



Karolinska Institute of Odontology

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SITE VISIT

FINAL REPORT

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Information re DENTED visit

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Dates for visit: 27th of May to 31st of May 2000

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Section 1: Introduction and General Description

Professor Björn Klinge, Head of Department, bjorn.klinge@ofa.ki.se

1.1 Introduction and General Description

Dental undergraduate education in Stockholm is the oldest in Sweden and celebrated its 100 year anniversary in 1998. Since 1964, the Faculty of Dentistry/School of Dentistry has been part of Karolinska Institutet. Karolinska Institutet is the only university in Sweden dedicated to the health sciences, and offers a broad spectrum of undergraduate courses and research in the field of medicine.

Until January 1st 1999, the Faculty of Dentistry was one of two faculties within Karolinska Institutet. Reorganization had become necessary *i.e.* because rapid expansion of activity had made the existing system unworkable. Another reason was that the institute wanted to give undergraduate education higher priority than before. The formal conditions changed insofar as the requirement for universities to organize activity into faculties was deleted from the University and Colleges Act. From January 1st 1999, Karolinska Institutet was reorganized into three boards, one for research, one for undergraduate education and one for postgraduate/research education. The new structure comprises 32 departments, of which dentistry/odontology is one. This change means *i.e.* that state funds are no longer specifically earmarked for odontological research: this funding is obtained by internal distribution within Karolinska Institutet. As there is no longer a dental faculty board, responsibility for overall running of the Institute of Odontology has passed to the new boards.

Karolinska Institutet is governed by the heads of the departments. This means that the head of the department, by delegation of the vice-chancellor, makes decisions about and is responsible for all matters to do with the department's activities, finances and staff. The departmental head may in turn delegate some of matters within the department. He/she can choose to have different groups, advisory committees etc. Co-operation between employer and employee organizations is at departmental level.

At the Institute of Odontology there is a departmental committee, with representatives from all personnel categories, undergraduates and postgraduate students. There is also an executive group comprising the head of the department, the chief administrator and three lecturers/researchers. This groups meets regularly and discusses various departmental issues. The head of the department also meets the unit heads weekly, in order to inform one another about current issues in the various units and also to discuss certain issues of mutual importance. Finally information to employee organizations (industrial unions) is updated at regular meetings, and before decisions are made on different issues, union representatives are summoned to MBL-information, or MBL-negotiations. (MBL = law governing the right of joint consultation and participation in decision-making)

The Institute of Odontology provides undergraduate education for dentists, dental technicians and dental hygienists. One of the goals is to integrate these courses where possible and expedient, in order that these dental professionals-in-training will learn to work together and to respect one another's professional skills. In all 120 students are admitted annually to these three courses.

Furthermore the Institute offers a number of separate courses, usually of 5 academic credit points, (1 academic credit point is the equivalent of 1 week's full-time study) for different categories of dental personnel. Examples of such courses are practice management, dental radiography, technique and diagnosis, bachelor's degree in odontology (20 academic credit points) and theoretical science and research methodology (for dental hygienists)

Ongoing continuing and further education is also arranged for personnel at departmental level.

Courses for a formal licence in all of the eight dental specialities recognised in Sweden; Periodontology, Oral Surgery, Prosthodontics, Orthodontics, Clinical Oral Physiology, Paedodontics, Oral Radiology, and Endodontics are available at the department. All courses are under the supervision of the State Board of Health and Social Well-fare. Courses require a Swedish licence of dentistry for formal recognition. In addition there are equivalent courses in Cariology and Restorative Dentistry.

1.2 Mission Statement and Vision

Mission Statement

Karolinska Institutet is a state medical university whose mission is to contribute to improvements in people's health. In addition to education and research, the university fulfils a third task: to work together with society and provide information about its activities.

Vision

The Institute of Odontology at Karolinska Institutet shall be respected internationally by the dental community as a centre of excellence.

Three areas comprise the core of the vision:

1) The Institute of Odontology at Karolinska Institutet shall be the obvious first preference for dental undergraduate education.

This implies that:

Karolinska Institutet shall be the obvious first preference for those seeking a dental education: undergraduate education for dentists, dental technicians and dental hygienists, and further and continuing education in professions where life-long learning is essential.

Selfdirected learning and responsibility for one's own training in which the lecturers and other personnel function as guides and experts.

Clinical contact with the dental community shall be a self-evident part of education.

Within the framework of the course, the students will learn the similarities and differences between the undergraduate courses for the various categories of dental personnel.

Today we offer small segments of knowledge and require the student to piece these together to make a whole. Tomorrow, the role of the academic staff will be to sketch the whole and support the students in cementing together the building blocks of knowledge which they the students have acquired independently.

The primary objective is to attain a learning goal – the individual student can select the best means of achieving this goal.

The academic staff shall have international exchange for learning and development of knowledge.

During an elective period of their undergraduate course, each student shall study at a well-respected university abroad.

The learning environment at the Institute of Odontology of Karolinska Institutet shall be characterised by:

- The most modern technology and pedagogical methods available
- An ambience conducive to both studies and social activities
- Confidence, openness and mutual respect

2) The Institute of Odontology of Karolinska Institutet shall conduct research of international quality

This implies:

Cutting edge research shall be conducted on a few well-defined questions.

Research shall be conducted in network programmes within Karolinska Institute and together with other prominent centres.

The Institute of Odontology of Karolinska Institutet shall be a selfevident partner for industry.

External financiers contribute an increasing proportion of the total research budget.

Our research results are reported in journals of international repute.

Our researchers participate in conferences, seminars and courses hosted by Karolinska Institutet, regularly contributing research results together with other internationally acknowledged researchers.

Our researchers present their research results in the international arena and participate in debate and exchange of ideas in the international research community.

Our researchers present their results to the public in popular versions (e.g. lectures, TV the press and radio).

The Institute of Odontology of Karolinska Institutet shall further develop a research climate characterized by:

- Competent, target-oriented colleagues at all levels
- Access to competence in order to use cutting edge technology
- An open, confidence-building, competent working environment, unconstrained by hierarchy

3) The Institute of Odontology at Karolinska Institutet shall provide modern dental care based on a patient-centred holistic philosophy

This implies:

Better informed patients with higher demands for service and flexibility expect thoroughly professional care.

New funding forms and increased competition imply that the Institute of Odontology must be competitive.

The patients total treatment need shall be met in one clinic.

General dentistry shall in principle be conducted in the undergraduate clinic. More complicated cases shall be treated by a specialist, usually in close cooperation with the student.

Treatment shall be characterised by empathy and be science and evidence based.

The patients shall participate in the treatment plan and treatment shall be conducted according to the patient's wishes.

Treatment shall be conducted within the framework of a quality assurance system with followup and feedback.

Treatment shall be conducted according to the latest and best technological advances. This requires close cooperation between clinical research, development and treatment.

All care shall be characterised by:

- Professionalism, openness and confidence
- Mutual respect and empathy

1.3.1 Teaching Programme - Dentistry

The undergraduate programme in dentistry, leading to the University Degree Doctor of Dental Surgery, is five years (200 academic credit points).

A revised undergraduate curriculum was introduced in 1993. This curriculum has a greater emphasis on integration of medical and dental undergraduate education than the old one. It is organised into larger, integrated problem-oriented blocks of subjects and includes elective periods for project work or in-depth study. The course ends with an assignment the students have to pass in order to qualify.

1.3.2 Undergraduate programme for dental technicians

In 1993, dental technician training in Sweden was transferred from secondary to tertiary level, which meant that from the autumn semester of 1993 Karolinska Institutet has been training dental technicians. The course covers three years (120 academic credit points). There is one annual intake of 20 students.

The course is run in close collaboration with the dental undergraduate course, i.e. certain steps in training, theoretical as well as practical, are integrated. The course includes extramural practical experience, corresponding to almost one and a half semesters (27 academic credit points). This time may be spent at a laboratory abroad. The course finishes with an independent degree project of 10 academic credit points. On successful completion of the course, the student is awarded a diploma in dental technology.

1.3.3 Undergraduate programme for dental hygienists

Since 1998, the undergraduate course in dental hygiene in Stockholm has been conducted by Karolinska Institutet. The course comprises two years (80 academic credit points). There is an annual intake of 40 students.

The course comprises three subject blocks: preventive dentistry (40 academic credit points), biomedical science (20 points) and social and behavioural science (20 points). Theory and practical experience are alternated through the course. The course finishes with an independent project of 5 academic credit points. On successful completion of the course the student graduates with a certificate in dental hygiene.

1.4 Resources and Facilities

Resources

Total budget 1998: 121 469 401 SEK (€14 634 867)

Sources:

Government funds: 68 %

Subsidies: 10 %

Examples: MFR (the Medical Research Council), NUTEK (the Swedish National Board for Industrial and Technical development), Svenska institutet (the Swedish Institute), Barncancerfonden, Patentmedelsfonden (the Swedish Patent Revenue Fund for Research in Preventive Dentistry), Nordiska ministerrådet (the Nordic Council of Ministers)

Commissions: 22 %

Examples: Patient fees, The Dental Care Committee/ Stockholm County Council

Facilities

The premises of the Institute of Odontology are currently undergoing reconstruction. Karolinska Institutet has reserved a considerable sum of money for total renovation of the premises and for the purchase of modern equipment. This renovation will facilitate co-ordination between various units and expanded use of computers. The premises comprise a total of 22 000 m².

In close proximity to the premises of the Institute of Odontology is Huddinge University Hospital's research building and Novum. The institute has access to modern research premises and laboratories.

In Flemingsberg there is also a branch of Karolinska Institutes Library (KIB) which is one of the country's most extensive with respect to the dental literature. The library also provides computer work stations for independent search for information, and a number of small rooms for students doing project work. The library will soon be relocated to premises in the same building as the Institute of Odontology. This will make the library even more accessible for students and staff of the department.

1.5 Research

With respect to research, the Institute of Odontology is exceptional in Sweden, producing almost 40% of the total research. This research has made important contributions in many different fields and has had a determining influence, both directly and indirectly, on the markedly improvement in oral health in the industrialized world. Examples of highly successful fields are fluoride research, digital techniques for oral radiography, investigation and treatment of iatrogenic dental damage and new biological methods for regeneration or renewal of tissues damaged by periodontal disease.

The overall goal of departmental research is to develop the potential to improve human health by preventing, curing, treating or relieving ill-health. Within the Institute of Odontology the following fields are to be given priority from the beginning of 2000: oral health of immigrants (particularly children and adolescents), oral health of the elderly (especially the institutionalized), the relationship between

oral infections/ inflammation and general health, and epidemiological studies of oral health.

These research fields are organized as four main areas or networks:

1. Odontology and society (with special reference to epidemiology, evaluation of dental services and dental insurance schemes, and dental care of the elderly)
2. Oral infection, inflammation and its relationship to general health
3. The masticatory system in health and disease, and
4. The biology of the oral hard tissues and toxicology

These groups comprise both experienced researchers and doctoral students. The fields are characterised by flexibility and there is naturally a flow of resources between the groups. The working mode emphasises the ability to collaborate.

On January 1st 1997 the Faculty of Dentistry inaugurated a clinical odontological school for research students, the first of its kind in Sweden. The aim was to give a firmer structure to research training and to alternate research training with clinical practice.

New such schools for research students, open to both medical and dental graduates, are now starting at Karolinska Institutet: one focussed on molecular biology and the other on epidemiology.

