry for a multidisciplinary judgement of the oral development and need in children.
- Examination where the student act in their role as a dentist strengthen the expectations of the teaching as relevant for their future needs as dentists.

10. Plans for future changes
More integrated training with Paediatric Dentistry for the training of an overall assessment of dentofacial deviations and oral diseases and injuries.

11. Visitors Comments
9.2 Paediatric Dentistry (Child Dental Health)

Professor Svante Twetman, DDS, PhD, Department of Odontology/Paediatric Dentistry
E-mail: svante.twetman@odont.umu.se

1. Introduction
Paediatric dentistry is an interdisciplinary subject in which basic elements from a number of disciplines within dentistry, medicine and behavioural science are brought together and applied on the growing individual. The course corresponds to 7 credits and the clinical training runs parallel with a theoretical program during the 9th and 10th semesters.

2. Primary Aim
- To give students understanding and knowledge of child oral health in relation to general health and conditions in the society
- To give students opportunity to acquire knowledge and skill for examination, diagnosis, risk assessment, prevention and treatment of oral diseases in childhood

3. Main objectives
- Understanding of the normal somatic growth and psychological development in childhood
- Understanding of oral diseases in children and how they relate to general health and to social and economic factors in society
- Understanding of how child dental health is organised in Sweden
- Confident with behaviour management techniques for children at various ages
- Confident in methods of prevention of oral disease in individual children as well as on the group level concerning effectiveness and efficiency
- Confident in the diagnosis, risk assessment, therapy planning and operative treatment of oral diseases in children and adolescents
- Confident in pain management in children and adolescents, including, anaesthesia and methods of sedation
- Understanding how to plan and perform prevention and intervention of oral diseases in cooperation with dental hygienists

4. Hours in the Curriculum
Theoretical teaching (including Pediatrics): A series consisting of 41 lectures, each of them with 45 minutes duration plus 10 group demonstrations of 2-3 hours each (9th semester) and five 1-2 hour demonstrations during the 10th semester. Clinical training: 1½ four-hour session every week for 40 weeks, a total of 200 hours. The time spent treating patients is about 160 hours.

5. Method of learning/teaching
The students are divided into groups 10-14 with 1-2 senior clinical teachers. The teachers provide a series of theoretical and clinical-practical demonstrations, mainly during the 9th semester. The clinical training is directed towards a gradual independence. After each clinical session, the group is gathered and the students are encouraged to reflect on their own work, what problems they did encounter and what they did to manage the problems. They are also asked to reflect
whether they had or lacked knowledge for the clinical activities and thus, depending on the outcome, formulate their own learning goal. The teachers aim to give each student the support and challenge that he or she needs for personal and professional development. The teachers give feedback not only on technical procedures but also on attitudes and management skills. The clinic is integrated with orthodontics in joint clinical sessions and case discussions.

6. Assessment methods
There is a continuous assessment after each clinical session. The students make a self-assessment validated by the group teacher. A 3-hour written examination is given at the end of the 9th semester. The final assessment at the end of the 10th semester is a group setting in which each student is examined verbally concerning attitudes to children’s dentistry as well as theoretical and clinical knowledge within the subject.

7. Strengths
The pediatric dental clinic is organized as part of Public Dental Health Clinic that responsible for 12,000 children. The child patients are in common and the same dental record is used. This is a great advantage, since the students are guaranteed a broad spectrum of patients and furthermore are able to work as dentists within this organization for 6-8 weeks during the summer break between the 9th and 10th semesters. This gives them a unique opportunity to improve their clinical experience and skills. The close association with the Specialist Clinic provides the students with insight and understanding of the full spectrum of referred patients, including medically compromised children and rarely seen cases. The personnel are extremely experienced and consistent which facilitates the student’s clinical training.

8. Weaknesses
Like most programs in paediatric dentistry, the course cannot provide enough clinical experience in traumatology and management of emergencies. Although the clinical setting is shared with Orthodontics, the courses are yet only partly integrated.

9. Innovations and Best Practices
- Elective course in nitrous oxide sedation (5 credits) – each year, 10 of the students at the 10th semester are offered a comprehensive course in oral, rectal and N₂O sedation for paediatric dentistry patients giving full competence and eligibility for clinical performance approved by the National Board of Health and Welfare.
- Pedagogic efforts – a new textbook in Pediatric Dentistry has been published this year in which three of the staff members have collaborated as authors.
- Access of patients – the agreement with the Public Dental Health enables and guarantees a sufficient number of child patients for each student

10. Plans for future changes
- A totally digitised dental record with notes and appointment book will be installed in collaboration with the Public Dental Service and launched for the students in time for the autumn semester 2002.
- A new textbook in paediatric dentistry was recently published and will form the base for a new curriculum. The number of lectures will be re-
duced by 50% and a more “problem based” form of learning will gradually be introduced. Parts of the lecturing and clinical programme, such as caries prevention and fissure sealing, will be integrated with the dental hygienist’s programme.

- An administrative merging of Paediatric Dentistry and Orthodontics is under discussion. This will enable a new single patient reception with improved service towards students as well as patients.

**11. Visitors Comments**
Section 10 – Public Dental Health and Community Dentistry

10.1 Public Dental Health and Community Dentistry

Senior lecturer Anders Wänman, DDS, PhD, Department of Odontology
E-mail: anders.wanman@odont.umu.se

1. Introduction
The course is entitled “Public Dental Health and Community Dentistry” and scheduled to the 10th semester. The course is accounted 3,5 academic credits.

2. Primary Aims
The students shall:
- gain knowledge of the socio-political ethical, judicial basis, financial and personnel resources for dental care in Sweden and in some European countries
- gain knowledge of the distribution and severity of the oral diseases, the importance to monitor diseases and models for organisation of dental care
- gain knowledge of group dynamics and leadership.

3. Main objectives
- Oral health in Sweden and in European countries
- Organisation of dentistry in Sweden and European countries
- Laws and Legislation
- Epidemiological methods
- Management and leadership
- Evaluation of treatment outcome and cost-benefit

4. Hours in the Curriculum
Lectures, seminars, examination 56 hours
Time for group project 50 hours

5. Method of learning/teaching
Based on lectures and on working in groups (5-6 persons) aiming certain questions and presenting the results to the class.

6. Assessment methods
Oral examination. The objective can be to present an oral health plan (staff, method, economy) based on certain conditions in society. External examiners/observers are sometimes used (Head of Public Dental Health, Head of the Social Board of Health and Well-fare)

7. Strengths
The students have reached a level of knowledge in dentistry where they can identify the individual treatment needs and they have also been trained in all clinical disciplines. They are therefore mature in the sense that they can image
the treatment needs from the population point of view and also discuss dentistry from the perspective of the community, public health and economy.

8. Weaknesses

9. Innovations and Best Practices
The group projects
Leadership and group dynamics

10. Plans for future changes
The course has only been running in the present design two times. Evaluation will be the basis for continuous quality improvement.

11. Visitors Comments
Section 11 – Restorative Dentistry

11.1 Conservative Dentistry

Professor Nicklas Strömberg, DDS, PhD, Department of Odontology/Cariology
E-mail: nicklas.stromberg@odont.umu.se

1. Introduction
The basic aspects of caries are taught in the “oral biology course” in the 3rd semester. A “preclinical cariology” course in the 5th semester introduces the student to the clinic and in semesters 6-8 clinical cariology is lectured integrated with other disciplines.

2. Primary Aims

- To identify risk patients and apply appropriate preventive strategies, both at an individual and population level, to identify caries and provide treatment considering underlying life-style and genetic factors.

- To perform up-to-date operative, restorative treatment of caries lesions based on tissue preservative, adhesive strategies, that restore tooth function and aesthetics over extended time.

3. Main objectives

- caries epidemiology and disease pattern, life-style and genetic factors underlying disease, and to estimate and measure those factors.

- risk assessment and preventive strategies, both at an individual and population level and based on underlying disease-factors.

- caries diagnostics and caries-treatment strategies based on underlying disease factors.

- principles for operative, restorative treatment with adhesive materials (e.g. composites).

- tissue preservative operative strategies in accordance with patients needs (e.g. esthetics)

- to integrate all aspects relating to dental caries to the best of the patient, both at an individual and population level.

4. Hours in the Curriculum
A student can spend a maximum of 302 hours for patient treatment training, divided among a total of 64 weeks during semester 5 (2.0 credits), 6 (5 credits), 7 (5 credits) and 8 (2 credits), and distributed as follows:
Semester 5: 4 weeks with 8 hrs/week,
Semester 6: 10 weeks with 4 hrs/week and 10 weeks with 8 hrs/week,
Semester 7: 10 weeks with 7 hrs/week and 10 weeks with2 hrs/week,
Semester 8: 10 weeks with 4 hrs/week and 10 weeks with2 hrs/week.
On an average, this corresponds to a patient treatment of 6.6 hrs/week during semester 5 and 6 and 3.75 hrs/week during semester 7 and 8.

5. Method of learning/teaching
Theory is taught mainly by lectures, but also in group seminars and demonstrations.
Clinical training is performed in groups of 10-14 students supervised by 2-3 tutors with different expertise.

6. Assessment methods
The theoretical understanding is estimated by written examinations step-by-step. The clinical practice is estimated/evaluated by the clinical tutor(s) in a step-wise-fashion. The combined clinical and theoretical understanding is then explored at a board examination, where the student, both in a written and oral context, present plans for treatment and prevention in selected patient cases.

7. Strengths
Highly active cariology-related research at the Department, allowing transfer of up-front knowledge to the students, and several teachers with long experience and high interest in cariology.

8. Weaknesses
Shortage of well-educated tutors with high specialization in cariology. The poor integration of operative and "biological" disease-underlying aspects in the clinical practice by students. The "broad" expertise of the clinical tutors does not educate the student fully as relates to the aforementioned aims and goals.

9. Innovations and Best Practices
The education part relating to the on-going, active research in cariology.

10. Plans for future changes
Reorganisation of the institution and public health part is planned and partly undertaken.

11. Visitors Comments
11.2 Endodontics

Professor Göran Sundqvist, DDS, PhD, Department of Odontology/Endodontics
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1. Introduction
Endodontics is studied and practised from the 5th to the 10th semester. A preclinical theoretical and practical course is given in the 5th semester, and a clinical course supervised by specialists in endodontics during the 6th semester. A theoretical course and seminars are given in 7th semester when also the clinical work with patients in the comprehensive care clinic starts.

2. Primary Aims
The students should have a detailed knowledge of the aetiology, pathology, clinical presentations and treatment options for diseases affecting the pulp and periapical tissues. The students should be able to plan, organise and perform an endodontic treatment.

3. Main objectives
- Have an in-depth knowledge of the biology, anatomy and physiology of the oral and perioral tissues
- Have an understanding of the microbiology and immunology of pulpal and periapical disease
- Have a detailed knowledge of the differential diagnosis of oro-facial pain including that arising from injury to the dental pulp and periapical tissues
- Have a detailed knowledge of the principles and practice of prevention of diseases of the pulp and periradicular tissues
- Have a detailed knowledge of the principles and practice of non-surgical root canal treatment for vital and non-vital de novo cases, and non-surgical root canal re-treatment
- Have knowledge of the principles and practice of dental trauma
- Have a detailed knowledge of the principles and practice of the management of endodontic emergencies
- Be able to diagnosis and plan treatment for patients who require surgical endodontics

4. Hours in the Curriculum
Lectures: 50 hours
Clinical practise: 250 hours

5. Method of learning/teaching
Theory is taught mainly by lectures, but there are also seminars, practical sessions in groups and demonstrations for small groups. Specialists teach and supervise the students in the clinic during 5th and 6th semester.

6. Assessment methods
Written tests following each course. One test after the pre-clinical course/clinical demonstration course; if the test is passed the student is allowed to work with patients. There is a final examination on the whole endodontic curriculum towards the end of the fourth year.
7. **Strengths**
It is an advantage that the theoretical education and most of the clinical training is given by specialists in endodontics. The start with a pre-clinical course followed by work on phantom heads before the student is allowed to treat patients is fundamental for the training and control of the skills of the student.

8. **Weaknesses**
As the students have too little training in conservative dentistry, endodontics becomes difficult. A delay with one semester would be preferred. The integrated clinic has also meant that non-specialists teach endodontics, which is a clear disadvantage. There is also a shortage of suitable patients.

9. **Innovations and Best Practices**
   - Introduction of the use of microscopes in the endodontic treatment
   - Use of ultrasound devices
   - Use of rotating instruments in the preparation of canals

10. **Plans for future changes**
The reduced teaching staff and the problem with recruiting qualified teachers means that the education needs to be changed. One way would be to use computer-based methods for learning.

11. **Visitors Comments**
11.3 Fixed and Removable Prosthodontics

Professor Margareta Molin, DDS, PhD, Department of Odontology
Prosthodontics
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1. Introduction
Prosthetic Dentistry is taught during the 6th, 7th, 8th and 9th semester. The preclinical training of fixed and removable prosthodontics, including temporary replacement and impressions are taught during the 4th and 5th semester during the material science course. During the 6th semester the professors and specialists in prosthetic dentistry give the basic clinical course including theoretical and clinical work in prosthetic dentistry. During the 7th, 8th and 9th semester teachers at the comprehensive care clinic including specialists in prosthetic dentistry supervise the clinical work with patients.

2. Primary Aims
The aims are that the student after completion of the course should have

- theoretical knowledge about possibilities and methods for endeavouring, with the help of prostheses, to recreate and maintain for the patient an optimal oral status both functionally and socially. The biological effects of the material should also be considered.
- practical experience of clinical work using recognised means and methods for prosthetic treatment of cases commonly found in general practice.

3. Main objectives
The student should

- Know the basic terminology and treatment procedures in prosthetic dentistry
- Know indications for prosthetic treatment
- Know how to make a proper treatment plan and identify the needs of the patient
- Know effects of prosthetic treatment on biological tissues
- Know the clinical and laboratory procedures connected to the fabrication of prosthodontic constructions including composition and qualities of dental materials used for prosthetic rehabilitation
- Be able to treat a patient with fixed and removable prosthetics including tooth preparation for post and cores, crowns, bridges, complete dentures, relining of dentures and removable partial dentures
- Be able to inform the patient about preventive strategies and dental hygiene in connection with prosthetic constructions.
- Know the scientific basis for, techniques for and prognosis of different implant systems.
- Have knowledge about alternative prosthodontic treatment in complicated edentulous and partially dentate cases.