1.6 Improvement of Quality

For a number of years the Faculty/Department of Odontology has worked actively towards improving quality. The following are examples of areas in which the faculty/department has worked/developed and which are considered to be strengths:

1. Co-Builder Project: a project in which all staff and students were invited to participate actively towards developing the organization. Both small and large projects were conducted within the framework of the Co-Builder Project. The project is described further below.
2. Leadership training – one of the projects within the Co-Builder Project. The aim of is that all, staff as well as students, shall have the opportunity to undergo leadership training. The training is in unique, inasmuch as it has been constructed in a project in which different staff categories and undergraduates have collaborated.
3. Evaluation – from 1993 to 1999 an evaluation group has worked on evaluation of dental undergraduate training (twice) and dental technician training (once). The work has been conducted in two stages: self-evaluation, external evaluation by both national and international experts, and corrective measures and follow-up. The work has contributed to systematic evaluation and development of undergraduate education. Using evaluation as an instrument the faculty/department has actively worked towards improvement in quality.

4. Internationalisation – the Institute of Odontology has an extensive international network for both research and education. Within undergraduate education the institute has exchange agreements within Erasmus with seven European dental schools. Furthermore students have the opportunity to use their elective periods to undertake projects at universities in other countries.
5. Local admission – admission to the Dental Program at Karolinska Institutet in an individualised way is allowed for at most two thirds of the students. The remaining one third is admitted in the traditional way by grades from secondary school and marks from USAT. The main objectives of the individualised admission system is to seek out highly motivated students with comprehensive ability and high academic achievement and to avoid admitting students deemed unsuitable to the profession.
6. Research – there is a strong bond between research and undergraduate education, because most of the lecturers are also actively engaged in research.
7. Research school – a structured course of research training in clinical dental science, alternating periods of research training with clinical experience.

A person has also been appointed on a three-year contract to work with quality development within the institute.

VISITORS' COMMENTS

The Karolinska Institutet is a dental school with a high international reputation and holds a leading position in Sweden. The school has remarkable international contacts and excellent results in dental research.

We wish to thank the authorities of the Karolinska Institutet, particularly the Rector and Professor Björn Klinge, Head of the Department of Odontology, for their invitation to visit this famous school.

We also wish to thank Professor Birgit Angmar-Månsson for the arrangements, both in preparation for the visit and during our stay in Stockholm.

We wish to thank Ms Kerstin Smedberg, and all of the other staff who helped us.

We have found a very motivated staff and enthusiastic students, all of whom were open and forthcoming in response to our questioning. They are proud of their school and study programme.

Section 2: Facilities

The Institute of Odontology is currently undergoing extensive renovations. This is expected to be completed by the Spring of 2004. The institute will then have modern premises and new equipment.

2.1 Clinical Facilities

General Explanation

The clinics are located on the 5th, 6th and 8th floors (oral diagnosis and radiography, Comprehensive Care Clinic and Paedodontics/Orthodontics), with clinical units for around 200 students. In the near future, when total renovations are completed, the undergraduate clinic will have around 110 clinical units, all with new equipment.

Strengths

In two years the student clinic will be totally modernised with new dental equipment, computers etc.

The Comprehensive Care Clinic will be located on just one floor, adjacent to the Department of Oral Radiology, the teaching laboratories and the lecturers' studies.

Weaknesses

During rebuilding, clinical training will be conducted in temporary premises.

Some disruptions will probably be unavoidable during the initial period.

The clinical floor is intended to house both dental and dental hygiene undergraduates. This will demand a detailed, carefully planned schedule for student services in the clinic.

Innovations

Patient's treatment records will be computerised.

The Comprehensive Care Clinic is an integrated clinic including oral prosthodontics, cariology, periodontology, endodontics and clinical oral physiology.

2.2 Teaching Facilities

General Explanation

Each floor has a number of seminar rooms, fully equipped.

On the 4th floor there are six lecture theatres (seating from 60 up to 120). After renovation all will be equipped with modern AV equipment.

Strengths

After renovation, the technical standard of the lecture theatres will be high.

Weaknesses

The lecture theatres are at present very poorly ventilated.

Best Practices

Lecturers each have their own PC connected by a local area network, for preparation of teaching material, communication etc.

Innovations

Lecture theatres and seminar rooms are available via a computerised, central booking system at the disposal of users.

2.3 Training (Preclinical) Laboratories*General Explanation*

The preclinical laboratories are currently situated on the 4th floor, but after the renovations will be relocated on the 6th floor, adjacent to the patient clinic.

Strengths

The new premises will be totally modernised and partly computerised, with very high hygienic, and technical, and pedagogic standards.

Weaknesses

Until the new laboratories are completed, preclinical training will continue in the old laboratories.

Innovations

Close proximity of the lab to the clinic will allow students under clinical training to use the lab for revision exercises on the phantom head before carrying out procedures on a patient.

2.4 Research Laboratories*General Explanation*

The research department for clinical research is situated at the 7th floor. It contains laboratories and studies for the researchers.

The Center for Oral Biology (COB) is a research foundation set up by Stockholm County Council, and located in the Novum Research Center. Research and development within the COB centers on basic biological research into oral tissues.

Strengths

The research department was recently rebuilt and contains modern and high-tech equipment.

It has a potential to expand in the future, because the University College of Southern Stockholm is relinquishing the adjacent research laboratories on the 7th floor.

The research department has a direct communication to the Novum Research Centre and the Huddinge Hospital Research complex. This allows the researchers to participate in interdisciplinary projects and access to apparatus in these centres.

Conditions at Novum are excellent for conducting odontological research of a high international standard. The laboratories are extremely well suited to the work and the equipment is of the highest quality. Proximity to Karolinska Institutet's department of Odontology, the other foundations, Huddinge hospital and the University College of Southern Stockholm helps to create a dynamic, progressive environment which is both unique and creative.

Weaknesses

A second step after the reconstruction of the clinical research department is to invest in a new system for analyses and fractionation of biomolecules in samples of saliva, synovial fluid and blood from patients participating in clinical trials.

Best Practices

- The clinical research department has developed a great skill in performing immuno-assays of pain and inflammatory mediators from blood as well as synovial and gingival fluid. It has a well-kept data-base system that has been developed specifically for clinical research.
- A qualified team has been composed for the performance of clinical trials according to GCP standards. The current activity is focused on testing caries preventive measures with quantitative light-induced fluorescence methods; the competence of the team may however be utilised for any clinical trial.

Innovations

A unique system for quantification of synovial fluid in samples obtained by saline washing of the temporomandibular joint has been developed using spectrophotometric absorbance measurements with vitamin B₁₂ as an internal marker. Investigation of the intrinsic pathophysiology of muscle pain has been made possible by adoption and development of microdialysis methods.

2.5 Library

General Explanation

The Karolinska Institutet Library -KIB, is situated in the Novum Research Centre building, 50 meters from the Institute of Odontology. This makes it, together with generous opening hours, very accessible for students, teachers and researchers. Within three years, KIB will move to the 4th and 5th floors of the neighbouring building, housing the Institute of Odontology of the Karolinska Institutet. This will make it even more accessible.

Strengths

Modern expertise, good services, generous opening hours with services (accessible for these with special permit 24 hours a day).
Generous study rooms, seminar rooms equipped with computers etc.

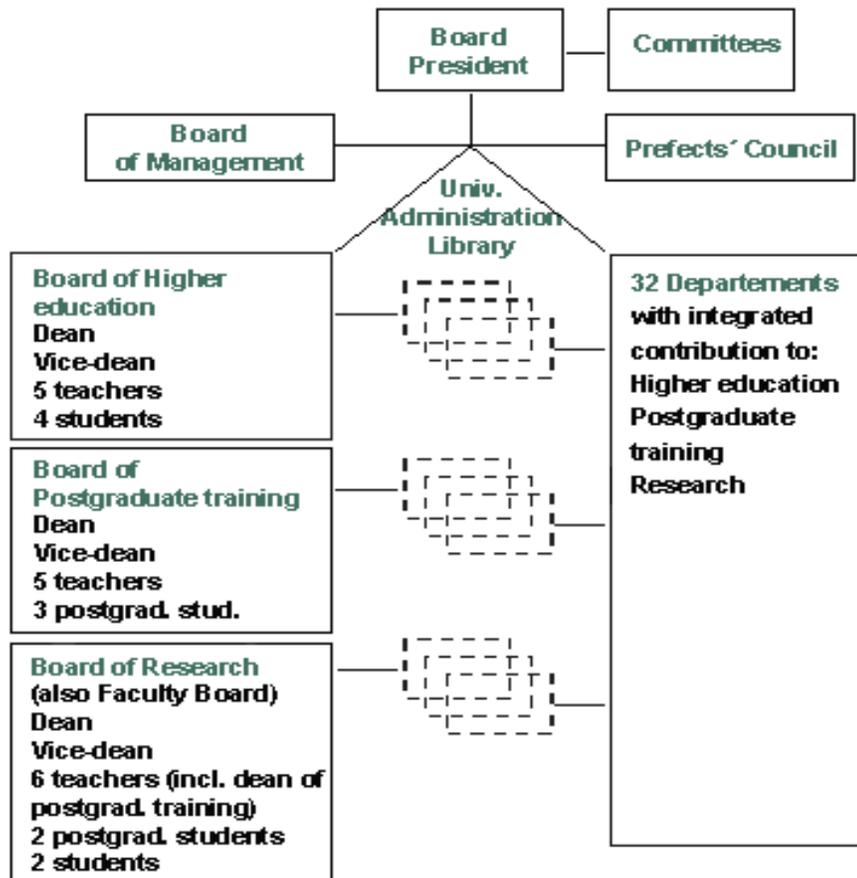
Weaknesses

There are no weaknesses.

Section 3: Organisational and Administrative Structures

Organizational structures

Since January 1st 1999, Karolinska Institute is organized under three boards, undergraduate education, research and postgraduate/research education. This organization is presented in more detail below.



The Institute of Odontology is led by the head of the department. The institute is separated into 12 units or centres, each with a head (corresponding to the former heads of departments).

The units are:

1. The Administration including economy, personnel, student secretariat, IT support, central sterilization, technical service etc.
2. Departments of Cariology and Endodontology
3. Departments of Periodontology, Prosthetic Dentistry, Geriatric Dentistry, Dental Hygienist Education
4. Clinical Oral Physiology, Clinical Research Department
5. Oral Surgery
6. Pedodontics
7. Orthodontics
8. Preclinical Oral Science, Dental Biomaterials, Dental Technician Education

9. Comprehensive Care Clinic for adult patients
10. Clinical Oral Diagnostics, Hospital Dentistry
11. Oral Radiology
12. Centre for Oral Biology

Clinical dentistry for adults is organized as a Comprehensive Care Clinic. Specialist care, delivered by the departmental instructors, assistant professors and associate professors, is provided in a specialist clinic.

Comprehensive Care Clinic

1. All undergraduate clinical training in dentistry for adults is carried out in a multidisciplinary clinic. The students start clinical training at the beginning of third year and continue through to their final semester, in fifth year.
2. During this period the one student is responsible for the total oral care of all his/her patients.
3. To ensure that the students are assigned cases in parity with their theoretical knowledge and clinical skills, careful selection and stratification of the patients is necessary.
4. Patients seeking care at the school are examined at the Department of Oral Diagnosis before being accepted. On admission, the patients are stratified into 3 levels depending on the complexity of treatment need. The comprehensive care clinic is organised into three corresponding levels.
5. Before being assigned patients the students must perform a set of theoretical and clinical tests. Each level includes further tests. These tests form a certificate system, which enables the students to proceed at their own pace, in accordance with their individual ability.
6. Multidisciplinary teams of faculty members from the different departments are responsible for clinical supervision of the students. Included in these teams are the faculty members who lecture in the theoretical courses. Each group of students is assigned a clinical tutor (faculty member), responsible for overall treatment planning, and the more specified selection of patients with treatment needs which match the individual student's need for comprehensive clinical experience.
7. A thorough description of the Comprehensive Care Clinic may be found a published paper by Gunilla Johnson: A comprehensive care clinic in Swedish dental undergraduate education. 3-year report published in *Eur J Dent Educ* 1999.