4. Hours in the Curriculum
The curriculum consists of 12 weeks full time studies in prosthetic dentistry divided in 4 semesters.
Lectures and examinations: 86 hours (semester 6-8).
Demonstrations: 12 hours (semester 6)
Clinical training:
Semester 6: 18 weeks/8 hrs/week
Semester 7: 10 weeks/8 hrs/week, 10 weeks 6 hrs/week
Semester 8: 19 weeks/4 hrs/week
Semester 9: 20 weeks/4 hrs/week

5. Method of learning/teaching
Theory is taught by lectures, group demonstrations and group seminars. Each student performs clinical training. Each group of students (13-15) are supervised by 2 specialists in prosthetic dentistry during the 6th semester. During the 7th, 8th, and 9th semester specialists from different fields including prosthetic dentistry supervise the students in the comprehensive care clinic.

6. Assessment methods
Clinical examinations of each patient treated. Written tests following each course. The final examination (written) includes the whole curriculum in prosthetic dentistry both theory and clinical understanding.

7. Strengths
All theoretical education as well as the clinical supervision during the first course (6th semester) is given by specialists in prosthetic dentistry and by very experienced teachers. Most of the teachers have a PhD. All teachers have a pedagogical education specially designed for university teachers and given by the Department of Pedagogics at Umeå University.

8. Weaknesses
The education in prosthetic dentistry starts to early and the basic training in conservative dentistry is insufficient. The treatment needs of available patients are often too complicated for the students, which results in an increased need for supervision. A closer integration with the course in dental material science should be preferred.

9. Innovations and Best Practices
- A textbook in fixed prosthodontics has been published during 2000. Two of the chapters are produced by the professors at the Department.
- Development of a multimedia prototype for teaching total prosthetic dentistry.
- Development of a prototype of the edentulous oral cavity, using virtual reality (VR). The model is to be used in teaching prosthetic dentistry to undergraduate dental students. The student will be able to examine structures in the oral cavity and to see structures that normally cannot be seen. The purpose is also to simulate structural changes over time, for example in connection to periodontitis, edentulous conditions or when the patient is treated with prosthesis.

11. Visitors Comments
11.4 Occlusion and Function of the Masticatory System

Professor Per-Olof Eriksson, DDS, PhD, Department of Odontology/Clinical Oral Physiology
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1. Introduction
The course in Clinical Oral Physiology is given within 8 weeks full-time study, and contains three parts distributed over six semesters, from the second to the fifth (last) year of education.

First part
Semester 4  1.5 credits Preclinical work. (Laboratory course)
Semester 5  2.5 credits Preclinical and clinical work

Second part
Semester 6  1.5 credits Clinical work

Third part
Semester 7  1.0 credit Integrated clinical work
Semester 8  0.5 credit Integrated clinical work
Semester 10  1.0 credit Integrated clinical work

Examination
Semester 4  Written examination
Semester 5  Clinical/oral examination, written examination
Semester 6  Written examination. Final written examination

2. Primary aims
- Give our students knowledge on structure and natural sensory-motor control of the jaw and head-neck motor systems, as a basis for education in mechanisms behind dysfunction,
- and clinical training in assessment and management of dysfunction and pain in the jaw-face and head-neck regions.

3. Main objectives
Attitude
A general policy of the staff-members of the Department of Clinical Oral Physiology, Umeå University is to behave so that students will gain not only a high standard of theoretical knowledge and clinical skills, but, very important, also a positive attitude to the subject.

Conceptual frame of research, education and clinical work in Clinical Oral Physiology.

The concept includes
“Structure and function of the Cranio-Cervical-Mandibular region”
The basis is “Movement”. Movement is one definition of life. When movement is hampered, whatever the reason may be, the individual is more or less invalid to perform activities of daily living. In fact, the ultimate goal of all health care professionals is to preserve, improve or regain natural movements.

A second standpoint is that “functional jaw movements” are the result of activation of jaw as well as neck nerves and muscles, leading to movements in the temporomandibular, atlanto-occipital and cervical spine joints. Consequently, both the theoretical and the clinical parts of the course include the functional integration of the jaw and the head-neck regions in health and disease of jaw function.

With this in mind and focusing on natural jaw function, the course includes knowledge and understanding about structure/anatomy and biomechanics of joint and muscular systems of the jaw and neck region, neuroanatomy of peripheral and central nervous systems in the cranial and cervical regions, peripheral and central nervous control of joints and muscles, how teeth/occlusion interact with the joints, muscles and nervous system.

On basis of knowledge about structure and natural sensory-motor control of the jaw and head/neck motor systems the student will be prepared to learn about dysfunction of the jaw and head/neck sensory-motor system, meaning impairment of:

- Movement-amplitudes of mandibular and head/neck movements,
- Speed of movement,
- Force production,
- Endurance of jaw actions and, finally
- Timing, temporal coordination of integrated mandibular and head-neck and facial skin movements.

and about longstanding pain conditions in the mouth-jaw-face-head-neck.

The most important cause of derangement of natural sensory-motor function of the musculoskeletal system is pain. The course includes mechanisms of pain, and how pain can disturb and impair fine as well as gross motor behaviour.

The curriculum contains education about the relation between overuse or misuse of jaw structures and pain in the mouth-jaw-face-head-neck.

The detrimental effects of mental stress, and the interaction between mental and physical overload on the musculoskeletal system are significant parts of the course.

Special emphasis is put on assessment and management of dysfunction/diseases of the temporomandibular joint.

A main issue of the course is to prepare the students so that they with self-confidence

- can and will apply their knowledge and skills in natural jaw function in their everyday clinical practise.
- can and will perform a systematic clinical examination followed by.
- differential diagnosis to distinguish symptoms and signs of artrogenous from those of muscular origin and thereafter.
• suggest treatment, decide goal of treatment, and evaluate treatment outcome (prognosis of treatment).

Education in strategy and behaviour directed to prophylactic work/actions, to avoid dysfunction is an important part of the course.

A general aim is to help the student to mature and embody a professional attitude and behaviour in the interaction with patients, colleagues etc.

Finally, the parts of the curriculum which underlines “Why” clinical intervention should or should not be performed (mechanisms on function and dysfunction) are mainly approached in lectures and discussions, whereas knowledge about “How” assessment and management etc. should be done is given preferentially during the clinical sessions of the course.

4. Hours in the Curriculum
Lectures: 50 hours (semesters 4 - 6)
Preclinical training: 70 hours (semesters 4 – 5)
Clinical training: 200 hours (semesters 5 – 8 and 10)

5. Method of learning/teaching
The education is based on lectures, demonstrations, laboratory work, clinical training, and clinical discussions. Continuous feedback on achieved results.

6. Assessment methods
Clinical examinations, oral and written examinations. Continuous follow up of clinical work. Evaluation of skills and professional maturity and judgment.

7. Strengths
The course extends from the second to the last year of the Curriculum. This gives students the opportunity of long-term follow up of patients and evaluation of diagnostics and treatment outcome.
Studies during the integrated part of the course, in semesters 7, 8 and 10, allow training in clinical examination and decision making of “general patients”, which importantly mimics the intended clinical behaviour in future general praxis.
Among numerous patients referred to the Department, suitable patients can be selected for students.

8. Weaknesses
Not all of the teachers are trained specialists. A programme for education/clinical training of teachers is presently going on.

9. Innovations and Best Practices
Recent improvement of the general curriculum focuses on integrated clinical training during the 7th semesters to the 10th. This allows the implementation of clinical examination of “routine” dental patients, as a standard behaviour in future general practice.

10 Plans for future changes
See 8 and 9 above.


11. Visitors Comments
Section 12 – Periodontology

12.1 Periodontology

Senior lecturer Lennart Hänström, DDS, PhD, Department of Odontology/Periodontology
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1. Introduction

During the 3rd semester basic aspects (etiology, pathobiology and pathogenesis) of diseases of the periodontal tissues are taught in an integrated course in "Oral Infectious Diseases". During 4th semester methods for mechanical and chemical plaque control are studied and during 5th to 8th semesters a clinical course in periodontics is given. During semesters 5 - 6 the clinic is integrated with cariology and from semester 7 also with endodontics, stomatognathophysiology and prosthetic dentistry. A separate course in periodontal surgery and oral surgery is given during semester 8. From semester 9 the students receive no further teaching from periodontal specialist teachers.

2. Primary aims

- Students should be able to carry out prevention and to diagnose and treat patients with periodontal diseases.
- Students should understand periodontal infections as risk factors for other medical conditions and diseases.

3. Main objectives

- To have profound knowledge of tooth and periodontal anatomy and understand its role for microbial biofilm formation and for periodontal disease.
- To have profound knowledge of infection, inflammation and immunity in periodontal diseases and the role they play as risk factors for other diseases.
- To be able to identify and understand local and systemic aggravating factors for periodontal diseases.
- To be fully acquainted with the methods for periodontal examination, to understand the clinical features for acute and chronic periodontal diseases and to be able to diagnose and diseases of the periodontium.
- To be fully acquainted with all methods for obtaining good oral hygiene and with hand- and ultrasonic instruments for scaling and root planing.
- To be able to evaluate results of initial therapy and to make decisions for periodontal surgery if necessary.
- To be able to perform open debridement with flap surgery and to do gingivectomy with scalpel and electrotome.
- To have knowledge about surgical methods for regenerative periodontal treatment.
- To have broad knowledge about antibiotic prophylaxis in dentistry and the use of antibiotics in the treatment of periodontal diseases.
- To be able to evaluate healing after surgery and to design individual maintenance programmes based upon risk evaluation.
4. Hours in the curriculum
Semester 3
Lectures, 15 hours (given in the integrated course "Oral Infectious Diseases")
Semester 4
Lectures and table demonstrations 12 hours (given in the integrated course "Clinical Introduction")
Semester 5 (2.0 credits)
Lectures, 12 hours, desk demonstrations, practice on phantom models and clinical demonstrations, 24 hours, and clinical treatment, 16 hours
Semester 6 (2.5 credits)
Cathedral lectures and seminars, 22 hours.
Clinical treatment, 80 hours.
Semester 7 (2.5 credits)
Lectures, 14 hours.
Clinical treatment, 60 hours.
Semester 8 (1.5 credits)
Clinical treatment, 60 hours.

Comment: Patients are treated in a comprehensive treatment clinic under partial or full integration with other clinical subjects. It is therefore not possible to give detailed information about the number of hours allocated to periodontal treatment alone. The hours given above should be seen, as the maximum periodontal treatment time for students with patients who have a high periodontal treatment need.

5. Methods of learning/teaching
Lectures, demonstrations, practice on phantoms, clinical demonstrations, and seminars. Individual tutoring with treatment planning of patients. The clinical training is performed in groups of 10 - 14 students under supervision of 2 -3 dentists with specialist license and representing various specialities. Periodontal surgery is performed in an operation theatre with 2 students, one periodontist and two dental nurses.

6. Assessment methods
Written examinations each semester and a "Tentamen Rigorosum" (4 hours written examination and presentation of treated patients).

7. Strengths
A multidisciplinary approach in the comprehensive care clinic always puts the patients treatment needs in focus. This is important, especially for the teaching during semesters 7-8.

Students are allowed to do periodontal surgery on patients under treatment in the specialist clinic. The specialists, who are also tutors in the student clinic, bring their patients to the surgical sessions.

8. Weaknesses
There may be problems to find patients with advanced forms of periodontal diseases for treatment in the student clinic. Some students treat patients with only light or moderate periodontitis. The students in semesters 5 - 6 feel stress since they are flooded with too much clinical information and should benefit from a "softer" start. The integrated teaching in the comprehensive care clinic should not commence earlier than semester 7.
9. Innovations and best practices

- Plaque formation during 72 hours without cleaning of the teeth is studied in a full class. Variations in plaque formation rate are discussed on individual and group basis.

- Each student takes bacterial samples for culture from periodontal pockets before and after treatment. Comparisons are made between changes clinical in parameters and the bacterial flora.

- Every student has his/her own hand instruments for scaling and root planing and the instruments can be traced back to the owner since they have identity labels.

- Preclinical training of periodontal surgical techniques on pig jaws.

10. Plans for future changes

We are planning to start cooperation between dental students and dental hygienist students. This will prepare the students for the teamwork, which is expected, from dental professionals in public and private dentistry.

11. Visitors Comments
Section 13 – Oral Surgery, Dental Radiography and Radiology

13.1 Oral and Maxillo-facial Surgery

Professor Stefan Lundgren, DDS, PhD, Department of Odontology Oral Surgery
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1. Introduction
Oral surgery is introduced into the curriculum in the 5th semester with a course in, anaesthesiology, and continues in the 8th semester with oral and maxillofacial surgery. In the 10th semester, there is an additional elective course in oral surgery.

2. Primary aims
Knowledge about dental anaesthesiology and minor oral surgery and to have skills for proper oral surgical diagnosis and necessary treatment.

3. Main Objectives

- Master dental local anesthesia, pain control and conscious sedation.
- Assess the patient’s general health and the consequence for the planned treatment and the need for referral of the patient to a specialist.
- Diagnosis and treatment of tooth extraction, impacted third molars, infections in the oral cavity, dental traumatology, oral soft tissue injury and diseases of the oral mucosa.
- Diagnosis of dento-facial anomalies, facial traumatology, oral benign and malignant tumors.
- Understand the principles of maxillofacial surgery and dental implantology.

4. Hours in the curriculum
Anesthesiology (local anesthesia, pain control and conscious sedation) 26 hours
140 hours (Including 80 clinical hours with patient treatment)

5. Method of learning/teaching
Anesthesiology: Demonstrations and seminars. Clinical training of local anaesthesia on volunteers (fellow students) under supervision of a teacher.

Oral and maxillofacial surgery: Lectures and seminars. Clinical course with extraction of teeth, oral surgery diagnosis and treatment. Assistant during oral and maxillofacial surgery performed by senior teachers. The clinical course is focused on dentoalveolar surgery, i.e. removal of impacted mandibular third molars performed by the student with a fellow student as assistant.

6. Assessment methods
Anesthesiology: Diagnostic course.
Oral and maxillofacial surgery: Final written examination during the 8:th semester.

7. Strengths
Extensive clinical course including own dent alveolar surgery.
8. Weaknesses
The scientific feedback including information retrieval is neglected by the students. They have a tendency to overestimate the clinical part of the education.

9. Innovations and plans for the future
   - Audiovisual library, CD Rom and DVD with basic oral and maxillofacial surgical principale teaching for interactive studies.
   - Participation in telemedicine conferences.
   - Implantology as a natural part of the dental treatment planning. Integration of dental implant surgery in the dentoalveolar surgical course.

11. Visitors Comments
13.2 Radiography and Radiology

Professor Annika Isberg, DDS, PhD, Department of Odontology/Oral and Maxillofacial Radiology
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1. Introduction
Oral and Maxillofacial Radiology is taught during the 1st, 3rd, 4th and 9th semesters. The first two parts are integrated in the courses “Clinical Introduction” and “Oral and Craniofacial Biology”. The latter two parts are clinically oriented, focusing on radiographic examinations and diagnosis, but they also include radiographic techniques, radiation physics and biology.

2. Primary Aims
The aim is that the student, when qualified as a dentist, shall be able to utilize radiographic techniques properly and to make radiographic diagnoses correctly in general dental practice.

3. Main objectives
- Indications for radiographic examinations
- Design of radiographic examinations
- Radiation protection
- Radiographic techniques
- Darkroom processing
- Radiographic interpretation
- Differential diagnosis
- Trouble-shooting and feed-back

4. Hours in the Curriculum
Semester 1: 7 hours.
Semester 3: 10 hours
Semester 4: 143 hours, including 36 hours of radiographic examinations of patients
Semester 9: 49 hours, including 8 hours of radiographic examination of patients in our Department and 12 hours of radiographic examination integrated into the course "Oral Diagnosis".
In addition the students perform intraoral radiographic examinations in other Departments of the Dental School as part of diagnosing and treating patients.

5. Method of learning/teaching
- Lectures as review and guidance for literature studies
- Laboratory work concerning radiation physics, including written reports
- Preparatory training in radiographic intraoral examination techniques on phantoms
- Radiographic examinations of patients including written reports
- Group seminars with the main focus on radiographic interpretation and differential diagnosis based on slide presentations and computer aided presentations. Presentations for self-studies are available on computers on the premises and some are also available on the web.
6. **Assessment methods**
- Written examination after each of the four semesters
- Written reports covering laboratory work
- Oral examination in small groups after the 9th semester
- Quality assessment of radiographic examinations

7. **Strengths**
We have a carefully prepared curriculum and the staff is highly qualified. Each teacher is a certified specialist and four hold a PhD. Clinical work is integrated with the Department of Radiology at the hospital, giving us access to the entire spectrum of radiographic equipment. Every teacher has taken the pedagogic course (5 university credits) given by the Department of Pedagogics at Umeå University Pedagogics and the pedagogic engagement is major (see scientific-pedagogic project below).

8. **Weaknesses**
We have not yet gone digital in the clinic and we have very old tomography equipment.

9. **Innovations and Best Practices**
- A method for caries calibration has been developed in our Department. In its latest version all images are digital.
- We have developed a prototype for Virtual Radiography, i.e. simulation of radiographic examinations in a virtual environment without the use of ionizing radiation. The prototype is used in a development and research project in co-operation with VRlab, and with supervision by the Departments of Pedagogics, Psychology and Design, all at Umeå University.
- Postgraduate courses in radiology nationally and internationally
- A textbook has been published this year by A.Isberg, publisher Taylor & Francis, London.

10. **Plans for future changes**
Implementing digital radiography, both for radiographic examinations performed at our Department and for demonstration of examinations archived in the PACS system at the university hospital. We argue that panoramic radiography should be integrated into the undergraduate curriculum.

11. **Visitors Comments**
Section 14 – Oral Medicine and Oral Pathology

14.1 Oral Medicine

Oral medicine is not given as a separate course. The content of oral medicine is included in the following courses: Oral surgery, Care of Special Needs Patients, Periodontology, Paediatric Dentistry and Oral Pathology.

14.2 Oral Pathology

Professor Ulf Lerner, DDS, PhD, Department of Odontology/Oral Cell Biology
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1. Introduction

Oral pathology is given mainly during the 4th and 5th semester when the students have passed the basic preclinical courses in histology, cell biology, biological chemistry and physiology which are required to understand the etiology, pathogenesis and histopathology of diseases in the jaws and oral mucous membrane. One part of the course is given during the 8th semester when the students have acquired some clinical experience and can take part in discussions on diagnosis and differential diagnosis based upon clinical appearance and histopathological examination.

2. Primary Aims

The primary aim is to give the students an integrated knowledge in clinical appearance, histopathological hallmarks as well as cellular and molecular aspects of diseases in the oral mucosal membrane and jaw bones. This knowledge should give a basis for the understanding of diagnostic difficulties and treatments of oral diseases and general diseases with oral manifestations and for the understanding of the etiology and pathogenesis of such diseases.

3. Main objectives

- based upon own experience in histopathology of oral diseases get an understanding in the process of making clinical diagnosis
- understand the cellular basis of oral diseases
- get an overview of the spectrum of oral diseases making it possible to require an understanding of the diagnostic difficulties and the problem of differential diagnosis
- get a detailed knowledge of the different clinical manifestations of malignant tumours and premalignant lesions in the oral mucosa and to understand the problems in the histopathological evaluations of such entities
- understand at a molecular level the interactions between pathological processes in the oral cavity (including jaw bones) and the surrounding tissues
- understand different biopsy techniques and their subsequent processing
- understand the cause and development of oral tumours

4. Hours in the Curriculum

Each student is given

- 33 hours as lectures for the whole class
• 16 hours as seminars for small groups
• 28 hours in a microscopic training course

5. Method of learning/teaching
• lectures
• seminars
• microscopic training

6. Assessment methods
One written examination

7. Strengths
The integration of clinic, histopathology, cellullar and molecular pathology for the understanding of the oral diseases.

8. Weaknesses
The small number of senior staff members permanently allocated to the Department in relation to the duties in the undergraduate teaching (which is consierably more than the course in oral pathology) and the teaching of the PhD-students – one full professor and one part time lecturer.

9. Innovations and Best Practices
The best parts of the course are the seminars and the integrated lectures in which teachers in both oral pathology and oral surgery are teaching simultaneously.

10. Plans for future changes
To use computer based teaching for the histopathological part of the course with interactive programs and to increase the number of seminars for small groups.

11. Visitors Comments
Section 15 – Comprehensive Dentistry, Dental Emergencies and Special Needs Patients

15.1 Comprehensive Dentistry

Senior lecturer Anders Wänman, DDS, PhD and Professor Johan Gunne, DDS, PhD
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1. Introduction

The course includes training in clinical treatment of adult patients. Integrated patient care is gradually introduced in the curriculum. The students undergo most of the clinical training in four comprehensive care clinics. Integrated patient care starts in the 5th semester with cariology and periodontology. This integration continues in the 6th semester. In the 7th semester endodontics, clinical oral physiology and prosthodontics are also integrated. Finally, in the 8th-10th semester in the students practice integrated patient care in the course Comprehensive Dentistry.

2. Primary Aims

The course shall promote both personal and professional development. The student shall be aware that every professional relationship is based on respect for the patient as a person. The student shall independently take care of adult patients within comprehensive dentistry.

3. Main objectives

- Every individual student is responsible for the total oral care of all his/her patients according to what is mentioned under the heading of no. 1.
- Examine, diagnose, document, plan treatment and carry out treatment of patients within regular dental care.
- Evaluate the effect and the prognoses of the treatment.
- Take care of emergencies.
- Practise in teamwork together with a dental nurse.
- All treatment should be carried out with a holistic view of the patient. During all semesters the treatment of the patients shall be based on a continuous discussion with the teacher.
- The completed treatment of the patient should be concluded with a written summary. From this summary, and from the patient's medical status and the quality of the clinical part of the treatment the student shall estimate the prognosis. A follow-up protocol shall also be decided.

4. Hours in the Curriculum

Out of totally approximately 2.500 hours of clinical training about half is spent in a clinical environment arranged for integrated patient care. The total time for clinical training per week in the curriculum (5th – 10th semester) is varying from 16-24 hours.

5. Method of learning/teaching

Clinical training on patients with various needs of dental care.
Continuous discussion with teachers on treatment planning, treatment decision-making, performance and evaluation of the clinical steps. Seminars where each individual student presents and discusses her/his own cases before the staff and the other students.

6. Assessment methods
Continuous evaluation of the clinical work and of the student’s ability to integrate the theoretical knowledge with the clinical work. An overall assessment of student’s ability to examine, diagnose, plan and carry out treatment of adult patients. At the end of semesters 7th and 9th semester there are comprehensive examinations. At the end of the 9th semester the students are exposed to three to four complicated cases with information of the patient history and status. Photos and radiographs are also available. The students shall diagnose, design a treatment plan and forecast the outcome of the treatment. (For detail see Section 17 Examinations, Assessments and Competence)

7. Strengths
Good facilities and equipment are available. Skilfull staff. Patients are at hand. The ratio student/teacher and student/dental nurse is favourable for the student. The clinical supervision is multidisciplinary and most teachers are specialists.

8. Weaknesses
Some of the patients are too complicated to treat for the students during the first clinical semesters. Some teachers have difficulties to accept the integrated student clinic and hesitate to go outside their own specialities.

9. Innovations and Best Practices
The student has throughout the clinical training his/her own place of work. In the clinical environment the students see patients with various dental treatment needs under multidisciplinary supervision. Within the course Comprehensive dentistry the students also learn emergency treatment. On the 9th semester the student get patients directly “from the street”, makes an independent thorough examination, takes requisite radiographs, presents a treatment plan and discuss this in a seminar.

10. Plans for future changes
The timing of integration will be revised and may start later in the curriculum.

11. Visitors Comments
15.2 Dental Emergencies

There is no separate course in dental emergencies. However, the topic is covered within the courses of Comprehensive Dentistry, Paediatric Dentistry and Endodontics.

15.3 Special Needs Patients

Senior lecturer Birgitta Båckman, DDS, PhD, Department of Odontology/Paediatric Dentistry
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1. Introduction
This is a purely theoretical course and the students see no patients. Lectures in the oral health care of patients with special needs are given. In the lectures the relation between oral health and general health as well as other contributing factors are described. To respect the integrity of the patient is pointed out. The course corresponds to 9 credits and spans the 7th – 9th semesters.

2. Primary Aims
To provide knowledge of importance for clinical assessment, decision-making and care in the treatment of patients with special needs. To enable the student to apply this knowledge and motivate her/his decisions in clinically relevant cases.

3. Main objectives
- Knowledge of ordinary medical diseases and their treatment
- Confidence in dental care for the elderly
- Confidence in dental care of individuals with diseases interfering with dental treatment
- Confidence in care of patients with long-standing oro-facial pain
- Confidence in treatment of patients with severe dental phobia
- Confidence in treatment of patients with symptoms related to dental materials
- Knowledge of clinical pharmacology
- Have insight into ethics and dental care
- Knowledge of special dental care subsidy

4. Hours in the Curriculum
146 hours distributed as follows: 24 hours semester 7, 72 hours semester 8, and 50 hours semester 9.

5. Method of learning/teaching
Lectures, demonstrations and seminars. All parts are compulsory.

6. Assessment methods
Examination is included in the comprehensive so called stage-examination semester 9.

7. Strengths
The course highlights the complicated and important patients needing special
support in dentistry.

8. Weaknesses
The many lectures can make the students passive.

9. Innovations and Best Practices
The course strengthens the importance of oral problems as part of general well being

10. Plans for future changes
In future courses, the students will be activated in the form of problem solving in connection with the different conditions and emphasis will be put on own search for knowledge.

11. Visitors Comments
Section 16 – Behavioural Sciences

16.1 Behavioural Sciences

Senior lecturer, Jan Bergdahl, DDS, psychologist, psychotherapist, PhD, Department of Psychology
E-mail: jan.bergdahl@psy.umu.se

1. Introduction
The course “Psychology/Psychiatry”, which includes theoretical and clinical aspects of mental processes, functioning and dysfunctioning, comprises weekly lectures and seminars during the 5th semester. The first part of the course is dealing with general aspects of developmental-, individual-, interpersonal-, social- and clinical psychology as well as general psychiatric issues. The second part deals with the interface between odontology and psychology/psychiatry especially the psyche–soma interaction and dental anxiety.

2. Primary Aims
The graduates shall have basic knowledge and understanding of mental normal functioning and dysfunctioning as well as the connection between the psyche and soma.

3. Main objectives
- Basic knowledge and understanding of developmental psychology, primarily from a system-process perspective
- Basic knowledge and understanding of interpersonal processes
- Basic knowledge of psychiatric disorders according to DSM IV
- Basic knowledge and understanding of psychosomatic disorders: explanatory models, diagnostic methods and treatment
- Basic knowledge and understanding of oral psychosomatic symptoms, amalgam sensitivity, environmental illness and dental anxiety
- Basic knowledge of psychological treatments: psychodynamic, cognitive, behavioural, affect focusing therapy and therapeutic alliance
- Clinical case presentations and discussions

4. Hours in the Curriculum
The scheduled time is 30 hours.

5. Method of learning/teaching
Mainly traditional lectures accompanied by seminars.

6. Assessment methods
The assessment method is an individually written paper that is presented in a seminar. Open discussions and questionnaires are used to evaluate the student’s opinion of the course.

7. Strengths
Experienced and competent academic staff.
8. Weaknesses
Short duration. The course should continue with booster lectures later on when the students have more clinical experiences

9. Innovations and Best Practices
The implementation of a bio-psycho-social model with a dynamic system approach.

10. Plans for future changes
In the future, there is an ambition to integrate basic theoretical knowledge of behaviour science into clinical practice.

11. Visitors Comments
16.2 Communications

Communications is given in the course “Clinical introduction”, 4th semester.

16.3 Ethics & Jurisprudence

Ethics and Jurisprudence is given in the courses “Clinical introduction”, “Care of Special Needs Patients” and “Public Dental Health and Community Dentistry”.

16.4 Elective Courses

During the 10th semester, the students decide on an elective course, corresponding to 5 credits. The two most frequently selected are Conscious Sedation and Panoramic Radiology.

Conscious sedation

Specific aims:
- To provide knowledge in preoperative assessment, analgesia and conscious sedation.
- To provide clinical knowledge of oral and rectal sedation including N₂O sedation.