Specialist clinic

1. Closely organized with the clinic for adult dentistry is the specialist clinic. Some of the lecturers from the adult clinic also spend some hours working as specialists in this clinic. The specialty fields covered today are cariology, periodontology, prosthodontics, endodontics and oral physiology. Special projects encompassing certain patient groups are also organized through the clinic, e.g. patients with eating disorders, apnoea patients and patients referred with mouth dryness.

2. Patients treated at the specialist clinic are those from the student clinic whose treatment has not been successful; patients who on admission are considered too difficult for undergraduate treatment are given the option of treatment in the specialist clinic; and patients who are referred by dentists or medical practitioners.
3. As well as patient treatment the clinic also provides specialist training within the different specialty fields. The specialists-in-training carry out their clinical training requirements in the clinic.

Information Technology (IT)

Student education/training

Ongoing project for teacher-supervised education via computer in practical dentistry (M Pamenius), Cariology (F Lagerlöf) and Periodontology (Attström/Sjödin).

Documentation of student progress

Ladok is used by a number of universities. Student data are entered on admission and their progress can then be followed throughout their undergraduate course. The system has been adapted to suit the special requirements of Karolinska Institutet (Kidok) and is used for both undergraduate and postgraduate/research students.

Patient records

Effica (TietoEnator) is under deployment. Local research databases. The Effica system is a commercially available patient record and appointment schedule system for dental practice and general practitioners and could be useful for other dental schools.

Management and Finance systems

Agresso. Used throughout Karolinska Institutet.

Section 4: Staffing

The Institute of Odontology has in all 255 employees; 68% are female. Women predominate among dental chairside assistants (100%), dental hygienists (100%), laboratory assistants (100%), administrative staff (100%) and service staff (80%). However, men comprise 60% of the academic staff.

In the Institute of Odontology there are 14 professors, of whom 2 are women. Men predominate also at reader level (80%), while there are more women lecturers than men (60%). The same applies to doctoral students, (60% women). About 40% of the total staff are academics. Doctoral students comprise 10%.

The mean age of the staff is high. Among the different personnel categories, the mean age is as follows:

Professors/heads of department	55yr
Readers	55yr
Lecturers	51yr
Nurses/hygienists	51yr
Administrators	55yr
Researchers	43yr
Doctoral students	34yr
Service personnel	53yr
Nursing superintendents	54yr

Strengths:

- High competence
- Different staff levels join in the same development projects
- Possibilities to evolve education
- Possibilities to evolve abroad
- Possibilities to take part in conferences etc

Weaknesses:

- The age structure, a substantial part of the staff is elderly
- Difficult to recruit specialists

Staff list:

Unit 1: Administration

Professor: Bjorn Klinge

Unit 2: Cariology and endontology

Professor: Birgit Angmar-Månsson

Associate/assistant professor: Gunilla Johnson, Folke Lagerlöf, Michael Ahlquist

Instructor: Annette Oliveby, Stefan Morge, Dag Wallerstedt 50%, Jan-Håkan Eriksson, Berit Degerstrand, Madeleine Allerbring, John Danin, Marianne Kjaeldgaard
Hygienist: Lena Karlsson

Unit 3: Periodontology, Prosthetic Dentistry, Geriatric Dentistry, Dental Hygienist Education

Professor:

Associate/assistant professor: Lars-Erik Moberg, Gunilla Nordenram

Instructor: Ola Hansson, Madeleine Pamenius, Gert Jonsson, Mats Lundquist, Lars-Åke Törnberg

Unit 4: Clinical Oral Physiology, Clinical Research Department

Professor: Sigvard Kopp

Instructor: Malin Ernberg

Unit 5: Oral Surgery

Professor: Anders Heimdahl

Associate/assistant professor: Anders Holmlund, Gösta Lundquist

Instructor: Lars Rundquist

Unit 6: Paedodontics

Professor: Thomas Modéer

Associate/assistant professor: Göran Dahllöf

Instructor: Stein Björkman, Monica Barr-Agholme, Kerstin Carlstedt, Biniyam Wondimu, Bashar Al-Khalili, Georgios Tsilingaridis

Hygienist: Eva Axiö, Ulla-Britt Ek-Ehrlemark

Unit 7: Orthodontics

Professor: Jan Huggare

Associate/assistant professor: Eva Hellsing, Carl-Magnus Forsberg

Instructor: Agneta Karsten

Unit 8: Preclinical Oral Science, Dental Biomaterials, Dental Technician Education

Professor: Jan Ekstrand, Lars Hammarström

Associate/assistant professor: Sven Lindskog,

Instructor: Eva Wiatr-Adamczak, Margareta Seiden, Jan Ringvall, Ove Lindh, Karin Nordin-Iwanow

Unit 9: Comprehensive Care Clinic for adult patients

Head of unit: Bengt Sjödin

Associate/assistant professor: Björn Appelgren

Instructor: P-E Engström, Arne Holmgren

Hygienist: Barbro Hellström

Unit 10: Clinical Oral Diagnostics, Hospital Dentistry

Professor:

Associate/assistant professor: Thore Martinsson

Instructor: Mikael Zimmerman, Rolf Bornstein, Agneta Gundler, Sadra Muzgan

Unit 11: Oral Radiology
Professor: Ulf Welander
Associate/assistant professor: Gunilla Tronje
Instructor: Anders Bolin, Inger Eklund

Unit 12: Centre for Oral Biology
Project Leader: Mikael Wendel
Researcher: Tilman Wurtz

Professor
Associate/assistant professor:
Instructor

Professor
Associate/assistant professor:
Instructor

Introduction to Section 5-16: The Dental Curriculum

In the fall semester of 1993, a new undergraduate curriculum was introduced at the Faculty of Dentistry, with greater emphasis on integration of medical and dental undergraduate education. This undergraduate curriculum is organised into larger, integrated problem-oriented blocks of subjects, and includes elective periods for project work or in-depth study in the form of courses of 12 university credit points (equivalent to 21,5 ECTS credits). More time has been reserved for seminars and independent study. Examinations now cover larger blocks of subjects, corresponding to 15-30 ECTS credits.

ECTS, the European Credit Transfer System, was developed by the Commission of the European Communities in order to provide common procedures to guarantee academic recognition of studies abroad. It provides a way of measuring and comparing learning achievements and transferring them from one institution to another.

ECTS is a decentralised system, based on the principle of mutual trust and confidence between the participating higher education institutions. ECTS provides an instrument to create transparency, to build bridges between institutions and to widen the choices available to students. The system makes it easier for institutions to recognise the learning achievements of students through the use of commonly understood measurements, credits and grades, and it also provides a means to interpret national systems of higher education.

ECTS is a credit system based on student workload. ECTS credits reflect the quantity of work each course unit requires in relation to the total quantity of work necessary to complete a full year of academic study at the institution, i.e. lectures, practical work, seminars, tutorials, fieldwork, private study, in the library or at home, and examinations or other assessment activities.

ECTS credits ensure that the programme will be reasonable in terms of workload for the study abroad. In ECTS, 60 credits represent the workload of an academic year of study, 30 credits a semester and 20 credits a term/trimester.

Full credit is awarded only when the student has completed the course and passed all the required examinations.

Main objectives of the curriculum

Undergraduate education in dentistry is intended primarily to prepare the future dentist to practise the entire range of dentistry. The aim of the undergraduate course is to achieve generalist competence, based not only on knowledge of basic theories, but also on a deeper understanding which will enable the graduate to interpret new information and to keep abreast of new developments. This generalist competence is also a prerequisite for specialisation and for in-depth studies in various fields of dentistry.

The aim of undergraduate education in dentistry is to provide the students with competence and knowledge to enable them independently to diagnose and treat children and adults with various treatment needs, including the disabled and chronically ill, and elderly patients requiring special care. The students shall be skilled in communication methods, and be able to apply their knowledge of ethics, psychology and sociology in a multicultural and international perspective. Issues such as treatment priorities, and training in economics relating to health and patient care are given emphasis.

The undergraduate course has a scientific foundation, which together with knowledge and skills is intended to provide the students with the ability to make independent critical judgements and the ability to solve problems independently, and should also prepare the students for life-long learning. Students are introduced to scientific methods early in the course: scientific theory has therefore a central role in undergraduate education. The course shall emphasise the importance of research as the foundation of progressive scientific knowledge, and stimulate and encourage the students to participate actively in research and developmental projects. In addition, the undergraduate course in dentistry at Karolinska Institutet has the following objectives:

Skills and competence

Throughout the undergraduate course the student shall be given the opportunity for critical reflection over course content. The learning processes are intended to enhance the personal development of the student, guiding transition from undergraduate to a balanced professional. The course shall highlight the importance of research and give the students stimulation and competence to carry out their own research and development projects within the framework of i.e.. elective periods and assignments. By this means the students are able to create their own individual undergraduate profiles, reflecting their particular interests and offering greater flexibility in their studies. Computers shall be used as tools for learning and as an aid for seeking, collecting and analysing material. The ability to present reports orally and in writing, in both Swedish and English shall be fostered during the course. During the undergraduate course the students shall be encouraged to participate in international exchange programmes.

Knowledge and insight

The undergraduate course shall encompass basic knowledge of the normal structure and function of the body at molecular level and at cellular and organic level, encompassing i.e.. the development, structure, function and dysfunction of various organs and organ systems. The aim is to attain the core of knowledge necessary for practical clinical dentistry or other closely related dental fields, and also to ensure that the prospective dentists acquire the necessary basic knowledge to enable them to follow future developments in the fields of dentistry and biomedicine. After completion of the undergraduate training the students shall be able to give a holistic view of the oral and medical status of patients, based on interpretation of diagnostic data; be able to propose and discuss various feasible therapy alternatives; in conjunction with therapy planning be able to give the patient individual advice and instruction necessary in each case, and be able to explain and motivate the proposed clinical measures. To this end good communication skills are emphasised. The

students shall be able to carry out causal treatment and evaluate the outcome, and on this basis make a prognosis and carry out definitive treatment and oral rehabilitation. The students shall also be skilled in consultation techniques and methods of patient referral. The students shall have knowledge of and be able to apply The Dental Act, and understand and adhere to regulations pertaining to keeping case records, and the current national dental insurance scheme.

Values and demeanour

The course shall foster both personal and professional development; new knowledge demands a review of standpoints, and this in turn requires ongoing reflection, based on intuition, common sense, conscience and empathy. The students shall be aware that every professional relationship is based on respect for the patient as a person. Education shall be based on humanism as a frame of reference for ethical standpoints. This implies that the students – training in an environment which offers them role models who impart intrinsic professional skills, experience and competence – shall develop both self-awareness and empathy towards patients; these qualities are the basis on which professional demeanour is gradually developed.

Curriculum design

First semester

The first semester begins with an introductory, transition course, based on several themes of importance to the future dentist, such as medical ethics. Efforts have been made to integrate the various subjects, with a central role given to a basic course in scientific method, including criteria for science, causal association and correlation. The course is designed so that the student is trained in the use of both the university library and computer resources as instruments for independent or self-directed learning. During the course, the students undertake a research project, working in small groups under the supervision of an experienced teacher-researcher. These projects are presented in English in the form of a one-day scientific congress during the last week of the course.