Main objectives:
- Knowledge of anatomy, physiology, fluid balance and circulation
- Patient psychology
- Pain physiology
- Preoperative sedation and pain control
- General anaesthesia
- Preoperative sedation using benzidoazepines or N₂O sedation

Methods of learning/teaching and assessment

About 120 hours in the curriculum are distributed as follows: 37 hours lectures and seminars; 80 hours clinical demonstrations and treatment of patients. Assessment methods: evaluation of clinical work and written examination

Panoramic radiography, certificate course and interpretation of radiographs

In Sweden panoramic radiography is not integrated into the undergraduate curriculum. Swedish dentists need to attend a separate course to get a certificate that permits use of panoramic equipment. The present course is aimed to give the student knowledge that qualifies for a certificate.

Specific aims

After the course the students shall
- have basic knowledge of the function of panoramic radiographic equipment
- have basic knowledge of radiation doses in panoramic
- be able to assess indications for panoramic examinations
be able to perform a panoramic examination
have solid knowledge of interpretation of the diagnostic information in the images, including normal anatomy and differential diagnosis.

**Methods of learning/teaching and assessment**
- Lectures as review and guidance for literature studies
- Laboratory work concerning radiation physics, including written reports
- Preparatory training in panoramic examination techniques on phantoms
- Panoramic examinations of patients including written reports
- Group seminars with main focus on radiographic interpretation and differential diagnosis based on slide presentations and computer aided presentations. Presentations for self-studies are available on computers.

**Section 17 – Examinations, Assessments and Competences**

Senior lecturer Anders Wänman, DDS, PhD, Department of Odontology
Email: anders.wanman@odont.umu.se

**1. Overall approach to assessments in the school**

In general examinations take place at the end of a course. The exams can be written and/or oral. Mostly, short answer questions are used. A combination of written and oral examinations is also quite commonly applied.

In order to participate in an examination, students are normally required to have completed and passed a course, i.e. to have completed satisfactory all the educational elements of the course in question. A completed course that has not been examined is valid for four semesters. An extension of validity may be granted after special appeal; application should be made to the relevant faculty board or its delegated body. Students with a course grade “Pass” are obligated to participate in examinations at the prescribed time if they do not have valid reason to do otherwise. Absence without due cause is counted as one attempted examination.

Students who fail an examination, or are prevented by sickness from attending the first regular examination occasion, shall be given an opportunity to participate in a further examination within a reasonable period. If the first occasion falls close to a vacation, a further examination shall be arranged at the latest two weeks after the new semester begins.

Grades are awarded for each completed examination. The grades are Fail, Pass, and Distinction. In the final assessment of examinations grades, account will be taken of a student’s knowledge, capacity for independent and critical judgement, and independent problem-solving ability. In an estimation of clinical maturity, attention will be paid equally to clinical skills and attitude to patients.

For every course the number of examinations is restricted as follows:

Students who fail an examination on the first occasion have the right to two further attempts at new examinations. Student failing three times may apply for permission to repeat the course. Application should be made to the faculty board or its delegated body. Students advised/given the chance to repeat a course, with
consequently two further examination opportunities, but who do not pass are allowed no further attempts, and thereby forfeit their place on the Dentistry programme.

The Director of Studies is continually informed of students’ results via the course committees. A student who repeatedly fails one or more courses will be contacted by the Director of Studies for counselling and discussion of what may be the cause of the trouble.

The assessments of a student’s knowledge, skills and competence are both formative and summative, the former being an integral and on-going activity of all courses. Examples of both summative and formative assessment are the two comprehensive examinations (Stage examination).

At the end of the seventh semester, after having completed approximately 2/3rd of the clinical training practise, the students have to pass the first comprehensive examination. This is composed of four parts: a written account report of what they have done clinically (in numerical semesters), a written account report of every patient they have treated (an epicrisis), a self-estimation of their achieved clinical competence in approximately 50 clinical items (the clinical teachers and the nurses also make an evaluation of each student’s clinical competence) The examination is completed with a case, which is presented with case-history, some clinical data, photos and x-rays. The student shall present diagnosis, treatment plan and an evaluation of the total cost of the treatment. The assessment of the students’ results are done by an board examination board composed of three professors or senior lecturers from the clinical disciplines (cariology, clinical oral physiology, endodontics, periodontology, prosthodontics).

In the assessment of the student’s clinical competence, maturity and skills, attention is paid to the volume and differentiation of the clinical practise, to the achieved clinical quality/competence and how well they managed the case. The result is presented to the students individually. This moment serves as a feedback and it is thought to be a part of their maturity process. The student is informed about how much they have done in relation to the other students, the teachers evaluation of their ability and quality in relation to the student’s evaluation and how they managed the case in relation to “the best practice”.

Those who fail the exam cannot continue to the 8th semester. They can apply to start a new clinical training period from the 6th or 7th semester. The application is done to the faculty board or to its delegated body. Students who are given the opportunity to repeat the clinical training but who do not pass the 2nd examination are allowed no further attempts, and thereby forfeit their place in the Dentistry programme.

At the end of the 9th semester the 2nd comprehensive examination has to be passed. The students will face 3-4 cases with different oral diseases together with varying medical diseases and medications. They shall present diagnosis, identify specific proceedings necessary in relation to the patient’s health, and give a reasonable and motivated treatment plan and to motivate it.

The assessment of the students’ results are made by an examination board composed of the same professors or senior lecturers that examined them at the first comprehensive examination. The results are given back to the students as a
group and include discussions of the different treatment strategies that can be accepted.

The evaluation protocol used by students and clinical staff is presented below. The student is instructed to give each item a figure between 1 and 10 which best fits their own image of themselves. Some few examples of 1 credit and 10 credits as well as 5-6 credits are given. The clinical teaching staffs also assess the student in the same way.

**STUDENT ASSESSMENT 7th semester**

<table>
<thead>
<tr>
<th>General attitude</th>
<th>DISTINCTION 10-8</th>
<th>FAIL 3-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care of patients</td>
<td>Always, in every moment focused on the patient’s comfort. Always attention to pain and/or reactions of discomfort during anaesthesia, and during every single operation</td>
<td>Often focused on the patient. Can now and then be so concentrated on the operative task that the patient is partly forgotten</td>
</tr>
<tr>
<td>Pay attention to signals</td>
<td></td>
<td>Never, any care paid on the patient’s situation. Never pays any attention to signals from the patient</td>
</tr>
<tr>
<td>Personal behaviour</td>
<td>Always polite. Adjust very well the behaviour to the patient. Has never been involved in any dispute with a patient. Case history always with the patient sitting. Has never had any relevant complains on the behaviour from patients.</td>
<td>Adjust most often the behaviour to the patient. Has never been involved in any dispute with a patient. Give often the patient relevant information.</td>
</tr>
<tr>
<td>Co-operation with personnel</td>
<td>Excellent behaviour Always smooth and easy manners. Positive attitude to other personnel groups. Can give constructive criticism Always in time and well prepared. Always sends a message in case of non-attendance Always punctual</td>
<td>Often smooth and easy manners may have had some single complaints on the behaviour due to stress or similar.</td>
</tr>
<tr>
<td>Be punctual</td>
<td></td>
<td>Arrogant, and brusque to personnel Knows always best, Always critical. Never admits a failure. Creates conflicts whenever around.</td>
</tr>
<tr>
<td>Hygiene</td>
<td>Always clean clothes. Always highest standard of personal hygiene. Do always wash hands carefully before and after intraoral operations. Never contaminates the surrounding desks. Always keeps a good order on the tray</td>
<td>Often clean clinical clothes Often good hygiene. May do some mistakes but work in general with good standard of aseptic.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In general dirty clothes. Deficiency in personal hygiene, which has not changed after remark. Do not wash hands, contaminates surrounding desks as well as patients records. No feeling for an aseptic approach.</td>
</tr>
<tr>
<td>Administration</td>
<td>DISTINCTION</td>
<td>FAIL</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
<td>------</td>
</tr>
<tr>
<td>Records</td>
<td>10-8</td>
<td>7-4</td>
</tr>
<tr>
<td>Records</td>
<td>Always correct. Always written and signed within 2 weeks from the examination. The therapy and working-plan always ready before treatment starts. Always well-written notes of the treatments. Codes always correct. The records always in a good order.</td>
<td>Often correct. The vast majority is written without delay. The records are most often in good order. Codes often correct.</td>
</tr>
<tr>
<td>Letter of referral</td>
<td>Always excellent draft of how to write an answer.</td>
<td>Most often acceptable draft of how to write an answer.</td>
</tr>
<tr>
<td>Calling in patients</td>
<td>Always well planned. The best example of order when the patient shall be recalled.</td>
<td>Often good control of calls and recalls.</td>
</tr>
<tr>
<td>Preparation</td>
<td>Always well prepared. Always the necessary equipment.</td>
<td>Often prepared and with necessary equipment.</td>
</tr>
<tr>
<td>Cariology</td>
<td>DISTINCTION</td>
<td>FAIL</td>
</tr>
<tr>
<td>Clinical examination</td>
<td>10-8</td>
<td>7-4</td>
</tr>
<tr>
<td>Clinical examination</td>
<td>Always very carefully and correct performed. Registration of decayed-filled teeth always correct. Always correctly indications for taken x-rays. Always correct analysis of food and drink intake. Based on patients recall. Always correct technique when sampling saliva.</td>
<td>Most often correct registration of decayed teeth and defect fillings. Always a good- Motivation for taken x-rays. Acceptable knowledge in analysing food and drink intake. As in taking samples of saliva.</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Always correct diagnosis. Always a correct interpretation of data. Always a mature reasoning of background.</td>
<td>Often a correct diagnosis. Most often shows maturity and knowledge in the judgements.</td>
</tr>
<tr>
<td>Anaesthetics</td>
<td>Achieve always full anaesthesia.</td>
<td>Achieve most often good anaesthesia. Correct chose of anaesthetics.</td>
</tr>
<tr>
<td>Excavation of caries</td>
<td>Can excellently use theoretical principles in all types of clinical situations. Excavation always correct. Can always judge correctly when cavity is free of caries.</td>
<td>Excavation most often correct.</td>
</tr>
<tr>
<td>Working field</td>
<td>Always rubber dam when using composite Always high standard and control over the working field. The matrix always has perfect fitness</td>
<td>Always a clean and dry working field with a good control.</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td>Fillings plastic materials</td>
<td>Can excellently use theoretical principles in all types of clinical situations. The filling is always correct.</td>
<td>The result is most often acceptable.</td>
</tr>
<tr>
<td>Inlays, crowns</td>
<td>Can excellently use theoretical principles in all types of clinical situations. Always full control of every single proceeding</td>
<td>Manage with some help</td>
</tr>
<tr>
<td>Prevention</td>
<td>Can excellently use theoretical principles in all types of clinical situations. Always excellent instruction and information to patients</td>
<td>Can most often recommend adequate prevention strategy to the patient</td>
</tr>
<tr>
<td>Risk and prognosis</td>
<td>The standpoint always based on science and knowledge of the patients situation</td>
<td>Often reasonable evaluations</td>
</tr>
<tr>
<td>Parodontologi</td>
<td>DISTINCTION 10-8</td>
<td>7-4</td>
</tr>
<tr>
<td>Clinical examination</td>
<td>Always careful examination and correct registration of pocket-depth-defects etc. Always correct indications for x-rays.</td>
<td>Often correct registration of pocket-depth, plaque gingivitis etc. Have a good motive-for x-rays.</td>
</tr>
<tr>
<td>Diagnosis of periodontal lesions</td>
<td>Always correct diagnosis Always correct judgement of the status Always a mature reasoning of the establishment of diagnosis.</td>
<td>Most often correct diagnosis. Shows often good knowledge and maturity in the decisions - With reference to diagnosis.</td>
</tr>
<tr>
<td>Information</td>
<td>Always the best judgement of the patient’s oral needs and can always motivate the patient to improve his/her oral health care</td>
<td>Most often give correct information to the patient. The judgement of the patient’s oral needs is acceptable</td>
</tr>
<tr>
<td>Scaling</td>
<td>Always sharp instruments The result after scaling Always perfect and not “over done”</td>
<td>Scaling mostly well done</td>
</tr>
<tr>
<td>Risk and prognosis</td>
<td>The standpoint always based on science and knowledge of the patients situation.</td>
<td>Often reasonable evaluations.</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Endodontics</td>
<td>DISTINCTION 10-8</td>
<td>7-4</td>
</tr>
<tr>
<td>Clinical examination</td>
<td>Always careful examination and correct registration of signs. Always correct indications for taken x-rays Always correct differential diagnosis. Always correct judgement of previous endodontic treatments as well as other signs.</td>
<td>Most often correct registration and choose of method. Always a good motivation for taken X-rays Most often correct differential diagnosis. Often correct judgement of previous endodontic treatments as well as other signs.</td>
</tr>
<tr>
<td>Diagnostics</td>
<td>Always correct diagnosis Always correct judgement of the examination. Always a mature reasoning when diagnosis is established.</td>
<td>Most often a correct diagnosis. Often a mature reasoning when diagnosis is established.</td>
</tr>
<tr>
<td>Anaesthetics</td>
<td>Achieve always full anaesthesia</td>
<td>Achieve most often good anaesthesia Correct chose of anaesthetics.</td>
</tr>
<tr>
<td>Preparation</td>
<td>Can excellently use theoretical principles in all types of clinical situations Preparation always correct.</td>
<td>Preparation mostly correct.</td>
</tr>
<tr>
<td>Working field</td>
<td>Always use of rubber dam. Always aseptic proceed. Always best control over the working field</td>
<td>Always dry and clean working field and with good control</td>
</tr>
<tr>
<td>Sealing</td>
<td>Can excellently use theoretical principles in all types of clinical situations Sealing always optimal.</td>
<td>The result most often acceptable.</td>
</tr>
<tr>
<td>Sealing of sealing</td>
<td>Can excellently use theoretical principles in all types of clinical situations Always excellent fit of temporary crowns.</td>
<td>Manage well but need some help to know how.</td>
</tr>
<tr>
<td>Analysis of treatment</td>
<td>Can always in a mature way evaluate the individual result and give a proper explanation of why a complication occurred and how to avoid it</td>
<td>Most often a correct evaluation of the treatment and why some complication may have occurred</td>
</tr>
<tr>
<td>Risk and prognosis</td>
<td>The standpoint always based on science and knowledge of the patients situation.</td>
<td>Often reasonable Evaluations.</td>
</tr>
<tr>
<td>Prosthetics</td>
<td>DISTINCTION 10-8</td>
<td>7-4</td>
</tr>
<tr>
<td>------------</td>
<td>------------------</td>
<td>-----</td>
</tr>
<tr>
<td>Preparation fixed prosthesis</td>
<td>Can excellently use theoretical principles in all types of clinical situations. Always perform each step structured, prepared and knowledgeable.</td>
<td>Can mostly use theoretical principles in the clinical situations. Can mostly decide when the preparation can be accepted.</td>
</tr>
<tr>
<td>Taking impressions</td>
<td>Always optimal preparation for impression (border, clean, choose of method). Has the ability to always take excellent impressions.</td>
<td>Often well prepared for impression (border, clean, choose of method). Has the ability to most often take acceptable impressions.</td>
</tr>
<tr>
<td>Temporary crowns and bridges</td>
<td>Can identify the specific need, plan and carry out temporary substitutes which always fulfill high demands.</td>
<td>Can carry out temporary substitutes.</td>
</tr>
<tr>
<td>Removable prosthesis</td>
<td>Can identify the need of pre-treatment and to carry out the treatment</td>
<td>Need help to identify the need of pre-treatment. Can carry out the treatment.</td>
</tr>
<tr>
<td>Taking impression</td>
<td>Acceptable prepared the impressions mostly acceptable</td>
<td>Difficulties to take impressions. Needs always significant help from the teacher.</td>
</tr>
<tr>
<td>Registration of jaw position</td>
<td>Can excellently use theoretical principles in all types of clinical situations. Can always perform each step structured, prepared and knowledgeable</td>
<td>Can quite well use theoretical principles in the clinical situations. Can relatively well and independent decide when registration is acceptable.</td>
</tr>
<tr>
<td>Trying the fit of dentures</td>
<td>The evaluations of the denture is acceptably done</td>
<td>Has sever difficulties to evaluate the denture. Needs always help from teacher.</td>
</tr>
<tr>
<td>Comprehensive understanding of prosthetic treatment</td>
<td>Has a very good understanding of the clinical steps when prosthetic treatment is needed. Has the ability to carry out these and to evaluate the outcome of each step.</td>
<td>Has a rather good understanding of the clinical steps when prosthetic treatment is needed. Need some help to carry out these. Can evaluate the outcome of each step.</td>
</tr>
</tbody>
</table>
### Risk and prognosis