The latter part of the first semester comprises a six weeks course in chemistry, in order to ensure basic knowledge necessary for continued studies. The first semester ends with the course in cellular biology, the objective being to familiarise the students with the molecular basis of the function and structure of the cell. Both these courses include various types of practical exercises, such as laboratory sessions and computer-based teaching and learning.

Second semester

During the second semester the students study the normal structure and function of the organs of the human body. It is important for the future dentist to comprehend clearly the regulatory systems of the body, in order to understand different bodily processes and to follow developments in the field of biomedicine. The course covers anatomy, physiology and histology, and also includes a dental strand, with themes of particular relevance to dentistry, such as pain and salivary secretion.

Third semester

This semester comprises a 13-week section on organ malfunction, and forms the basis of studies of the mechanisms of disease. The section covers general and oral pathology, and studies of micro-organisms and the body's defence mechanisms against disease. There are also seminars and group discussions on questions of medical ethics which may arise during the course. Laboratory sessions include culture and analysis of commonly occurring bacteria. The third semester also comprises a four-week elective period.

Fourth semester

During the fourth semester the students study clinical oral diagnosis. The major fields are clinical and radiographic oral diagnosis, general medicine and pharmacology. The objective of the course is to train students in examination of adult patients, and diagnosis of oral and medical conditions. The course includes a research strand, linked to the course in basic science and scientific method from the first semester. The fourth semester also concludes a final examination designed to test the students' comprehension of the courses given previously.

Fifth to tenth semesters

During the clinical phase of the undergraduate course, the students assume greater independence as they gradually become more competent in diagnosis, treatment and management of adults and children with varying treatment needs. Students should be able to recognise and understand the association between oral and medical conditions and assess patients requiring special precautions during dental treatment, for example because of disease or drugs prescribed in treatment of medical condition. There is special emphasis on preventive dentistry. Students are trained to develop communication skills in their contact with patients, and with other health personnel. Applied ethics and psychology are also included in the clinical course.

Complexity of treatment increases successively, keeping pace with the students' advancing knowledge of the theoretical basis of clinical dentistry. During these semesters additional elective periods are included. These periods form the base for the special project each student must undertake and present by the end of the tenth semester.

Courses of the ten semesters of the curriculum in dentistry**Semester 1.**

Introduction course including scientific methods: 9 weeks.

Chemistry and Oral biochemistry: 6 weeks.

Cell biology: 5 weeks

Semester 2.

Normal structure and functions of the organs of the body including a dental strand: 20 weeks.

Semester 3.

Oral histology: 2.5 weeks.

Organ malfunction: 13.5 weeks.

Elective period: 4 weeks.

Semester 4.

Pharmacology: 4 weeks.

General Medicine: 4 weeks.

Oral diagnosis and Oral radiology: 12 weeks.

Semester 5.

Clinical oral Biology I-III: 7 weeks.

Preclinical courses: 7.5 weeks.

General Dentistry I: 5.5 weeks.

Semester 6.

General Dentistry I: 9 weeks.

Preclinical courses: 8 weeks.

Elective period: 3 weeks.

Semester 7.

General Dentistry II, incl. Oral surgery I: 20 weeks.

Semester 8.

General Dentistry II, incl. Oral Children's and Adolescent Surgery II: 13 weeks.

Children's and adolescent Dentistry I: 7 weeks.

Semester 9.

General Dentistry III: 7 weeks.

Children's and Adolescent Dentistry II: 7 weeks.

Oral radiology: 2 weeks.

Administration and Management and Community Dentistry: 1.5 week.

Clinical Pharmacology: 2.5 weeks.

Special Assignment - planning period: 0.5 week.

Semester 10.

General Dentistry III: 4 weeks.

Nitrous Oxide Sedation: 5.5 weeks.

Oral Surgery/Otorhinolaryngology/Oncology: 5 weeks.

Special assignment: 4.5 weeks.

General Dentistry includes both subject-specific courses, based on the dental specialities, i.e. Cariology (incl. *Restorative Dentistry*), Endodontics, Clinical Oral Physiology, Periodontology (incl. *Function of the Masticatory System*), Prosthetic Dentistry, Toxicology and Clinical General Dentistry.

All clinical training in general dentistry for adults is run in a comprehensive care clinic, where the one student is responsible for the total oral care of all his/her patients.

Course committees run the planning and continuous evaluation of the curriculum. There are six such course committees with different fields of responsibility.

Course committee I: Introduction course incl. scientific methods.
Elective periods and special assignment.
Involves courses during semester 1, 3, 6, 9 and 10.

Course committee II: Normal structure and function of the organs of the human body.
Involves courses during semester 1 and 2.

Course committee III.: Dysfunctions of the organs of the human body.
Involves courses during semester 3.

Course committee IV: Oral diagnostics and general medicine.
Involves courses during semester 4.

Course Committee V: General dentistry
Involves courses during semester 5, 6, 7, 8, 9 and 10.

Course Committee VI: Children's and adolescent dentistry.
Involves courses during semester 8 and 9.

Section 5: Biological Sciences

5.1 Chemistry

1. The course

The course is scheduled to the first semester of the first year of study in odontology. The course runs in parallel to the Introductory course for students of odontology. This means that although the course corresponds to 6 university points it is scheduled over a time of 11 weeks.

The Course consists of the following sections, each examined separately:

a) General and Physical Chemistry (1 p)

This course covers general definitions and concepts, with emphasis on acid-base equilibria and problem solving in that area. It includes one day of laboratory work with titration and buffers, and also covers photometry including the Lambert-Beer law, kinetic treatment of the decay of radioactive isotopes, and elementary concepts of various types of chromatography .

b) Chemistry of the Natural Products (0.5 p)

Descriptive chemistry of carbohydrates, lipids, proteins and nucleic acids. The covalent bond, structural formulae, basic concepts of stereochemistry.

c) Medical Chemistry (3 p)

Basic bioenergetics, the ATP molecule. Basic concepts of enzymology. Digestion and absorption in the gastrointestinal tract. Metabolism of carbohydrates, lipids, proteins, and nucleic acids. The respiratory chain. Transport of oxygen and carbon dioxide in blood. Hormones. Haemostasis. Two days of laboratory work are included (properties of salivary amylase, and study of transamination in rat liver homogenate).

d) Oral Biochemistry (1.5 p)

Buffer systems of saliva. Salivary constituents including salivary glycoproteins. Calcium and phosphate metabolism. Chemistry and biochemistry of dental plaque.

2. Primary aims

1. To provide basic knowledge in general and physical chemistry, chemistry of the natural products, medical chemistry and oral biochemistry necessary for further studies in odontology, particularly in physiology, pharmacology, cariology and periodontology
2. To provide a general understanding of chemistry as a basis for life-science-oriented education.

3. Main objectives:

Cf. 1.

4. Hours in the curriculum

- a) 16 h
- b) 10 h
- c) 29 h
- d) 8 h (plus computer-aided teaching)

In addition to the above:

Four exercises in problem solving in physical chemistry, 8 h

Four laboratory sessions, including introductory lectures, 16 h

Repetition of basic concepts in chemistry, 4 h

Total: 91 h

5. Methods of teaching/learning

Teaching: Lectures, practical sessions, laboratory sessions, computer-aided teaching.

Learning: Lectures, practical sessions, laboratory sessions, questions and discussion with the teachers, reading compendia and recommended literature.

6. Assessment

Compulsory course evaluation to be filled in during the last examination (medical chemistry).

7. Strengths

Lectures and exercises are given at a reasonable speed. The aim is that each lecture/exercise should move on at a pace that is in dynamic equilibrium with the students comprehension. 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/exercises. This is appreciated by the students, as are also the laboratory sessions which they considered demonstrate well the theory and important principles.

8. Weaknesses

The course layout and the teaching material (compendia) need updating, particularly in fields such as biochemical separation techniques and chromatography. Recent developments in these fields are currently presented in lectures on modern aspects, principles and instrumentation.

9. Innovations

Design of exercises in problem solving in general and physical chemistry. Highly interactive where students participate with suggestions and discussion.

10. Plans for future changes

Use of a textbook in Chemistry/Biochemistry with compendia only as a complement, to reinforce knowledge in areas of special relevance to odontology. Seminars with groups of 12-15 students.

5.2 Molecular Biology*1. The course*

The aim of the course is to give the students an insight into the basic structures and functions of pro- and eucaryotic cells. The lectures span from basic principles of molecular cell biology to organogenesis. One practical laboratory experiment (polymerase chain reaction) is included to illustrate the basics of DNA synthesis and the power of this particular technique. The course is at present given on the five last weeks of the first semester.

2. Primary Aims

1. To provide the students with enough knowledge to understand the basic rules for the function and survival of a cellular organism.
2. To provide basic knowledge in cell and molecular biology as foundations for the courses in anatomy and histology.

3. Main objectives

1. On completion of the course, students should know:
 - Components of pro- and eucaryotic cells
 - Basic molecular biology (basic structures, structure-function relationships)
 - The cell organelles and their function
 - Replication, transcription, and translations
 - The cell cycle
 - Cell communication
2. On completion of the course, students should have knowledge of:
 - Signal transduction
 - Mitosis and meiosis
 - Developmental biology

4. Hours in the curriculum

Five weeks fulltime. Lectures correspond to six hours per day.

5. Method of learning/teaching

Selected chapters in textbooks in Cell biology (Essential Cell Biology) and Embryology (Essentials of Human embryology). Lectures using PowerPoint computer presentation technique on the most important basic principles. Overview lectures on clinical examples of genetic diseases. Lecture and practical training on the PCR technique.

6. Assessment methods

After three weeks, a test on cell and molecular biology, to encourage continuous reading. A major examination covering the whole 5 week course, including PCR, on the last day of the course.

7. Strengths

Experienced lecturers. A logical course with a clear beginning (the cell) and clear end (development of a foetus). Practical experience of the PCR technique.

8. Weaknesses

A large area to be covered in only five weeks. Two large textbooks to cover during the same period. A completely new terminology is introduced during the embryology section. We are now considering moving embryology to the anatomy course: this would eliminate double teaching of terminology.

9. Innovations and Best Practices

Advanced use of computer assisted lectures, where films from the textbook CD ROM have been introduced. The recent introduction of the practical PCR experiment to better illustrate basics of DNA synthesis and the usefulness of the technique.

10. Plans for future changes

A full integration between the courses in Medical Chemistry and Cell and Molecular biology where the aim is “to describe the structure and function of the organelle in the morning and describe the chemical processes in the same organelle in the afternoon”. Apart from the gains from integration the two courses will span most of the first semester whereby more time is provided for the students to read the textbooks. The Embryology section will move to the course in anatomy to simplify the learning of new terminology. Seminars on important processes will be introduced; this will encourage discussion and more interactive learning.

5.3 Genetics

Genetics comprises a small section of the course in cellular biology.

VISITORS' COMMENTS

The integrated approach is commended. Lectures, seminars, chat groups and practical laboratory work are well balanced. This course is now under review (see recommendations). We support the aim to have the same level of instruction and knowledge as medical students.

Section 6: Pre-Clinical Sciences

The structure and function of the human organ systems

1. The course

Covering 17 weeks of the second semester of first year dentistry, this is an integrated course based on anatomy, histology and physiology, with several strands of basic oral physiology and function interwoven. It deals with the structural organization of tissues and organ systems, their functions and interactions. There is special emphasis on integration between basic morphological and physiological sciences, in order to convey an understanding of the relationship between structure and function.

2. Primary aims

This course sets out to teach basic knowledge about the normal organization and function at the cellular and organic levels, knowledge that is necessary for the understanding and the treatment of oral disease, either in clinical dentistry or in other biomedical fields.

3. Main objectives

- Laying a foundation of basic science. The course aims to convey an understanding of how individual structures relate to the composition of the entire body.
- Correlating structure and function. The relationship between morphology and physiology is the key to understanding the subject.
- Building a professional vocabulary.
- Introducing basic knowledge in developmental anatomy and physiology.
- Describing how various feedback mechanisms work to maintain normal physiological processes.
- Conveying an understanding of the role of specific oral physiological processes in general homeostatic mechanisms.
- Providing basic knowledge in biological sciences for students who want to pursue careers in dental research and/or education.

4. Hours in the curriculum

The course covers 17 weeks. Each week has an average of 12-14 scheduled lecture hours and 10-12 hours of scheduled group laboratory sessions.

5. Method of learning/teaching

The course consists of lectures for the entire student group, lab. groups for gross anatomy, microscopy and physiology, and smaller study groups for a restricted number of students. Although used at a few stages, Problem Based Learning is not a key feature of this course. Interactive computer programs are used for several sections.

6. *Assessment methods*

Students have to progress through the course by passing two written tests on part of the course as well as a microscopy examination, to qualify to sit for the final written exam. This consists of a six-hour test with six questions, each covering a broad area of structure and physiology within a defined functional system. The individual student may attempt each test three times..

7. *Strengths*

The major strength of this course is the successful integration of the three basic sciences, anatomy, histology and physiology. These subjects here form a unified body of knowledge which we believe helps the students to gain a better understanding of how the normal human body works. Furthermore, oral topics of relevance are introduced by specialists at appropriate stages, e.g. taste/smell and salivary function while studying the digestive system, or trigeminal pain during the nervous system study. This helps the students to perceive the oral cavity in its true context, and not isolated from the rest of the body.

8. *Weaknesses*

The formidable mass of information demands a great deal of memory work. We recognize that teaching techniques based on Problem Based Learning may to some extent be better suited to enable the students to penetrate the subject. However, the time available for the course does not allow us to employ such techniques.

9. *Innovations and best practices*

- Full integration of structure and function
- Three-day seminar on various aspects of pain
- Individual projects presented as seminars
- Award presented to best student at the end of the semester

10. *Plans for future changes*

We hope to reduce the number of lectures, in order to allow more time for self-study. To compensate, efforts will be made to expand computer-based learning. Some aspects of development as well as ageing of the human body are inadequately covered at present: these topics will be expanded and integrated into the course.

Oral Anatomy

1. *The course*

This course comprises 3 weeks at the end of the second semester of first year dentistry, and focuses on the topographic anatomy of the head and the neck.

2. *Primary aims*

To guide dental students in the study of the specific anatomy of the head and neck, with special reference to the practice of dentistry.

3. *Main objectives*

- To provide necessary knowledge in anatomy for the understanding of clinical subjects, especially oral radiology and oral surgery.
- To build a professional vocabulary.
- To introduce basic knowledge of developmental anatomy necessary for understanding the causes for craniofacial malformations.
- To provide the opportunity, through dissections, to practice manual skills for future surgical training

4. *Hours in the curriculum*

The course runs over 3 weeks. Each week has an average of 10 scheduled lecture hours and 10-12 hours of scheduled laboratory dissection practical sessions.

5. *Method of learning/teaching*

The course consists of lectures for the entire student group and group work in the dissection sessions. In addition, osteology is presented for smaller classes of students, under the supervision of lecturers. Interactive computer programs are also used (e.g. A.D.A.M., Interactive skeleton).

6. *Assessment methods*

The course finishes with a preliminary *viva voce* examination, followed by a final written paper: a 2.5-hour test with 21 questions. The individual student may attempt each test three times.

7. *Strengths*

- Dissection of human cadavers
- Teachers with clinical experience

8. *Weaknesses*

- The course is in need of modernization with respect to technology and learning equipment: the currently available computers, software and radiological material are inadequate.
- The course is taught during the pre-clinical stage, and for some students it may be difficult to retain all pertinent knowledge in basic oral anatomy needed during the clinical courses, about a year later.

9. *Innovations and best practices*

- A generous and carefully supervised dissection lab. course.
- Full-day seminar on the structure and function of the temporomandibular joint.

10. *Plans for future changes*

We hope to establish closer links with the clinical subjects, so that the correlation between basic anatomy and e.g. radiology will be stronger and more obvious. We also plan to expand computer-aided learning by acquiring up-to-date software and computers.

VISITORS' COMMENTS

Well integrated course. teaching normal morphology and function. We would recommend discussing the content with the dental para-clinical and clinical disciplines. The integration so far is more time oriented and the team of teachers should discuss joint seminars, at least some of them prepared by students.

Section 7: Para-Clinical Sciences

7.1 Pharmacology

1. The course

Pharmacology is taught during the 4:th and the 9:th semesters.

2. Primary Aims

1. Knowledge about effects and properties of medicaments
2. Pharmacotherapeutic methods in dental practice.

3. Main objectives

1. Mode of action
2. Pharmacokinetics
3. Secondary effects
4. Interactions
5. Drug addiction
6. Developments in pharmacology
7. Current science

4. Hours in curriculum

Pharmacology, 5:th semester, 49 hours

Clinical pharmacology, 9:th semester 18 hours

5. Method of learning/teaching

Lectures, conferences and sessions led by teachers

6. Assessment methods

Written examination

7. Strengths

Appreciated by the students.

8. Weaknesses

The course is rather "compact". A lot of information in a relatively short time.

10. Plans for the future

To spread the course over the 4:th semester which should give possibilities for extended integration.

7.2 Microbiology

1. The course

Microbiology has both preclinical and clinical aspects. The students need to know both the basic behaviour of microorganisms, their natural interactions with the host organism, the mechanisms underlying infectious diseases and how these are treated. Because of its position in the curriculum, emphasis is currently on preclinical rather than clinical aspects; it is taught in second year, with a short (2-day) course on

inflammation and infection in fourth year. Previously, the course was separated into Medical Microbiology and Oral Microbiology and taught by two different departments. Combining these two courses has resulted in better co-ordination. Certain aspects of microbiology are also presented in the courses in cariology and periodontology.

2. Primary aims

1. Knowledge of general microbiology including bacteria viruses and fungi.
2. Knowledge of infectious diseases, particularly those affecting the oral cavity.

3. Main objectives

1. To describe bacteria, viruses and fungi in terms of e.g. taxonomy, physiology and morphology
2. To describe the immune system and how it protects the body from infections
3. To learn about the concepts of virulence and pathogenicity
4. To learn about antibiotic treatment and problems with resistance
5. To learn about the normal microbial flora, especially about the oral normal flora
6. To learn oral microbiology and its implications for caries and periodontology
7. To train the students in practical handling of bacteria in the laboratory.
8. To learn about clinical bacteriology and some infectious diseases

4. Hours in the curriculum

The course comprises five weeks: one week's immunology (ca 30 lectures, no practicals) and 3 days' virology (ca 20 lectures, no practicals), and bacteriology, comprising ca 55 lectures and 8 half-day practical laboratory sessions.

5. Method of teaching/learning

Teaching consists mainly of teaching in classes and practical laboratory exercises. Ample time is given for reading. The practical exercises are conducted for groups of 25-30 students each. In Clinical Bacteriology, PBL is used to some extent, with lectures focusing on clinical cases of infection.

6. Assessment methods

Exams are given twice during the microbiology course; one after immunology and one at the end of the course. The exams contain both short and long explanatory questions. Every year the students assess the course by questionnaire, and their views are taken into account during continuous re-evaluation. The overall score is usually 3.5-4 on a 5-point scale.

7. Strengths

A fairly high ratio of teachers to students. Qualified staff available covering all parts of microbiology.

8. Weaknesses

Microbiology is by definition a heterogeneous subject, ranging from bacterial taxonomy, metabolism, diagnostic methods to infectiology. It has been difficult to include everything in the time allocated: much information is lost. Certain parts of the

course would be better given at a later stage, when the students have gained some clinical experience.

9. Plans for future changes

Plans are progressing to divide the microbiology course into three sections: 1) Prokaryotic cell biology, to be given in year one together with eukaryotic cell biology, 2) General and Oral microbiology in year two and 3) Inflammation and infectious diseases in year 4. The latter will be strongly oriented towards PBL.

7.3 General Pathology

1. The course

The course is divided into 2 parts: 1. Basic pathology describing general pathogenetic mechanisms underlying cell damage, cellular adaptation, tumor development, inflammation, regeneration and tissue repair and 2. Organ pathology. The course is given in the middle of the 3rd semester, just prior to the more specialized course in oral pathology.

2. Primary aims

To provide a theoretical background to inflammatory, tumor and immunological diseases and to provide relevant organ-specific examples of such diseases.

3. Main objectives

See above.

4. Hours in the curriculum

3,5 weeks.

5. Methods of learning/teaching

Lectures (45 hours), macroscopical and microscopical demonstrations of diseased tissues, histological techniques, autopsies (2 for each student).

6. Assessment methods

Written examination at the end of course.

7. Strengths

Mechanistic explanation in combination with anatomical/histological description of pathogenesis of organ dysfunction. Clinically oriented.

8. Weaknesses

No time for histopathological studies by the students themselves.

9. Innovations and Best Practices

Not applicable.

10. Plans for future changes

We would like to see better integration with other disciplines in the pre-clinical period, in particular oral pathology.

VISITORS' COMMENTS

We feel that there is a need for discussion of further internal integration of these subjects. Additionally, there seems to be a need for better integration of these subjects with dental disciplines in the pre-clinical period, particularly with dental pharmacology, oral microbiology and oral pathology. We note that pharmacology integrated into general medicine and we support the idea of extending the time over which the pharmacology course is given to permit greater possibilities for clinical integration.

Section 8: Human Diseases

8.1 General Medicine

1. The course

"General medicine" is taught during the 4:th semester and comprises several medical specialities including general surgery.

"Ear-nose and throat" and Oncology is taught during the 10:th semester.

2. Primary aims

To provide knowledge of general diseases, with special reference to oral problems.

To help the students understand the close relationship between odontology and medicine.

3. Main objectives

- Medical conditions increasing the risk of complications during dental treatment.
- Medical conditions that might put the dentist providing treatment at risk.
- Medical conditions with oral signs and symptoms which should be referred.
- Malignancy in the oral cavity
- The importance of the patients' health and medical declaration.
- How to handle general complications during dental treatment.
- Analysis and tests.

4. Hours in the curriculum

General medicine , 78 hours

Ear-nose and throat , 20 hours

Oncology, 20 hours.

5. Method of learning/teaching

General medicine, 4:th semester. Lectures within the fields of internal medicine, general surgery, nutritional health, dermatology, ENT, geriatrics, psychiatry and infection.

Demonstrations. Blood sampling. Allergy tests. Analysis. Importance. Lectures and clinical conferences on odontologic aspects of medical conditions, with contributions by medical as well as odontological specialists.

Ear-nose and throat, 10:th semester. Lectures, patient demonstrations, practical training in examination of patients.

Oncology, 10:th semester. Lectures, seminars, demonstrations, observation at the Department of Oncology, Södersjukhuset.