- **The standpoint always based on science and knowledge of the patient situation.**
- **Often reasonable evaluations.**
- **Have no knowledge of basics for evaluation of risk and of prognosis.**

### Clinical Oral Physiology

<table>
<thead>
<tr>
<th>Distinction</th>
<th>Clinical examination</th>
<th>Diagnosis of TMD</th>
<th>Information to patients having TMD</th>
<th>Treatment</th>
<th>Follow-up</th>
<th>Risk and prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISTINCTION</td>
<td>Examination acceptable</td>
<td>Always correct diagnosis</td>
<td>Always correct information to the patient</td>
<td>Can excellently use theoretical principles in all types of clinical situations</td>
<td>Can always evaluate treatment result critically and independent.</td>
<td>The standpoint always based on science and knowledge of the patient situation.</td>
</tr>
<tr>
<td>10-8</td>
<td>Need some assistance from teachers</td>
<td>Shows often both knowledge and maturity when diagnosis is established.</td>
<td>Most often correct information to the patient.</td>
<td>Can most often use theoretical principles in all the clinical situations</td>
<td>Can evaluate treatment acceptable Need some guidance to proceed.</td>
<td>Often reasonable evaluations.</td>
</tr>
<tr>
<td>7-4</td>
<td>Do not know why and how to exam</td>
<td>Often wrong diagnosis and severe lack of knowledge when diagnosis is established.</td>
<td>Miss the target. Give confusing, wrong or not understandable information.</td>
<td>Can relatively independent do all stages in the treatment procedure.</td>
<td>Cannot evaluate the treatment result Needs always significant help and support from teachers to proceed. Do not know why treatment was carried out</td>
<td>Have no knowledge of basics for evaluation of risk and of prognosis.</td>
</tr>
<tr>
<td>3-1</td>
<td>Do not know why and how to exam</td>
<td>Often wrong diagnosis and severe lack of knowledge when diagnosis is established.</td>
<td>Miss the target. Give confusing, wrong or not understandable information.</td>
<td>Can never use theoretical principles in the clinical situation. Cannot carry out treatment without significant help from teacher.</td>
<td>Cannot evaluate the treatment result Needs always significant help and support from teachers to proceed. Do not know why treatment was carried out</td>
<td>Have no knowledge of basics for evaluation of risk and of prognosis.</td>
</tr>
</tbody>
</table>

### 2. Student motivating activities

It is neither the intention nor the wish to rely only on exams to motivate and stimulate the student’s process of learning. The clinical practice when student’s face patients and their oral problems are probably a high motivation factor for the learning process. The exams, however, may be of major importance in the student motivation towards learning.

### 3. Strengths

The clustering into blocks has increased the variability of questions in the exams. The short-answer design of examination is a not very resource demanding procedure. They are fair, easily corrected objectively and the marking system is relatively transparent. This implies a high legal security for the student. The
security is also promoted by coding student identity on the examination forms during assessment, in many of the written examinations.

The comprehensive examinations help to clarify the individual students’ clinical ability. It has also proved to be a good opportunity to give the student structured criticism, which may help them in their maturity process. The use of a board of examiners means strengthened legal security of the assessment of the test result for the student as well as the examiners.

The oral examinations allow assessment of in-depth understanding of a subject. Misunderstandings and/or weaknesses can be identified and corrected. In addition, it allows the examiner to assess other qualities such as the student’s ability to communicate his/her knowledge, attitude, etc.

4. Weaknesses

There is a risk in “block courses” where complete integration has not been achieved or if integration has not reached the examination that student’s will develop a strategy to sort out some fundamentals in their learning.

Oral exams are resource demanding and thus expensive. For the examiners it might be difficulties to remain objective and fair in their judgement and the examinations are less transparent.

The comprehensive examination including an individual feedback is a rather time and resource demanding process.

5. Innovations and/or Best Practices

The comprehensive examination at the end of the 7th semester takes into account what the student has done, the variation of patients and treatments, the self-assessment as well as the teachers evaluation of the students “know why” and “know-how”. The examination further test the student’s ability to propose a diagnosis, a treatment plan, including preventive measures, a prognosis, an appropriate recall schedule and cost for care. This overall assessment of the individual student’s maturity has been effective in two ways. First those student who pass the test have a good image of their development in dentistry, what they need to practice more are how they are perceived by the staff. Second the procedure has had the ability to identify those students who need much more clinical training to reach acceptable standards. A board of examiners, which relieve pressure on single clinical teachers, takes the decision of who will pass or fail.

To give the students insight and to bring interest to science, the students work two by two in a scientific project. Their project is examined in the 10th semester in the form of a “scientific congress”. All students have during the course applied their knowledge in scientific methodology and how to read and write scientific papers. The congress is very formal and open to the public. Except for questions from the session chairman and the audience, other students are asked to criticise the work.

In the course of cariology the students are trained in self-assessment of their preparations, fillings, ability to objectively judge the quality of their work. In oral radiology the student’s ability to identify caries is tested in a computer-based program, this calibration test has to be passed.
6. Plans for future changes
At present there are no plans for an overall change in how examinations are done. Development and improvement of examinations is mainly done by the professor/lecturer responsible for a specific course.

7. External examiners
It is a general rule at Umeå University that a student who fails a test two times has the right to have another examiner if he or she wishes so. In these cases external examiners have sometimes been used.

8. Formal completion of an exam for students to qualify and register as dentists (e.g. final examination)
There is no final examination. The requirements are that the student has passed all given exams and fulfilled the clinical requirements throughout the five years of education.

9. The extent to which the school seeks those competences recommended by the EU Advisory Committee on the Training of Dental Practitioners.
The main content of our education is in accordance with the competencies recommended by the EU Advisory Committee on the Training of Dental Practitioners.

11. Visitors Comments
Section 18 – Other Influences

Professor Svante Twetman, DDS, PhD, Department of Odontology
Director of Studies Pernilla Lif-Holgerson, DDS
County Dental Director Lage Wigren, DDS,
Head of Development, County Council of Västerbotten Hans Forsberg,
Head of unit, County Council of Västerbotten Anna-Lena Olofsson
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lage.wigren.lt@vll.se, hans.forsberg.lt@vll.se, annalena.olofsson.lt@vll.se

18.1 Regional Oral Health Needs

All children and adolescents in the region are provided a preventive oriented comprehensive dental care, free of charge, between birth and 19 years of age. The oral health in childhood has improved significantly, but there are some regional variations. Moreover, the distribution of caries is skewed which underline the importance of risk assessment. Thus, the understanding and training of this process is major objective in child dental health.

In the County Council of Västerbotten the oral health among those aged 0-19 years is good. The number of individuals 19 years of age with no caries lesions of the approximal surfaces have increased from 45% to 54% between 1991 and 2000.

Although no nation-wide study of adult oral health has been performed in the recent decade, it is generally thought that the oral health is improving also among the adults. Some regional epidemiological studies show that the decreasing number of edentulous individuals is most pronounced among the older adults. Approximately 20% have full dentures at the age of 75 and 10% have extensive bridges and crowns. 8% were found to have severe periodontal problems. As the age group over 65 years will increase their percentage of the population in the next two decades, much of the future need and demand of dental treatment will be found among the elderly.

According to a study by the National Bureau of Statistics, the number of individuals who visit a dentist regularly has decreased somewhat in recent years. This is explained by increasing costs for the patients and the groups that showed a lower frequency of visits were the unemployed, social care recipients and retired. A study by the National Board of Health and Welfare1999 showed that 88% of individuals between 20-65 years of age had visited a dentist during the last two years. Three groups of individuals showed a lower frequency of visits namely unemployed, social care recipients and low-income groups. Thus, there is an increasing risk of socio-economic inequities in dental health and students have to master relevant tools to deal with this situation. Even concerning regular visits there is a difference between regions. In the northern part of Sweden the percentage of adults with irregular dental visits is higher compared with the south.

Disease panorama and recruitment of patients

The population of Västerbotten is approximately 250 000. The largest town in the region is Umeå with a population close to 105 000. The Dental School has a special general clinic “Allmänkliniken” responsible for recruiting patients to the student clinics. The clinic is also responsible for the pre- and post-student care of these patients if required.
In Umeå there are a few Public Dental Health clinics and a large number of Private Dental clinics. This competition makes it difficult to recruit patients to the students. Our motto when recruiting patients is “The right patient at the right time”. Umeå is a University town with a high social and economic standard. This has lead to a high dental health level amongst the inhabitants. This means that we must examine large numbers of patients to find the right type of patients for our students. We have for example great difficulty in finding enough cases with varying levels of periodontal disease to supply the demand for both dental and dental hygienist students.

18.2 Evidence Based Treatments

All treatment procedures are based on scientific evidence in that all regulations and instructions issued by The National Board of Health and Welfare are followed. Furthermore, the treatment regime follows in most aspects the programme recommended by the Public Dental Health Service within the county. We plan to include a more formal training in Evidence Based Dentistry for the undergraduate students.

Time for student reflection

Each week during the ongoing semester a eight-hour slot is scheduled. This is a time for self-studies and reflection. It’s also a time for literature search and study planning.

18.3 Involvement in other university activities and sport

Umeå University provides large and easy accessible indoor sport and recreation facilities, the IKSU-Sportcenter. The centre has gym and gymnastics, aerobics, tennis, badminton, squash, rock-climbing, beach volleyball, a swimming pool for lap swimming and a relax Department with sauna and Jacuzzi. The sport centre is open seven days a week from 8 am to 11 p.m. Close to the university campus, there are outdoor tracks for skiing, walking and running. The price for all activities is subsidized for students.

18.4 Recreation

During each semester there are several opportunities for recreation and a social life. The student’s union arrange a greeting-party and “kick off” dinner to introduce the new students. Several dinner parties with different themes are also traditionally arranged each year. Weekend trips to the mountain area for skiing are frequently arranged.

During each semester, one full day (“studentsportardagen”) is devoted to physical activities for the students together with the employees at the Department. The employees at the Department of Dentistry can use one hour per week of their working time for own physical activity. They have also possibilities to have subsidized prices at the student’s sportscenter, IKSU.

18.5 Student Selection Procedures

Students apply through a central office for all Swedish Universities (the National Admission Office to Higher Education, VHS) and the selection is based on their marks achieved in the third level education (upper-secondary school). To be eli-
gible, students have to fulfill a requirement of studies in nature sciences on a specified level. In addition, a few students (2-3 each year) are admitted from a special group of applicants with minor handicaps and functional limitations, such as dyslexia.

18.6 Labour Market Perspectives

During the period 1985-1998, a decline in the labour market in Sweden was evident, which resulted in a cut down of dental students with approximately 50% as compared to the mid 80-ties. A lot of dentists became unemployed and during 1991-1999, approximately one thousand dentists moved abroad. The most popular countries for emigration were Norway and the UK. The picture is however totally different today. Due to retirements above relocation, there is a shortage of dentists in the entire country but predominantly in the northern parts of Sweden. In a recent study carried out by the National Health Board of Health and Welfare (October 2001) it was found that 23 regions in Sweden have a total of 221 vacancies for general practitioners and 92 vacancies for specialists.

The table shows the current demand of dentists in the five regions situated in the north of Sweden. Many areas have an overwhelming demand for dental care, which has lead to a lengthening of the interval between routine examinations. Dentist availability is however unevenly distributed within these areas. In Västerbotten there is an imbalance of resources between rural and suburban areas.

Table. Demand of dentists within the Public Dental Health the northern regions as well as in Sweden in October 2001 (National Health Board of Health and Welfare).

<table>
<thead>
<tr>
<th>County</th>
<th>General practitioner</th>
<th>Specialist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Västerbotten</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Norrbotten</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>Jämtland</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Västernorrland</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td><strong>Sweden, total</strong></td>
<td><strong>221</strong></td>
<td><strong>92</strong></td>
</tr>
</tbody>
</table>

The future demand for dentists is very difficult to predict. It will depend very much upon whether dentists educated in Sweden continue to move abroad at the current rate. Furthermore, between 2005-2010 about 50% of all practising dentists in Sweden will retire and the shortage will be even more troublesome. However, with the further development of "Team" dental care we should be able to meet the growing demand even with fewer dentists, than today.

In summary, the employment opportunities, in both public and private practice, implicates a prosperous future for our dental students.
Section 19 – Student Affairs

19.1 Basic Data

- Average number of dental students graduating each per year: 30
- Average number of dental students admitted to the first year: 50
- Length of course in years and/or semesters: 5 years; 10 semesters
- There is no separate period of vocational training following graduation in Sweden

19.2 List of Different Postgraduate Courses

The Department of Odontology presents specialist education and training in all 8 certified specialties (Clinical Oral physiology, Endodontics, Oral Surgery, Oral Radiology, Orthodontics, Paediatric Dentistry, Periodontology, Prosthodontics). At present (2001) there are 10 postgraduate dentists undergoing specialist training.

A number of postgraduate courses 2, 5 or 10 credits are available for continuing education for a wide range of health professionals including dentists, dental hygienists, dental nurses and dental technicians. The courses 1998 - 2000 are listed below:

1998

- Oral medicine: Infectious diseases with special emphasis on the head and neck region, 5 credits
- Oral medicine: Salivary glands in health and disease, 5 credits
- Oral medicine: Chronic pain in the orofacial -, temporo-mandibular joint - and head-neck regions, 5 credits
- Dental materials science, 10 credits
- Clinical evaluation of dental materials, 5 credits
- Implant surgery in dentistry, 10 credits
- Ear -, nose - and throat diseases, 5 credits
- Pharmacology, 5 credits
- Oral and cranial neurophysiology, 10 credits
- Dental polymeric materials. Dental and environmental aspects, 5 credits
- Further education in medicine. For dental nurses, 5 credits
- Cariology. For dental nurses, 5 credits
- The biology of the inflammatory process. For dental hygienists, 5 credits

1999

- Oral medicine: Internal medicine, 10 credits
- Oral medicine: Diseases of the oral mucosa, 10 credits
- Clinical evaluation of dental materials, 5 credits
- Implants in prosthodontics, 5 credits
- Oral rehabilitation in prosthetic dentistry, 10 credits
- Maxillofacial rehabilitation, 5 credits
- Dentistry for children and adolescents with special needs, 5 credits
- Dentistry for the elderly, 5 credits
- Oral and cranial neurophysiology, 10 credits
- Further education in medicine. For dental nurses, 5 credits
- Cariology, 5 credits
- Cariology. For dental nurses, 5 credits
- Conscious sedation in dentistry with special reference to nitrous oxide sedation, 7 credits
- Surgical and medical attendance. For dental nurses, 10 credits
- Ear -, nose - and throat diseases, 5 credits
- Pharmacology. For dental hygienists, 5 credits
- Panoramic radiology – certificate course, 2 credits
- Panoramic radiology, interpretation of radiographs, 2 credits

2000

- Oral medicine: Diseases of the jaws, abnormalities of tooth morphology, and disturbances in tooth formation, 5 credits
- Oral medicine: Infectious diseases with special emphasis on the head and neck region, 5 credits
- Oral medicine: Salivary glands in health and disease, 5 credits
- Oral medicine: Chronic pain in the orofacial -, temporomandibular joint - and head-neck regions, 5 credits
- Dental materials science, 10 credits
- Clinical oral physiology basics in diagnostics and rehabilitation, 5 credits
- Dental care for adults with special needs, 5 credits
- Dental fear in adults. Ethics in dentistry, 5 credits
- Dentistry for children and adolescents with special needs, 5 credits
- Dentistry for the elderly, 5 credits
- Clinical evaluation of dental materials. Statistics, 5 credits
- Dentoalveolar surgery in dentistry, 7 credits
- Ear -, nose - and throat diseases, 5 credits
- Pharmacology, 5 credits
- Pharmacology for dental hygienists, 5 credits
- Cariology for dental nurses, 5 credits
- From bacterial adhesion to loss of attachment, 5 credits
- Oral rehabilitation for dental nurses, 5 credits
- Cariology, periodontology and dental materials science for dental hygienists, 10 credits

### 19.3 Curriculum for Dental Hygienists

Professor Jan WV van Dijken, DDS, PhD, Head of Dental Hygienist Programme  
E-mail: jan.van.dijken@odont.umu.se

In Sweden the dental hygienist education became a mandatory 2-year university programme (80 credits) in 1996. Umeå University admits 25-30 students per year to the Dental Hygienist program.

This new curriculum has a high theoretical standard and clinical application. During the first year preclinical education is given in basic courses like chemistry/biochemistry, cell biology, histology, general and oral microbiology, immunology, anatomy and physiology. These are followed by dental and medical ground courses as oral anatomy, cariology, periodontology, oral radiology, oral hygiene and depuration, pharmacology, dental local anaesthesia, general medicine, psychology, general dentistry. During the first year preclinical practical laboratory are given during almost the whole year followed by and finished with a preclinical clinical course before the students start their clinical application at the end of the first year. During their second year at the university the students continue with their main course oral health in which are given: cariology II, nutrition, periodon-
ology II and III, clinical oral physiology, prosthodontics, oral pathology, psychology II, gerodontics, dental care for patients with special needs, pharmacology II, paediatric dentistry and orthodontics. Scientific methods and community dentistry are given in the last part of the education. Clinical application during the second year is partly in public dental health clinics. Every year, two students have been doing part of their education abroad in the Netherlands and exchange students from Nijmegen have been taken part of the second year education programme during three months. Within the programme a written degree project (2.5 credits) constitutes the final part before the students get their university degree.

The program has a fixed course of study, i.e. subjects must be studied in the order stated in the curriculum. In certain cases students may be exempted from this requirement. All grades are awarded for each completed examination. The terms used are Fail, Pass, and Distinction for courses of = 5 credits. For courses of less than 5 credits, the terms used are Fail and Pass. The scale of grades for each course is given in the relevant curriculum.

Students completing the program successfully are awarded with the official dental hygienist legitimation (National Board of Health and Welfare). After completing the program, the students have the possibility to continue their education with the Master of Science program for dental hygienist or to continue directly with a doctoral thesis.

### 19.4 Curriculum for Dental Technicians

Senior lecturer Anders Berglund, DDS, PhD, Head of Dental Technology Programme
E-mail: anders.berglund@odont.umu.se

In Sweden a new and mandatory 3-year university education (120 credits) for dental technicians started in 1993. Umeå University admits 16 students per year to the Dental Technician program.

This new curriculum has a high theoretical standard and it also involves the general types of practical laboratory work for all kinds of fixed and removable prostheses, implant supported bridges and orthodontic appliances. The training has a clear aim towards biological issues and aspects of the dental materials compositions and properties. During the second year the students make advanced works in ceramics and metal-ceramics, also CAD/CAM techniques. Further advanced practical work within the course involves the casting of titanium for crowns and fixed prosthesis together with laser welding of titanium constructions.

During the third year, the students have 26 weeks general practice at a laboratory outside the university. Some students have been doing their laboratory practice abroad. A written degree project (10 credits) constitutes the final part before the students get their university degree.

The program has a fixed course of study, i.e. subjects must be studied in the order stated in the curriculum. In certain cases students may be exempted from this requirement. All grades are awarded for each completed examination. The terms used are Fail, Pass, and Distinction for courses of = 5 credits. For courses of less than 5 credits, the terms used are Fail and Pass. The scale of grades for each course is given in the relevant curriculum.
Students completing the program successfully are awarded the degree of Bachelor of Science in Dental Technology complying with the Swedish National Agency for Higher Education's regulation (1993:100). After completing the program, the students have the possibility to continue their education with the Master of Science program for dental technicians or to continue directly with a doctoral thesis.

19.5 Auxiliary/technology/other courses and number of qualified per year

- Undergraduate programme for Dental Technicians (3 years). The average number of technology students qualifying per year: 15 (admitted: 21).
- Undergraduate programme for Dental Hygienists (2 years). The average number of hygienist students qualifying per year (1998-1999): 20 (admitted 23). Currently, 25 are admitted per year.

19.6 Student counselling services

The student’s office at the Department of Odontology provides the students with all formal information and all kinds of advice. The student counsellors provides many different services, for example:

- Support students with special needs
- Provide information about studies abroad

At the university, there is a central section for Study Counselling. The central section should provide students with information and give students with special needs general information.
Section 20 – Research and Publications


<table>
<thead>
<tr>
<th>Year</th>
<th>Number of publications</th>
<th>Number of chapters in textbooks</th>
<th>Number of textbooks</th>
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<tr>
<td>1998</td>
<td>69</td>
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<tr>
<td>1999</td>
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<td></td>
</tr>
<tr>
<td>2000</td>
<td>54</td>
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</tr>
</tbody>
</table>

Publications by Staff and Students of the Faculty of Medicine and Odontology, Department of Odontology, Umeå University

1998


2000


Lindberg A, Dijken JWV van, Hörstedt P. Interfacial adaptation of a class II polyacid-modified resin composite/resin composite laminate restoration in vivo. Acta Odontol Scand 58:77-84.


Nakazava F, Michiko S, Poco S, Hashimura T, Ikeda T, Kalfas S, Sundqvist G, Hoshino E. Description of Mogibacterium pumilum gen. nov., sp. nov. and Mogibacterium vescum gen. nov., sp. nov., reclassification of Eubacterium


20.2 Invited to participate at Major Conferences 1998-2000

1998
"The annual lecturer programme at the Royal Odonto-Chirurgical Society of Scotland" 98-12-10. Titel: "Mercury Exposure from Dental Amalgam and its’ Potential for Adverse Health Effects". {Anders Berglund}

American Association of Orthodontics (Philadelphia, USA) April 1998
"The Temporomandibular Joint in Orthopedic Focus" {Annika Isberg, Main speaker}

The Temporomandibular Joint in Orthopedic Focus. Norwegian Orthodontic Society, Oslo, Norway {Annika Isberg, Main speaker}

The Temporomandibular Joint in Orthopedic Focus. Latin American Association of Orthodontists, Mexico. {Annika Isberg, Main speaker}

Functional Perspectives of the Temporomandibular Joint. Portuguese Orthodontic Society. Porto, Portugal. {Annika Isberg, Main speaker}

The Temporomandibular Joint in Orthopedic Focus. The French Orthodontic Society. Vittel, France. {Annika Isberg, Main speaker}

Temporomandibular Joint Dysfunction. Brazilian Dental Society, Rio Preto, Brazil. {Annika Isberg, Main speaker}
Swedish Dental Society, Riksstämma, (Stockholm, Sweden). "Can metal-ceramic constructions be replaced by all-ceramic constructions" {Margareta Molin}

Swedish Society of Pediatric Dentistry (Halmstad. Sweden), When prevention is not enough. {I.A.Wenckert}

Second Joint Meeting of the American Society for Bone and Mineral Research and the International Bone and Mineral Society, San Francisco, California, USA, December 1-6, 1998; Functional Characterization Of Osteoblasts and Osteoclasts from alkaline phosphatase knockout mice {speaker: Charlotte Wennberg}

1999


New Conn Orthodontic Study Group (New York, USA) May 1999, "Temporomandibular Disorders and Facial Growth" {Annika Isberg, Panelist}

Temporomandibular Joint Dysfunction. University of Concepcion, Concepcion, Chile. {Annika Isberg, Main speaker}

Temporomandibular Joint Dysfunction. New-Conn Orthodontic Study Group Growth Seminar New York, USA. {Annika Isberg, Main speaker}

26th European Conference on Calcified Tissues, Maastricht, The Netherlands, May 7-11, 1999; Osteoclast biology {Chairman: Ulf Lerner}

Third International Conference on Biological Mechanisms of Tooth Movement and Craniofacial Adaptation, Seoul, South Korea, October 7-10, 1999; Neuropeptidergic regulation of osteoclast formation by vasoactive intestinal peptide {Key note speaker: Ulf Lerner}

2000

Adverse effects of oral biomaterials - Conference in Oslo 29th of May 2000, internationell konferens arrangerad av Statens helsetilsyn, Norge. Mina två föreläsningar var: "Systems for reporting adverse reactions - the purpose" och "Case reports - vs. - controlled trials". {Anders Berglund}

"Biverkningar och biverkningsrapportering", Odontologiska riksstämmman 2000. (Stockholm, Sweden). {Anders Berglund}


American Association of Orthodontics, World Federation of Orthodontics, (Chicago USA). April 2000 "Functional Perspectives on the Temporomandibular Joint". {Annika Isberg, Main speaker}

Temporomandibular Joint Dysfunction. Dento-Facial Seminars, London, England. {Annika Isberg, Main speaker}

American Association of Orthodontics, World Federation of Orthodontics (Chicago, USA). May 2000 "Functional Perspectives on the Temporomandibular Joint". {Annika Isberg, Chairman, Round Table discussion}
International Association of DentomaxilloFacial Radiology (Athens, Greece) June 2000 "TMJ Session" {Annika Isberg, Chairman}

International Procera Network Meeting, (Göteborg, Sweden). "Procera All Ceram Bridge. Clinical experience" {Margareta Molin}
### 20.3 Grants Awarded 1998-2000

**Source of grants**

<table>
<thead>
<tr>
<th></th>
<th></th>
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<tr>
<td>Other Universities and High Schools</td>
<td>61 109</td>
<td>91 395</td>
<td>49 009</td>
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<tr>
<td>KK-foundation</td>
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<td>Lions, Cancer Research Fund</td>
<td>8 241</td>
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<td>1 660</td>
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<td>The Medical Research Council</td>
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<td>116 379</td>
<td>155 325</td>
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<td>Cancer Fund RMC</td>
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<td>20 892</td>
<td>21 849</td>
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<tr>
<td>Strategical foundation</td>
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<tr>
<td>Umea University Foundation</td>
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<td>9 401</td>
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<tr>
<td>Västerbotten County Council</td>
<td>5 945</td>
<td>7 421</td>
<td>6 815</td>
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<tr>
<td>“Spear Head Grants” VCC</td>
<td>111 973</td>
<td>113 541</td>
<td>118 388</td>
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<tr>
<td>Other Swedish State Authorities; Karolinska Institute, The National Institute for Working Life</td>
<td>68 314</td>
<td>110 463</td>
<td>236 202</td>
</tr>
<tr>
<td>Other organisations; Bergvallsstiftelsen, Wibergs Foundation, von Kenzow foundation, Nilsson fondation, Sv Tandläkarsällskapet, The Swedish Reumatism Association</td>
<td>88 173</td>
<td>123 749</td>
<td>117 328</td>
</tr>
<tr>
<td>Other County Councils</td>
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<td>7 942</td>
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<tr>
<td>Kempe fund</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>EG-program</td>
<td>9 547</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other foreign financial; Neos</td>
<td>6 432</td>
<td>1 101</td>
<td>110 243</td>
</tr>
<tr>
<td>Sahlbergs foundation</td>
<td>728</td>
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<tr>
<td>Swedish Companies; Doxa Certex AB</td>
<td>1 659</td>
<td>82 801</td>
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<td>563 324</td>
<td>642 051</td>
<td>937 514</td>
</tr>
</tbody>
</table>
## 20.4 Higher Degrees 1998-2000

(PhD includes Dr Odont, Dr Med and Dr Med Sci).