6. Assessment methods

General medicine. One written examination after the lecture series. A final examination at the end of the semester comprising two patient cases with as well medical as dental problems.

The main goal with this is to assess the student's ability to "understand" and have a "comprehensive view".

7. Strengths

Integration between medicine and odontology.

8. Weaknesses

A lot of disciplines, medical as well as odontological, are involved. Coordinating is sometimes a problem.

9. Innovations and Best Practices

The course in general medicine has recently been expanded markedly with representatives from several medical specialities. The basic approach of the course is that the oral cavity should be viewed as part of the whole body.

10. Plans for future changes

To give the students possibilities to see more of "real patients". More emphasis on the medical/odontological problems.

8.2 General Surgery

General surgery comprises a small section of the course in general medicine.

8.3 Anaesthesiology

1. The course

Local anesthesia is taught during the 5:th semester.

2. Primary aims

The students shall have knowledge about the principles of pain relief and be able to give local anesthesia in the oral cavity .

3. Main objectives.

Principles of pain relief.

Practical training in local anesthesia in the oral cavity.

4. Hours in the curriculum

Seventeen hours. Nine of these are practical training.

5. Methods of learning/teaching

Lectures. Demonstrations. Clinical practice.

6. Assessment methods

Written and clinical examination.

7. Strengths

Few students on each supervisor during practical training.

8. Weaknesses

The students use each other as "patients" when they practice local anesthesia during the course. Thus the anatomy is very similar.

9. Innovations

Integration with Pharmacology.

10. Plans for future changes

To give the students the possibility to practice local anesthesia under supervision on "real patients" during the course.

VISITORS' COMMENTS

The information in general medicine and surgery is the minimal level necessary for general dental practice. We feel that an attempt is made to combine too many medical disciplines in the 4th semester. Students do not have the opportunity of examining patients directly but have to observe demonstrations by staff; we do not consider this to be satisfactory. There appears to be no training in the basic principles of general anaesthesia.

To raise communication skills, bedside teaching is recommended. Close collaboration with the medical departments is recommended. We recommend that the responsible physician be course co-ordinator.

Taking into consideration the continual changes in population resulting in numbers of elderly and medically handicapped persons, we recommend that more attention be paid to the medical problems of these groups.

Section 9: Orthodontics and Child Dental Health

Children's and adolescent dentistry I

Orthodontics

1. The course

Semester 8.

2. Primary aims

To teach the students the theoretical and clinical background to orthodontic treatment planning. To teach them how to assess treatment needs and introduce them to the clinic.

3. Main objectives

1. Basic knowledge of the growth and development of the cranium, the jaws, the dentition and other oral tissues;
2. To recognise sagittal, vertical and transverse deviation from the normal dentition;
3. Cephalometric analysis from a profile X-ray;
4. Orthodontic treatment planning;
5. Preclinical training on a mannikin, making orthodontic appliances commonly used in general dentistry;
6. Introduction to clinical work as chairside assistant to the teacher;
7. How to search the relevant literature.

4. Hours in the curriculum

Four hours per week over 20 weeks.

5. Methods of learning/teaching

The teaching is of a traditional form: 25% lectures, 25% with 12 students per teacher, 25% clinical work with six students per teacher and 25% preclinical and theoretic work with six students per teacher. At the end of the semester, there is a written exam covering the theory.

6. Assessment methods

Written examination at the end of the semester, and direct communication between the teacher and the students during the sessions. Students keep a log-book of clinical practice for self-assessment.

7. Strengths

There are small student groups, allowing for the teachers to get to know the students. The students are aware that they are judged on their ability to establish a good relationship with the patient and to understand the "philosophy of Orthodontics". There are no quantitative clinical requirements. The teaching and learning environment is harmonious and relaxed.

8. *Weaknesses*

The financial restraints on employment of more teaching staff, and the lack of time for preparing new forms of teaching e.g. courses in problem based learning.

9. *Innovations and Best Practices*

Letting the students practise not only removable appliances, but also working as assistants to teachers providing more advanced orthodontic treatment. Practising on a well-equipped mannikin.

10. *Plans for future changes*

In the Fall semester year 2000 there will be a new student clinic shared with the Paedodontic Department. To work towards continuous development of the curriculum in co-operation with the Paedodontic Department.

Child dental health

1. Curricular position

Semester 8

2. Primary aims

1. To give students an understanding of child oral health in relation to general health and conditions in the society.
2. To give students opportunity to acquire knowledge and skill required for prevention, treatment and risk assessment of oral disease during childhood.

3. Main objectives

1. Understanding of oral diseases in children and how they relate to social and economic factors in society and how child dental health is organised in Sweden.
2. Confident with behaviour management techniques
3. Confident in methods of prevention of oral disease in individual children as well as on the group level. Confident in giving information to parents with one year old children at child health centres.
4. Confident in the diagnosis, therapy planning, treatment and risk assessment of oral diseases in children and adolescents
5. Confident in pain management in children and adolescents, including, anaesthesia and methods of sedation
6. To get insight in your own learning styles, learn to reflect on your own clinical practices, to learn self-assessment and to formulate your own learning goals.

4. Hours in the curriculum

Two sessions of 3 hours every week for 20 weeks, a total of 120 hours. The time spent treating patients is about 90 hours.

During this semester a lecture series is given comprising about 15, 45 min lectures.

5. Method of learning

The methods of learning are based on self-directed learning and reflection. With the use of a clinical log book, all clinical activities are recorded. The students are trained in self-assessment using a competence scale. This assessment is then externally validated by the teachers. The students are encouraged to reflect on each treatment session, what problems they did encounter, what they did to manage the problems. The clinical activities performed by the students are used as a basis to formulate their own learning goal.

The teachers aim to give each student the support and challenge he/she need for their personal and professional development. The teachers give feedback not only on technical procedures but also on attitudes and management skills.

6. Assessment methods

There is a continuous assessment after each clinical session. The students make a self-assessment which is validated by the teacher. At two times a semester the logbook is reviewed and individual learning goals are formulated. One written examination is given.

7. Strengths

See below

8. Weaknesses

See below

9. Innovations

See below

10. Plans for future changes

See below

Children's and adolescent dentistry II

Orthodontics

1. The course

Semester 9.

2. Primary aims

To give the students profound clinical experience useful in general dentistry and to let them assist in the treatment of as many patients as possible. To screen patients with respect to paedodontic and orthodontic treatment needs.

3. Main objectives

1. To assess treatment needs;
2. To continue treatment planning;
3. Deepening knowledge of the etiology and treatment of different malocclusions;
4. To learn about cleft, lip and palate- and other syndromes;
5. To work with preventive care on patients with fixed appliances;

6. To learn how to handle orthodontic retention appliances, seen in general dentistry;
7. To search relevant literature.

4. Hours in the curriculum

Four hours per week for 20 weeks.

5. Methods of learning/teaching

The teaching is of a traditional form with ¼ of the time with lectures, ¼ seminars with different number of students, ½ clinical work with six students per teacher. There is a written exam over clinical cases at the end of the semester.

6. Assessment methods

Written inquiry in the end of the semester and direct communication between the teacher and the students. At the beginning of each semester, the department traditionally provides information about changes to the curriculum, often recommended by previous students.

7. Strengths

See above.

8. Weaknesses

See above

9. Innovations and Best Practices

To give the student a holistic view of children's and adolescent dentistry.

10. Plans for future changes

To be able to develop computerized learning for both theoretical and clinical segments of the course.

Child Dental Health

1. Curricular position

Semester 9

2. Primary aims

1. To give students an understanding of child oral health in relation to general health and conditions in the society.
2. To give students opportunity to acquire knowledge and skill required for prevention, treatment and risk assessment of oral disease during childhood.

3. Main objectives

1. Understanding of oral diseases in children and how they relate so social and economic factors in society and how child dental health is organised in Sweden.
2. Confident with behaviour management techniques

3. Confident in methods of prevention of oral disease in individual children as well as on the group level. Confident in giving information to parents with one-year old children at child health centres.
4. Confident in the diagnosis, therapy planning, treatment and risk assessment of oral diseases in children and adolescents
5. Confident in pain management in children and adolescents, including, anaesthesia and methods of sedation
6. To have an understanding of diseases during childhood
7. To have insight in oral health care for chronically sick and handicapped children
8. To have an insight in diseases during childhood
9. To get insight in your own learning styles, learn to reflect on your own clinical practices, to learn self-assessment and to formulate you own learning goals.

4. Hours in the curriculum

Two sessions of 3 hours every week for 20 weeks, a total of 120 hours The time spent treating patients is about 180 hours.

During this semester a lecture series is given comprising about 15, 45 minutes lectures.

5. Method of learning

The methods of learning are based on self-directed learning and reflection. With the use of a clinical logbook, all clinical activities are recorded. The students are trained in self-assessment using a competence scale. This assessment is then externally validated by the teachers. The students are encouraged to reflect on each treatment session, what problems they did encounter, what they did to manage the problems. The clinical activities performed by the students are used as a basis to formulate their own learning goal.

The teachers aim to give each student the support and challenge he/she needs for their personal and professional development. The teachers also feedback not only on technical procedures but also on attitudes and management skills.

6. Assessment methods

There is a continuous assessment after each clinical session. The students make a self-assessment validated by the teacher. At four times a year the logbook is reviewed and individual learning goals are formulated. A 3-hour final examination is given at the end of the course. Included in the final examination is an essay to be written at home, concerning attitudes to children's dentistry and how students can formulate their own learning goals.

7. Strengths

The courses provide the students with a scientific background and good clinical training in paediatric dentistry. They also visit schools and day care centres to give oral health information. The log book is an effective tool to stimulate students to be more self directed and take responsibility for their own education.

8. Weaknesses

Like most programs in paediatric dentistry the course cannot provide enough clinical experience in traumatology and management of acute conditions. The method of assessment differ from the rest of the school, which may give rise to initial problems.

9. Innovations and best practices

1. the log book
2. a student leads a therapy meeting before each clinical session, where they discuss patients to be treated
3. child dental health information to one-year-olds and their parents
4. students prepare a lecture to go out to schools and day care centres for young children and give oral health information
5. Screening. The students participate in screening sessions, where children and adolescents with low risk of oral diseases are seen.
6. The course is built on an age perspective, pre-school, school age and adolescent.

10. Plans for future change

Our new clinic which is being built at the moment, we move in end of May, will provide us the opportunity to be totally digitised with journal, notes and appointment book.

On our home page we have launched a function where private practitioners can ask questions in paediatric dentistry, these questions will be answered by the students. In the new clinic there will be four stations for computer assisted learning, in the middle of the clinic, literature search, case presentations and programs from other schools will be used.

The log book is subjected to scientific evaluation, this evaluation will continue as we develop the log book.

We have received a grant for development of a OSCE examination in paediatric dentistry, which will be ready in November this year.

VISITORS' COMMENTS

There appear to be insufficient staff for the proper teaching of clinical orthodontics. To meet the needs of general dental practitioners taking care of normal development of deciduous, mixed and permanent dentitions, there is a need for more pre-clinical and clinical teaching of orthodontics. Proposals of more collaborations with public health service are supported, there is also a need for increase the numbers of cases seen.

In paediatric dentistry, the research profile in basic sciences is well developed. The collaboration with the public dental health services is commended. The restricted use of materials in the permanent dentition (i.e. the unavailability of amalgam) is a cause for major concern.

Section 10: Public Dental Health and Prevention

1. Timing in the curriculum

Semester 4 and 10

2. Aim of course

1. To give students knowledge, skill and attitudes which will enable them to practice scientifically based Odontology in the context of environmental factors and the overlapping community factors.