<table>
<thead>
<tr>
<th>Thesis Title</th>
<th>Name</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1998</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The temporomandibular joint. Tomographic and CT assessment of its bone demarcations with reference to adjacent organs</td>
<td>Jan Ahlqvist</td>
<td>PhD</td>
</tr>
<tr>
<td>Studies on the effects of glucose and insulin on the function of neutrophil granulocytes</td>
<td>Oldenborg P-A.</td>
<td>PhD</td>
</tr>
<tr>
<td><strong>1999</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salivary proteins as potential modulators of oral microbial adhesion and ecology</td>
<td>Bratt P.</td>
<td>PhD</td>
</tr>
<tr>
<td>Craniofacial morphometric changes following temporomandibular joint disk displacement.</td>
<td>Legrell PE.</td>
<td>PhD</td>
</tr>
<tr>
<td>Age-related changes in fibre type and myosin heavy chain compositions of human jaw muscles</td>
<td>Monemi M.</td>
<td>PhD</td>
</tr>
<tr>
<td>Innervation in tooth-related tissues – immunohistochemical studies in normal and experimental situations</td>
<td>Norevall LI.</td>
<td>PhD</td>
</tr>
<tr>
<td>In vivo evaluation of glass ionomer cement and polyacidmodified resin composite (compomer) restorations in primary molars</td>
<td>Andersson-Wenckert IE.</td>
<td>Lic Odont</td>
</tr>
<tr>
<td>A cystatin C. studies of a cysteine proteinase inhibitor on bone resorption</td>
<td>Johansson L.</td>
<td>Lic Odont</td>
</tr>
<tr>
<td>Role of polymorphism of salivary molecules for bacterial adhesion in host susceptibility and resistance to dental caries</td>
<td>Stenudd C.</td>
<td>Lic Odont</td>
</tr>
</tbody>
</table>
2000

Salivary flow and oral complaints in adults – Association with medication and psychological factors
Bergdahl M. PhD

Cytotoxic interactions of the periodontopathogens Aactinobacillus actinomycetemcomitans and Porphyromonas gingivalis with host cells
Johansson A. PhD

Dysphagia and pharyngeal swallowing dysfunction related to snoring and surgical treatment
Levring Jäghagen E. PhD

The neuropeptide VIP as regulator of bone cell functions
Lundberg P. PhD

Interpreting alkaline phosphatase function in a mouse model
Wennberg C. PhD

Integrated jaw and neck function in man. Studies of mandibular and Manager-neck movements during jaw opening-closing tasks
Zafar H. PhD

Experimental study of bone healing after implantation of bone substitute materials
Öberg S. Lic Odont

Section 21 – Quality Development
Umeå University has a Committee for Quality Development that outlines programmes for quality development and make follow-ups. The Committee should also support the different Departments in their work with quality development and initiate discussions on quality. IT should be integrated and actively utilised.

A general aim of all activities within the Dental School is to continuously improve the quality of

- student education, both clinically and theoretically, and to develop and adjust teaching and learning to a continuously changing dental environment.
- the professional and pedagogic qualifications of the teaching staff and other staff categories.
- all facilities necessary for a good dental education.

Faculty and staff development
In general, the pedagogic competence of all teachers at the universities in Sweden shall be improved in the next years. To obtain that, all university
teachers should undergo a course in rhetoric, assessment and how to use pedagogic facilities.

To assure a high quality of the dental programme the aims are that all teachers employed by the Council, should 1) be specialists, 2) have a scientific training corresponding to lic odont, 3) have passed a pedagogical course provided by the university. Twenty percent of the working-time for the clinical teachers is reserved for research.

Most of the dental nurses are also involved in the clinical training of the dental students. Therefore this category is involved in a especially staff designed educational program so that they can raise their competence.

**Student evaluation**

When an individual course is finished, the students evaluate the course with focus on how the aims of the course have been fulfilled, the position in the curriculum in relation to previous knowledge, the total number of hours, the literature and the type of examination.

A similar evaluation of the whole program is done after the 10th semester. That evaluation focuses on many things, e.g. the student’s total judgement of the curriculum, if the education has given a holistic view of the patient, if the programme has given basic knowledge, if the student feels mature to judge the patients total need of dental care. The student is also asked to propose which parts in the curriculum he/she finds unnecessary and what he/she feels is lacking.

These evaluations facilitate a continuous improvement of the quality of the curriculum.

An example of an activity to identify student problems and to get an implement to solve the problem is the structured focus interviews. A professional pedagogue and our own director of studies interview 6-8 students from some of the courses. These interviews were performed 1998 and 2000 and focused on e.g. examination and clinical practise. The students were interview for about one hour and open answers were used. The results from these interviews have been important for the ongoing revision of the curriculum. As a consequence, all teachers shall undergo a course in clinical supervision.

The comprehensive examinations (stage examination) that take place at the end of the 7th and 9th semester are also important for monitoring quality. These examinations are described in detail in Section 17.

The ratio of student/teacher and student/dental nurse is favourable. A good supervision means a good security for both the student and the patient.

There is a course committee where the staff can discuss the individual student, her/his clinical performance and professional development. Those who have not followed the course are discussed individually and problems are identified to help the student.

International Contacts are arranged within the Erasmus program. Two or three students from the university in Würzburg in Germany follow the dental education at our Department. The same number of our own students is offered to go to
Würzburg to increase student exchange mainly with other English-speaking universities in Europe.

**Section 22 - Visitors Comments and Executive Summary**
DentEdEvolves

School Visit

School of Dentistry

UMEÅ
Sweden

February 2-6 2002

Part I  School Self Assessment
(Please See separate PDF file on www.adee.org or www.dented.org)

Part II  Visitors Comments
Part II - Visitors Comments - Contents

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Section 2 – Facilities .......................................................... 5
Section 3 - Administration and Organisation ......................... 6
Section 4 – Staff ............................................................... 7
Section 5 – The Biological Sciences ..................................... 8
Section 6 – Pre-Clinical Science .......................................... 10
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DentEd visit – UMEÅ, Sweden  February 2-6 2002

Before commencing the report we would like to express our very grateful thanks to the Head of the Department of Odontology, her colleagues and the students for the very warm welcome extended to us. We are particularly grateful for the arrangements made for our visit. The Self Assessment Document was a model of clarity. We recognise only too well the effort that was needed to ensure the smooth running of the visit and the production of the document.
Section 1 - Introduction

1.4 Visitors comment
The Department of Odontology of Umeå University is part of the Faculty of Medicine and Odontology, which is situated on a unified site within the university campus in a pleasant and peaceful setting. This convenient arrangement must encourage collaborative research and give the students plenty of opportunity to make use of the academic and extra-mural facilities.

The atmosphere of the school and the university is very open and friendly. People are interested in other views and the visitors did not notice that there were hidden political influences, wishes or agendas. Staff and students are proud of being part of the School especially because of its good reputation and emphasis on clinical training and education, which is widely admired.

Part of the budget of the school comes from the University to support research and education; part comes from the County Council for the clinical teaching as well as for patient treatment by staff. We understood that the latter part appears to have higher priority than the former and that this dual-funding arrangement has caused some tension. This set of circumstances leads us to make a particular recommendation in Section 22.

The curriculum is characterised by what we would regard as an overload of traditional lectures in all courses. Although there are ideas and initiatives using of other more interactive teaching methods it seems that the overall approach to education is influenced to only a very limited extent by educational developments that are apparent in many other schools worldwide. A broadly supported philosophy on learning and teaching does not exist nor is there available an identifiable document which details the structure of the curriculum and the teaching methods to be used. Students did not appear to be familiar with other educational approaches, including the significance of evidence based teaching; all appeared to place the greatest emphasis on clinical activity.

Because of the overloaded curriculum time for self-study is very limited and is spread thinly over each semester. We gained the impression that students would prefer this limited time to be concentrated around the examination periods. We found little evidence of additional reading of literature by the students and of their being made responsible for finding evidence. When this is the case, it happens more with the pre-clinical and para-clinical sciences in the first three semesters. Working with literature however is taught in the fifth semester.

Students report unnecessary overlap of teaching material, especially in the early semesters and there seems to be rather limited co-ordination of the curriculum as a whole. Departments outside the school and, to a minor extent, units within the dental school have much freedom on how to construct their courses.
Most examinations are written short-answer examinations. In some courses aims and objectives are made available for the students. For most of the time, however they become clear by attending the lectures. In the lectures an addition of knowledge is presented to that which can be found in books and synopses.

There appears to be over-emphasis on control of what is taught, with the decision as to content being made by the professors and many of the lecturers being given by them.

Having made these comments we would also like to praise the Department for having made changes to the curriculum, which have been largely directed towards reducing the number of very short courses, and to developing the concept of integrated treatment. We commend these changes as examples of best practice and recognise the hard work, which has been needed to bring them to their current level of development.
Section 2 - Facilities

2.6 Visitors comment
The building and infrastructure are of high quality, attractive and convenient; the clinical areas are well planned and maintained. In quantity the clinical facilities seem to be more than sufficient but the dental units are now very outdated. Having the support of three dental nurses on each group of 15 units seems to be very appropriate.

There are enough lecture halls available. However we understand that only one has facilities for data projection. Although according to the students, only a few teachers use PowerPoint, there will surely be a need for appropriate equipment in the near future. The lack of small group teaching rooms in the school itself did not appear to be recognised by the faculty staff. If teaching and learning techniques are to change we feel there will be a definite need for this type of teaching space. In the biomedical science building many small teaching rooms are available and teaching facilities in general are more than adequate.

There are no facilities at the school for students to use computers on a regular basis. There also was no evidence of any CAL programme being available for students. Only the radiology unit has web-based slide programmes consisting of radiographs illustrating various pathologies.

In the school there is no facility for students to study alone or in groups.

Generally, there seems to be an adequate number of patients available but in some disciplines there is a lack of patients suitable for the inexperienced junior students. This shortage has had an adverse effect on the smooth running of the Integrated Treatment programme; this problem is certainly not confined to Umeå. However, we understand that one of the reasons for this shortage is the patients’ fee structure for treatment, which does not encourage them to seek care in the Dental School.

The library is within the Dental School and its facilities are shared with the Medical School. The number of dental titles is limited, as is the available space. We were very relieved to learn that, in the very near future, the library will move to a new and more spacious building.

The main research facilities are concentrated on one floor, which seems to be very beneficial. The whole area looks very well organised and equipped. There is only limited space for every PhD student to have his/hers own desk and study place.
**Section 3 - Administration and Organisation**

**3.3 Visitors comment**

Organisational Structure

The Dental School is very much dependant on the Medical School for its teaching of pre-clinical and para-clinical subjects. The representation in the Faculty Board is a departmental representation, which, theoretically, makes the School’s voice rather small. We were therefore very pleased to learn that the structure supports the aspirations of the Dental School. We were also delighted to learn that the School receives support and encouragement from the University, the Faculty and its Dean.

The existence of 13 departmental like units and the great autonomy these units traditionally have, makes a strong central leadership within the dental school difficult to reach.

As mentioned earlier the operational links between University staff and County Council staff are sometimes difficult because of different interests. Having ‘two captains on the ship’ seems to not be working as well as it might. In this situation, which dates back to 1987, the formal local agreement between the University and the County Council has yet to be made. There have been some recent openings of negotiations and we very much hope that they will bear fruit.
Section 4 - Staff

Visitors comment
One of the most special things with Umeå Dental School is the relatively high numbers of pre-clinical and para-clinical teachers that are also qualified as dentists. This is a great advantage to other schools, which makes orientation on dental sciences much easier and effective.

By far most of the staff is fully employed by either the school or the County council or both. The danger then could be that the academic view on certain aspects of the curriculum could easily become divergent from dentistry in real life.

The mean age of junior staff is quite high. It is difficult for them to stay up to date because there is not enough time to follow courses in their own discipline. The school has serious problems in retention and recruiting young staff. One reason is the great difference in income between dentists working in hospital compared with their colleagues in private practice. Also the heavy demand on the level of qualifications before the first career step can be made (9 years of additional training after graduation), could be far from motivating. Some of the faculty did follow a 6-week didactic course, while others only had one week of training. Educational training is mandatory for those in senior positions. In the very near future a 10 week course will be mandatory to get an academic position which on one hand is of course very positive on an educational point of view but on the other hand could have the negative side effect of elongating the required qualifications even further. Maybe, a voluntary teaching the teacher course for those existing teachers by trainers well acquainted with the dental teaching environment situation would be a way to promote good teaching.
Section 5 – The Biological Sciences

5.1 Introduction to Dental Studies

5.1.11 Visitors comments

This course seems to be appropriate. We understand that part of this course involves an Outward Bound type course where teachers and students go up to the mountains together; this seems an excellent way of promoting team spirit.

5.2 Biochemistry

5.2.11 Visitors comments

Like other biomedical sciences in the Umeå dental school in biochemistry the course is characterised by a "dugga" which is an intermediate exam that has implications to the result in the course or the progress of the student. In Biochemistry the dugga is judge as passed or failed. In the latter case a student cannot participate in the course examination as long this is not changed into a "pass".

5.3 Genetics

5.3.11 Visitors comments

No comments

5.4 Anatomy (Morphology)

5.4.11 Visitors comments

The committee was impressed by the educational atmosphere this department showed. Facilities and ideas on teaching were very up-to-date. Anatomy is more taught with respect to function rather than as morphology. Passing the dugga generates 3 extra points on top of the maximum of 10 with the final exam.

5.5 Physiology

5.5.11 Visitors comments

No comments

5.6 Oral and Craniofacial Biology

5.6.11 Visitors comments

The idea of this integrated course is much appreciated by the committee. However the applied methods less welcomed. The use of student assistants is considered positively. The dugga in this course is only honoured when the test is passed at the first attempt, everybody should pass once.