3. Main objectives

On completion of the course the students will:

2. have knowledge of the socio-political ethical and judicial basis and financial and personnel resources for dental care in Sweden
3. know about different models for organisation of dental care
4. have a general knowledge of the distribution and severity of the oral diseases
5. be able to use various simple epidemiological methods for planning of treatment, evaluating care outcomes, and analysis of the effect of different factors on the dental health of populations
6. understand the principles governing population-based dental care and priorities in care
7. understand the theoretical basis for changing attitudes and behaviour by education
8. be able to provide and assess the reception of information on dental health care to groups

4-5. Hours in the curriculum and method for learning/teaching

17 lectures in administrative dentistry, 14 lectures in Social Odontology and Dental Health Care. Course literature recommended.

6. Assessment method

Requirements and compulsory attendance at the above and a pass in the written examination paper.

7. Strengths

Training in methods used to plan the dental care, prognosis of dental care and analysing different factors concerning the dental health among the population.

8. Weaknesses

Improved co-operation with the Public Dental Service needed.

9. Innovations

A project which involves bringing oral health care to the work-place has been in progress since January 1983. It is based on cooperation between the Dental School and the public dental health.

A mobile clinic has been constructed. The clinic can be set up in a readily available area for example a conference room in 30 minutes, and can be transported between various work-places in a small van.

10. Plans for future changes

See paragraph 8.

VISITORS' COMMENTS

We have commented elsewhere on the collaborations desirable with the clinical courses in the school. We strongly urge that student/patient contact should begin in semester 1 in preventive dentistry with patient contact. Plans for increased collaboration with the public dental services are supported. We strongly recommend the exposure of students to different population groups in nursing homes for the elderly, industrial enterprises, kindergartens, homes for handicapped etc, by use of the mobile clinical facilities.

Subject-specific courses in General Dentistry

VISITORS' NOTE

This topic is discussed under section 11, Restorative dentistry

Section 11: Restorative Dentistry

11.1 Cariology (Conservative Dentistry)

Preclinical cariology

1. The course and its timing in the curriculum

The 5th semester of the dental undergraduate course opens with a nine week course in preclinical cariology, integrated with lectures on dental biomaterials and an introduction to oral surgery.

2. Primary aims

Prepare students for clinical practice in all aspects of restorative dentistry related to dental caries.

3. Main objectives

1. To learn principles for cavity preparations for plastic restorative materials (composite, glass ionomer and amalgam)
2. To handle common restorative materials.
3. To attain the prerequisite level of manual skills for admission to clinical training in restorative dentistry.

4. Hours in the curriculum

Each student takes on average 100 hours to achieve the above aims. Practical training is integrated with lectures and demonstrations.

5. and 6. Method of learning/teaching and assessment methods

During the first three weeks the practical work of the students is constantly supervised by the teaching staff. This is followed by six weeks of independent work with little or no guidance. To reach this stage of independence and as an introduction to this second period each group of students has to assess a number of preparations and fillings done by others, in order to obtain a calibrated view of what is optimal, acceptable or unacceptable standards.

When their practical work is finished it will be examined by teachers. This is followed by a *viva voce* examination covering practical and theoretical knowledge as well as their assessment of their own work.

7. Strengths

The interaction between the students' self-assessments and the teachers' points of view is a constant process during the whole course. This is however especially emphasised during the first independent period and at the end of the course.

Student assessments disclose that the course is generally considered to have a high standard of teaching and learning.

8. Weaknesses

Constant shortage of teachers.

Equipment is old-fashioned and almost worn out.

9. Innovations and Best practices

Continuous development to meet the changing needs of the students and changes in clinical dentistry.

10. Plans for future changes

Relocating in the near future to another floor, with access to new equipment and computers to aid teaching and learning.

Clinical cariology

1. The course and its timing in the curriculum

We emphasize that dental caries is an infectious disease that can be prevented and treated by changing the balance between the attacking and resisting factors. The signs of the disease, the lesions and cavities, are restored with modern filling materials (composites, glass ionomers, porcelain, gold etc.) to establish function, aesthetic and healthy oral conditions. To reach our goals we give the students instruction and data about epidemiology, aetiology, diagnosis, prevention and treatment of the caries disease and other pathological changes of the dental hard tissues. On completion of the course, the students will have adequate knowledge and skills to work independently as a dentist. The course consists of lectures, seminars, demonstrations and clinical training in the comprehensive care clinic. The main theoretical part of the course is in the 5th to the 7th semester and the clinical part, treating patients, starts at the 5th semester and continues until the end of the 10th semester.

2. Primary Aims

1. To prevent and treat the caries disease and thus to keep the patient healthy is the primary aim, the secondary aim is to restore teeth to good, long-lasting function and aesthetics.

3. Main objectives

The main objectives are:

2. On completion of treatment ,the patient will
 - i. have healthy oral conditions without any signs or symptoms
 - ii. have been informed and motivated in preventive measures and
 - iii. be satisfied by the treatment delivered.
3. Prevention and treatment shall be based on
 - i. thorough investigation of the patient's medical, oral and social condition, including relevant tests (e.g salivary flow rate, presence of cariogenic bacteria.)
 - ii. correct and complete diagnosis

- iii. leading to an adequate therapeutic and preventive program registered in clear and easily understandable dental records.
- 4. The preventive and therapeutic measures should be adequately performed in a logical order. The patient shall be efficiently informed about preventive measures and the restorative treatment shall be of good quality, using restorative materials selected as optimal and appropriate to each situation.
- 5. The therapeutic treatment shall lead to a healthy mouth, a well functioning dentition with intact teeth, resistant teeth, durable, optimally shaped restorations in beautiful teeth.

4. Hours in the curriculum (Theoretical course).

The main hours used for cariology are:

5th semester: 53 lectures and 36 hours with smaller group demonstrations / seminars.

6th semester: 34 lectures and 8 hours smaller group demonstrations / seminars.

7th semester: 22 lectures and 20 hours smaller group demonstrations / seminars.

8th semester: 20 hours smaller group demonstrations / seminars.

5. Method of learning/teaching

Theory is taught mainly by lectures for full class (60 students), but also seminars, practical sessions in groups and demonstrations for small groups.

Clinical training, in the comprehensive care clinic: patient treatment is based on a holistic approach. Each clinical session starts with a presentation and planning of the days clinical work.

Additionally, teaching is performed as individual tutoring in elective periods when the students are required to find and present information within a limited area of research.

6. Assessment methods

Theoretical knowledge is assessed by traditional written papers, with questions designed to test knowledge and understanding of cariology. Each stage of the clinical work is assessed throughout the treatment of the patient. After each completed patient treatment the student shows her / his work to the teacher. The student describes the patient history, status, diagnosis, treatment planned and performed, preventive measures recommended, patient reactions and prognosis. The outcome of the treatment is discussed between teacher and student. The fillings are assessed for quality according to the CDA system and the assessments are discussed with the teacher. There is also a written examination, centred around a patient, which tests a complete treatment situation, including knowledge of cariology.

7. Strengths

To treat dental caries as a curable disease. After treatment, the patient has healthy restored teeth, in a dentition with good function and aesthetics and the patient knows how to prevent further disease.

8. Weaknesses

The students do not meet the same teachers at each clinical session, and may receive conflicting advice about how to perform certain procedures. This may at first be

confusing to the students, but as they become more experienced, they can benefit from understanding that each clinical situation can have different solutions. At that time the initial weakness becomes a strength.

9. *Innovations and Best Practices*

1. Comprehensive clinical work from the start, giving students a holistic patient view.
2. Comprehensive clinical chart to register the oral situation.
3. Two students work together during the first 10 weeks of patient treatment.
4. Advanced methods for detection and quantification of incipient caries lesions are presented and applied.
5. Problems concerning eating disorders (anorexia/bulimia) as topic for special assignment.

10. *Plans for future changes*

Computer records. Rebuilt clinics will facilitate communication between the teacher and the group of students in daily clinical work. The contact between one teacher and her / his student group can be closer.

11.2 Endodontics

1. *The course and its timing in the curriculum*

The course in endodontics is presented for the students during their 7th semester and includes a pre-clinical course, an introductory clinical course and a clinical course with lectures, seminars and clinical work on patients in the comprehensive care clinic.

2. *Primary Aims*

1. To diagnose, prevent and treat pulpal or periodontal conditions, with a biological and scientific approach.

3. *Main objectives*

2. The students should be able to plan, organize and perform an endodontic treatment.
3. The students should have knowledge of the prognoses from endodontic procedures
4. The students should have knowledge of anatomical structures within the teeth and within this region of the body
5. The students should have sufficient knowledge to diagnose and treat patients with different pain conditions
6. The students should have knowledge in endodontic microbiology, traumatology and pharmacology
7. The students should have knowledge of different materials used in dental/endodontic practice
8. The students should have knowledge in the management of endodontic complications

4. *Hours in the curriculum*

During the pre-clinical course the students work (50% of the students at a time) for 3 hours, in 8-10 sessions. The clinical demonstrations on patients are performed for groups of eight students in 5 sessions (2-3 hours each time), 3 sessions during the clinical demonstration course and later during the semester, 2 occasions for guidance in molar treatment.

16-20 hours of specific endodontic lectures are presented to the students. In addition, 5 seminars (1 hour each time) i.e. a discussion of endodontic literature read and presented by the students.

The time for the clinical work on patients is very difficult to estimate since the course is fully integrated within the Comprehensive Care Clinic, where the minimal requirements in Endodontics are 7 root-fillings (3 on molars).

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.

6. Assessment methods

Written tests following each course. One test after the pre-clinical course/clinical demonstration course: if this test is passed the student is allowed to work with endodontic procedures on patients at the integrated care clinic.

There is a final examination on the whole endodontic curriculum towards the end of fourth year.

7. Strengths

The students are introduced early in the integrated care clinic and they are encouraged to look upon their patients in a broader perspective.

8. Weaknesses

The common conflict between the goals of the comprehensive care and those of a specialist is noticed also in endodontics.

10. Plans for future changes

The final examination in endodontology should be placed later in the curriculum so that the students may be more mature in their clinical considerations.

11.3 Prosthodontics (Fixed and Removable Prosthodontics. Edentulous State)

Preclinical Prosthodontics

1. The course and its timing in the curriculum

Preclinical training begins in the 5th semester. The students learn preparations for crowns and bridges, including temporary replacements and impressions. There is also an introduction to dental technology and some parts of the course are integrated with the dental technology students. Continuing with the 6th semester, the students do some waxing and casting of their own and finish the course with a wax-up of bite blocks and a set-up of teeth in wax for a complete denture.

2. *Primary Aims*

Primary aims are to practice preparation work on plastic teeth in phantom heads before the clinical part starts, with real patients, and to learn about the problems and potentials of dental technology.

3. *Main objectives*

1. learn the basic principles of tooth preparations for crown and bridge.
2. rule the art of making perfect temporary restorations.
3. learn impression taking and gypsum models.
4. to judge whether a cast restoration fits to its preparation and to decide what to do if it does not fit.
5. have knowledge about and insight and understanding of the dental technicians work.
6. know tooth anatomy in detail and manage wax technique.
7. have knowledge of the basic principles of baking-up ceramics and firing processes.
8. be able to grind and polish casting alloys, ceramic materials and acrylics.
9. do baseplates, bite blocks and set-up of teeth in wax for a complete denture.