Scientific Methods
5.7.11 Visitors comments
Clearly this is an innovative course with teaching methods that look quite attractive. There is emphasis on student activity and good relation with the research project later in the curriculum. The visitors recommend the staff to support new self-directed methods of education in the main portion of the curriculum to provide students with the necessary competencies such as self-assessment of learning gaps, evaluation of self and others, reflection, and therefore to enhance critical thinking and critical appraisal necessary to scientific methods. The place of this course in the curriculum seems to be a problem. The 5th semester is for the student very stressful and too far ahead from the start of the research project. On the other hand students have to perform parts of what they learn in this course in some of the courses in the 2nd and 3rd semester.
Section 6 – Pre-Clinical Science

6.1 Dental Material Science

6.1.11 Visitors comments
The teaching facilities for phantom head practicals that is the main activity of this unit, are very old-fashioned. There is very little contact with the cario and prothetic units on the principals to use in preparation and restoration. There is also quite some time between the phantom head exercises and the crown and bridge work with patients.

6.2 Clinical introductory Courses

6.2.11 Visitors comments
This seems to be an appropriate way to introduce students to the clinic. The co-operation between the units involved is a recommendation to other schools. It prevents different approaches to comparable clinical situations and thus saves time.
Section 7 – Para-Clinical Sciences

7.1 Pharmacology

7.1.11 Visitors comments
The integrated way pharmacology is taught as is stated in the self-study remains unclear. The staff involved indicated that the planned integration with Physiology is not more than avoiding overlap. They, however, think that integration with physiology, pathology and medicine and participation in combined seminars on e.g. pain is very necessary. The department would very much like to have a dentist-pharmacologist available for teaching dental students, like the situation used to be. These are unfortunately hard to find. The most important wish is to move the teaching to a later semester in order to be able to work with students who then have the needed knowledge on different aspects of function and pathology and to be able to integrate more with dental clinics (e.g. in drug prescription). This demand is fully supported by the visiting delegation.

The department is experimenting with case-based teaching in the medical curriculum, which maybe will be introduced in the pharmacology course for dental students too.

7.2 Microbiology, Immunology, Virology

7.2.11 Visitors comments
The integration of these three disciplines is working very well and is a good example how this can function. The need co-ordination with oral microbiology is been provided

7.3 General Pathology

7.3.11 Visitors comments
In this course the histo-pathology and clinical signs and symptoms are taught per subject, which seems to be a favourable approach. What is also a memorable thing is the seminar in which some of the students have to present the solution of a assigned case. In this presentation they have to give attention to the pathological meaning and the dental meaning. Other students do the same with physiological cases or pharmacology cases. The presentations are for the full group.
Section 8 – Human Diseases

8.11 Visitors comments
Human diseases teaching is included partly in the course of General Pathology (7.3) and partly in the Course Care of special needs patients in the 7th semester.

Anaesthesiology is taught with oral surgery.

Oral infectious diseases are taught together with perio, cario and endo in a really integrated manner. Relations are made during the lectures with recent scientific results. The lab exercises students must undertake are followed by discussions within the group in order to make students understand the mechanisms of infection, inflammation and defence.
Section 9 – Orthodontics and Paediatric Dentistry

9.1 Orthodontics

9.1.11 Visitors comments
In ortho no number of treatments are required. The emphasis is on care delivering and risk reduction, which the committee considers to be a modern attitude in orthodontic teaching. What is also well appreciated is the involvement of students in outdoors consultant duties. Assessments are made through case presentations and by an oral examination. There is a wish to further reduce the number of lectures and replace them by other teaching methods. The chair reports a lack of tutors and a wish for more integration with oral physiology and public dental health. The co-operation with paedodontics is very much comparable with the comprehensive dental organisation of the other clinical units. The committee thinks this is an example of good practise. The unit wishes to extent the teaching over a longer period to be able to have students experience the development of the orofacial structures in non-pathological situations.

9.2 Paediatric Dentistry (Child Dental Health)

9.2.11 Visitors comments
This is a well organised course in which the students for the first 6 weeks are intensely prepared in theory and clinical practise through a scheme of tell-show-do. The emphasis is on prevention, care delivering and risk assessment. Treatments, fillings or whatsoever are counted. With the use of a logbook students are motivated to reflect on their own progress and be responsible for their own learning which are very sound principles of modern education. There is a strong co-operation and integration with orthodontics that is very well appreciated by both groups as well as by the committee. In summer students are invited to spend a 6 week period in a dental public health clinic outside. Almost all students take this opportunity and enjoy it. In the near future paedodontics want to change the bulk of lectures into more student activating learning methods and have students use literature to a greater extent.,
Section 10 – Public Dental Health and Community Dentistry

10.1 Public Dental Health and Community Dentistry

10.1.11 Visitors comments
The attention given to management and leadership is considered to be good practice. For the teaching in treatment outcomes and epidemiology the use of recall patient should be considered.
Section 11 – Restorative Dentistry

11.1 Conservative Dentistry

11.1.11 Visitors comments
This unit has a problem of having little influence on the teaching of preparation and restoration principles on phantom head. They also would like to start the teaching of cariology in a later semester, an opinion that is not shared by the committee. The committee like the way in which the requirements focus on care and not on number of fillings and the case presentation that is part of the assessment.

11.2 Endodontics

11.2.11 Visitors comments
The endodontic unit would like to start later in the curriculum, a wish the committee can understand, given the minor clinical experience students have at the start of the endodontic course. The lack of an endodontic teacher in the 8th semester is considered both by the endodontic unit as by the committee as being a great omission in the curriculum structure.

11.3 Fixed and Removable Prosthodontics

11.3.11 Visitors comments
The committee regrets that there is no successful interaction with the programme of the dental technicians. Also the attention given to implantology with regards to possibilities and indication for implants deserves more time. The students contact with relevant literature and evidence based decision making could be enhanced. Furthermore students report that the books that are used are too many in number and too expensive. The committee has an understanding about the wish to start prosthodontics at a moment students have ample training patient in other fields.

11.4 Occlusion and Function of the Masticatory System

11.4.11 Visitors comments
A problem the clinical oral physiology experiences is the undertreatment of the population in this field as a result of underpayment in the fee structure. Students consider the course as a difficult one, maybe partly explained by the fact that they are not satisfied with immediate result of treatment. The committee considers the continuity in the course as being positive. The emphasis on evidence based decision making could perhaps be enhanced by linking pre-clinical and clinical studies and have students discuss this. Furthermore there could be more integration with the medical disciplines.
Section 12 – Periodontology

12.1 Periodontology

12.1.11 Visitors comments
Like with cariology the committee appreciates the qualitative evaluation of students through a case presentation. In agreement with the unit the committee thinks that the teaching in perio is a little bit too much spread over the curriculum.
Section 13 – Oral Surgery, Dental Radiography and Radiology

13.1 Oral and Maxillo-facial Surgery

13.1.11 Visitors comments
An example of best practice is the teaching by this department of the surgical removal of impacted molars. There is no relation with the teaching in oral medicine and the relation with the teaching in oral pathology is weak. The emphasis on what students learn except from extraction of teeth, is to learn when and how to refer. The oral surgery unit wants to teach students to be critical but because of the clinical orientation of the curriculum and the students, this is difficult.

13.2 Radiography and Radiology

13.2.11 Visitors comments
The radiology unit seems to be well organised, the teachers are interested in educational developments and think their influence on the curriculum should be enhanced.

Although the unit facilities are modern, the benefit for the teaching of undergraduate students is unclear. The programmes the unit has made on behalf of undergraduate teaching by which a series of radiographs are digitized and made available through internet is nice for students to practise but no substitute for problem-based learning.
Section 14 – Oral Medicine and Oral Pathology

14.1 Oral Medicine
O.M. is not given as a separate course. The content of oral medicine is included in the following courses:
Oral Surgery (13.1)
Care of Special Needs Patients (15.3)
Periodontology (12.1)
Paediatric Dentistry (9.2) and
Oral Pathology (14.2).

14.2 Oral Pathology

14.2.11 Visitors comments
This is a strong research unit with also clear ideas on what teaching should be. The content of the course is co-ordinated with courses in general pathology and oral surgery. The seminars with literature to be studied and criticised, are worth mentioning.
Section 15 – Comprehensive Dentistry, Dental Emergencies and Special Needs Patients

15.1 Comprehensive Dentistry

15.1.11 Visitors comments
The establishment of the comprehensive dental clinic must have been a major task that is admired by the committee. There are however some remarks to be made. Since the students are not involved whatsoever in disinfections and sterilisation the committee is a little worried that as a consequence this will later in practice will have little attention. Something alike is felt about the assistance by the professional dental nurses. The students are not trained in e.g. mixing compound properly. What when they will not have a nurse to assist.

Different protocols seem to be used in handling clinical procedures by the different departments. The committee proposes that one protocol for comprehensive dentistry is developed and used.

15.2 Dental Emergencies

There is no separate course in dental emergencies. However, the topic is covered within the courses of Comprehensive Dentistry, Paediatric Dentistry and Endodontics.

15.3 Special Needs Patients

15.3.11 Visitors comments
In this course students do not see any patients. The unit would like students to visit specialist clinics outside the school. The committee agrees with the unit that too many lectures are given. Integration with pharmacology, psychology, oral medicine and public dental health is lacking. The case-based examinations together with comprehensive dentistry are well appreciated by the committee.
Section 16 – Behavioural Sciences

16.1 Behavioural Sciences

16.1.11 Visitors comments
In the schedule there was no meeting with representatives of this unit. From the self-study the committee learned that this part of the curriculum is underestimated. It is very much psychology oriented, there is no training in communication skills, there is no integration with the clinical introductory courses (for communication skills teaching).

16.2 Communications
16.3 C. is given in the course Clinical Introduction, 4th semester. Besides that the is none in the curriculum

16.4 Ethics & Jurisprudence
16.5 E&J is given in the course Clinical Introduction (6.2), Care of Special Needs Patients (15.3) and Public Health and Community Dentistry (10.1). The committee thinks that this subjects deserves more attention, and to be taught in a more up-to-date way.

16.4 Elective Courses
no comments
Section 17 – Examinations, Assessments and Competences

17.1.11 Visitors comments
There seems to be no formal educational philosophy or teaching concept that is agreed upon by the faculty. The school is proud of the amount of knowledge students gather during their stay in school, but the faculty has difficulties in teaching students how to apply this knowledge in the right manner and right moment. A reason for this could be the very well and closely guided clinical training. Two to three teachers on 14 students is a very favourable ratio but the teachers show the tendency to take over responsibilities in treatment very quickly. Students are not invited on a structured basis to think about problems, solutions, treatment choices, evidence, etc.

The committee has the opinion that the "dugga" is a nice educational method to activate the student towards self-study.

The comprehensive examinations in the later semester were also highly appreciated, but it is a sound educational principle that criteria along which assessment takes place, are made explicit before.

There are no written down goals and objectives nor are there clear competencies. Students sometimes are given well documented prescriptions on what has to be learned but in other cases only a series of traditional lectures are the only indication on the subject content.
Section 18 - Other influences

18.7 Visitors comments
In the region there is an overwhelming demand for dental care. The dentists in the area are unevenly distributed and the population is very widely spread. At the school with the in house training programmes for oral hygienists and oral technicians there are great potentials to develop dental team experiences that could have their impact on the structure of care delivering. A serious constraint in this can be the absence of formal training programmes for dental nurses in Sweden.

In the teaching programme very little emphasis on evidence based treatments could be distinguished. The students are not invited to search for evidence themselves, teacher give too many answers and put too little questions forward.

There is very little time available for students to do other things than work in the clinic and study, because of the curriculum overload. During the summer holidays they often do extras in pedodontontology or in research electives.

No other selection than the selection on high school results are applied with student enrolments. The selection procedure is carried out by a national institute.

The labour market perspectives are very good.
Section 19 - student affairs

19.7 Visitors comments
From the basic data one could conclude that the drop out is with 40% very high. In reality it is said that this is on an average much less, being around 20%.

There are no mandatory requirements with respect to registration as a dentist in attending postdoctoral dental courses.

Students do not have the opportunity of foreign experiences in learning and research. There is no student counselling available nor seems there to be student health care. Also a safety net for students who are confronted with serious failure is absent.
Section 21 - Quality development

Visitors comments
A mandatory 10-week didactic training for young teachers is under consideration. Perhaps a start could be made with a didactic training related to the needs of the school for those teachers already employed on a voluntary basis. Staff complain that there is not enough time to follow courses in their own discipline. Human resource development plans could not be distinguished.

The position of the program committee is quite weak. Organisational units are to a great extent independent in the way they construct their courses. The student evaluations are as far as the committee understood, not published. Students are not very confident that these evaluation have a major influence on changes in the programmes or the curriculum.
Section 22 – Visitors recommendations and Executive Summary

The visiting committee consisted of:
Prof Robin Basker, Chairman
Dr Henk Kersten, Rapporteur
Dr. Veronica Bucur
Mr Mark Brennan
Prof Gerard Levy
Prof Corrado Paganelli

Due to family circumstances Dr. Bucur had to cancel the visit to Umea.

Recommendations
1. Come to agreement as soon as possible with the County Council on what is who's responsibility and what can be expected from the partner.

2. Reduce the number of organisational units.

3. Develop a educational philosophy and a strategy for the future that is coherent to encourage learning rather than teaching in order to create a more student centred programme

4. Reduce the lecture load

5. Push forward the negotiations on fee structure to assure that sufficient students of all kind are available for the student clinics.

6. Make a plan in co-operation with the County Council to replace the dental units.

7. Replace the phantom head units.

8. Create more small group teaching according to the chosen educational philosophy.

9. Create information technology facilities, teach students and teachers how to use them in teaching and use them. Simultaneously develop a maintenance system (help-desk).

10. Introduce mandatory educational training programmes related to the chosen educational philosophy and the clinical teaching situation.

11. Urgently solve the problem of recruitment and retention, considering the high average age of staff. Consider higher salaries against a little less number of teachers or consider to create personal income out of patient treatment for clinical teachers.
12. Move the bulk of pharmacology teaching to later semesters

13. Encourage critical enquiry, critical thinking and critical appraisal of knowledge with students.

14. Create a yearly scheme of cardio-pulmonary resuscitation training of students and staff.

15. Introduce a clinical environment for the teaching of general medicine and general surgery.

16. Rotate the students through the Public Dental Health clinic (3rd floor) in order to get them in contact with emergency treatment.

17. Explicit the criteria of the comprehensive examination beforehand.

18. Pay more attention to evidence based treatment decisions.

19. Reduce the overload in the curriculum for students to enjoy student life.