4. *Hours in the curriculum*

Approximately 320 hours per student. (One week = 40 h)

5. *Method of learning/teaching*

Lectures, practical demonstrations and practical work, ending with a written test. There is also a tooth preparation test with time limits.

6. *Assessment methods*

At the end of the 5th semester, a written assessment is given from the student as well as in the end of the 6th semester. Feed-back of the results of these assessments is given to the students at the beginning of semester 6 and 7, respectively.

7. *Strengths*

See below.

8. *Weaknesses*

Shortage of teachers.

7, 9. *Strengths, Innovations and Best Practices*

Integration part with the dental technology course: the dental student prepares a molar for a gold crown in the phantom head and take an impression and pour it up, then the dental technician student waxes and casts the gold crown and deliver it to the dental student. Together they then try-in the crown.

Another innovation is that the dental student uses the lost-wax-technique for making a full ceramic crown (IPS Empress), and takes part in computer reading of models for making a Procera All Ceram crown ("The Swedish crown").

10. *Plans for future changes*

To move the preclinical department to the same floor as the clinical department, for even better integration.

Clinical Prosthodontics

1. The course and its timing in the curriculum

Clinical prosthodontic training starts in the Comprehensive Care Clinic in 3rd year, with fixed Prosthodontics, removable partial and full denture treatment. The course lasts 2 years, the 2nd year including a course in implant supported Prosthodontics (one week; lectures, practical and clinical training).

2. Primary Aims

Clinical prosthodontic training with patients starts in the 6th semester with fixed Prosthodontics, removable partial and full denture treatment. The clinical training last for 2 years within the Comprehensive Care Clinic. The 9th semester includes a course in implant supported Prosthodontics (one week; lectures, practical and clinical training).

3. Main objectives

- Training in treatment planning and identifying the need of the patient.
- Plan and make minimal invasive restorations with bonding technique.
- Tooth preparations for conventional fixed prosthodontics, with minimal biological damage to teeth, pulps, and soft tissues.
- Plan and deliver removable partial denture therapy with a biological approach i.e. without adverse effects on long-term dental, periodontal, and soft tissue health.
- Train in prosthetic treatment of the edentulous patient, observing difficulties and potentials.
- Introduction of implant-supported fixed and removable prosthodontics, give a survey of biological prerequisites and treatment possibilities.

4. Hours in the curriculum (Theoretical course)

The main hours used for the clinical course in prosthodontic are:

6th semester: 10 lectures

7th semester: 35 lectures and 32 hours demonstrations including patients.

8th semester: 35 lectures and 4 hours demonstrations.

10th semester: Implantology course: 22 lectures and 16 hours demonstrations and auscultation.

5. Method of learning/teaching

Lectures, seminars, clinical training, attending classes as an observer.

6. Assessment methods

Student's reports and demonstrations of their clinical treatments made, examinations, seminars and written evaluations.

7. Strengths

Instructed clinical treatments based on the student's own activity and ability to observe and solve problems.

8. *Weaknesses*

Resource demanding: especially with respect to experienced teachers.

9. *Innovations and Best Practices*

Students plan and carry out the entire treatment of the patient. Form an opinion of the prognosis of the treatment and follow the patient as long as is possible during their education.

Integration with dental technician education.

10. *Plans for future changes*

Integrate preclinical and clinical part of the prosthodontic courses. Expand integration with dental technician education.

11.4 Clinical Oral Physiology (Occlusion and Function of the Masticatory System)

1. *The course and its timing in the curriculum*

The education in clinical oral physiology is divided into four different parts. The first course is taught in the first year (second term) and includes basic pain physiology. The second course is part of the diagnostic education in the second year (fourth term) and includes diagnostic methods and basic clinical examination techniques. The third course is taught in the third year and includes diagnosis and basic treatments of orofacial pain conditions of musculoskeletal origin. The first three courses are mainly pre-clinical but the course in the third year includes a clinical part. The final course is clinical. It is taught in the fourth and fifth year (8th and 9th term) and includes diagnosis and treatment of patients referred to the department. Emphasis is put on treatment strategies and diagnosis of chronic orofacial pain.

2. *Primary Aims*

1. To give the students understanding and some basic clinical practice in diagnosis and treatment of orofacial pain conditions.

3. *Main objectives*

Knowledge about

2. neuroanatomy and neurophysiology of the trigeminal system.
3. basic diagnostic methods (clinical examination techniques).
4. orofacial pain conditions of musculoskeletal origin.
5. basic treatment of orofacial pain conditions of musculoskeletal origin (analgesics, bite splints, jaw exercises).
6. chronic pain patients
7. advanced examination techniques (neurological examination, diagnostic anaesthetic nerve blocks etc.)
8. advanced treatment methods, such as intra-articular treatment, acupuncture, nerve blocks etc.

4. Hours in the curriculum (Theoretical course)

First course (second semester): 26 hours of lectures

Second course (fourth semester): 8 hours of lectures, 4 hours of demonstrations, 4 hours of pre-clinical training

Third course (5th and 6th semester): 16 hours of lectures, 20 hours of pre-clinical/clinical training.

Fourth course (8th and 9th semester): 28 hours of lectures, 56 hours of clinical training (patients).

5. Method of learning/teaching

Lectures, demonstrations, element of problem-based learning, and clinical supervision.

6. Assessment methods

Written and oral tests.

7. Strengths

First, there are numerous patients referred to the department. Second, the teachers are specialists in stomatognathic physiology.

8. Weaknesses

First, the subject is fragmented into many small courses. Second, the patients referred to the department are specialist cases and sometimes too difficult for the student clinic.

9. Innovations and Best Practices

See question 10.

10. Plans for future changes

The curriculum in clinical oral physiology has recently been changed and is at present under evaluation.

VISITORS' COMMENTS

For ethical reasons and to raise manual skills, a more integrated preclinical course should be developed. We support the plans to start collaboration with the public dental service by 2000/2001. The integrated approach in clinical training of comprehensive dental care is commended. The school should consider having more integrated seminars where students and specialists from different fields are responsible for the preparation of the material. The ratio of theoretical lectures and problem based case discussions and clinical training in comprehensive dental care should be discussed among ALL clinical disciplines. The course on clinical oral physiology seems to be too extensive.

Section 12: Periodontology

1. *The course and its timing in the curriculum*

The theoretical courses begin in semester 5 and finish in semester 8. The integrated clinic comprising all clinical subjects starts at semester 5 and continues through all remaining semesters. The clinical basics are presented in an integrated course "Oral biology" at the beginning of semester 5. Preventive dentistry is also a separate course in semester 5 including oral hygiene and professional tooth cleaning (scaling).

2. *Primary Aims*

Students should be able to diagnose and treat periodontal diseases and perform periodontal surgery. Students should be able to recognise and manage other oral pathological conditions, and be aware of the importance of referral.

3. *Main objectives*

The student should ...

1. be able to view periodontal problems in relation to general health and in relation to the oral condition as a whole.
2. have a profound knowledge of the normal periodontium and the pathogenesis of periodontal disease, including its microbiological and immunological background.
3. be well informed about the indications and contra-indications for the use of antibiotics in periodontal treatment.
4. be able to recognise risk factors and aggravating factors.
5. be able to inform the patient about the disease so as to motivate the patient to take action to prevent or arrest the disease.
6. be able to suggest and demonstrate existing methods to improve oral hygiene.
7. be able to treat periodontal disease including flap surgery for open debridement.
8. be well informed about the indications for regenerative surgical methods as well as its limitations.
9. be able to include osseo-integrated implant methods in the treatment plan when one or several missing teeth are to be replaced.
10. be able to follow up and support the patients efforts to prevent recurrence after treatment.
11. be trained and motivated to follow advances in periodontology.

4. *Hours in the curriculum (Theoretical course)*

The clinic is integrated within the Comprehensive Care Clinic. It is estimated that about 20% of clinical hours are spent in periodontal treatment, periodontal surgery and treatment planning. During semesters 6-8, lectures, seminars or demonstrations in periodontology comprise a total of about 80 hours per student. In addition, periodontology is included in "Clinical oral biology" in semester 5 (§ 1).

5. *Method of learning/teaching*

Lectures for full class (60 students), clinical demonstrations and seminars for smaller groups (12 students) and individual (1-3 students) therapy planning and surgery

sessions. Individual tutoring in elective periods when the students are required to find and present information within a limited area of research.

6. Assessment methods

Written examination after semester 6 and 7 (final), a total of 8 hours.

The immunological block is assessed as a group project after extensive and detailed teaching.

Additional periodontology is given in semester 8 as lectures and as a clinical demonstration (included in § 4).

7. Strengths

The flexibility of the curriculum permitting latest theoretical data to be presented.

Open and good co-operation between disciplines. The strength of the clinic is the almost complete integration of all clinical procedures. The students provide total treatment for each patient, including almost all treatment needs.

8. Weaknesses

Patient selection is more important compared to when we had a separate student clinic for each specialty. The evaluation of clinical skills in periodontology is more difficult in the integrated clinic.

9. Innovations and Best Practices

1. Flap surgery training on pigs jaw. Instructive and appreciated by the students.
2. Problem based learning within the field of immunology in a block after the final examination.
3. One hour sessions of integrated therapy discussion on standard cases in small groups of 2-3 students.
4. Group seminars on therapeutic solutions of clinical problems with a surgical and/or endodontic approach with discussions on basic biology and other dental disciplines.

10. Plans for future changes

To increase clinical integration between dental and dental hygiene students, in order to improve mutual appreciation and future co-operation between these professionals.

Data base on periodontology under construction to be used in teaching and self-evaluation at different levels.

VISITORS' COMMENTS

We commend the preclinical course on pigs' heads. We recommend the teaching of scaling on mannikin heads. There appear to be problems with the management of periodontal disease in the integrated clinic. We are concerned that students do not obtain adequate experience in periodontal surgery. Group seminars (see 12.9.4 page 60) are to be commended.

Comprehensive Care Clinic

VISITORS' NOTE

We have moved the self-assessment text on the Comprehensive Care Clinic to section xx. We believe that is essential the integrated care be considered in the context of total dental and oral care and not as a subset of restorative dentistry.

Section 13: Oral Surgery and Dental Radiography and Radiology

13.1 Oral Surgery

1. The course

Oral surgery is taught during the 4:th, 5:th, 7:th, 8:th and 10:th semesters.

2. Primary aims

1. The student shall understand the potential of oral surgery and be able to assess the need for surgical treatment in patients.
2. The student shall be able to give local anaesthesia in the oral cavity and perform minor surgical operations suitable for the dentist in general practice.

3. Main objectives

1. Local anaesthesia
2. Tooth extraction and dentoalveolar surgery
3. Traumatic injuries of the teeth and jaws
4. Orthognathic surgery
5. Temporomandibular joint surgery
6. Infections
7. Facial pain
8. Tumours and cysts
9. Premalignancy and malignancy
10. Oral medicine

4. Hours in the curriculum

Diagnostic course, 4:th semester	36 hours. With patients 4 hours
Local anaesthesia, 5:th semester	17 hours. With patients 9 hours
Clinical course I, 7:th semester	16 hours. With patients 12 hours
Clinical course II, 8:th semester	16 hours. With patients 16 hours
Maxillofacial surgery, 10:th semester	65 hours. With patients 36 hours

5. Method of learning/teaching

The diagnostic course, 4:th semester, is characterized by integration. Conferences theme-based conferences are held, with participation by several teachers. The students are introduced to diagnosis of mucous membrane lesions on patients. Basic lectures are held.

Local anaesthetics, 5:th semester is described under "anaesthesiology."

Clinical courses I and II, 7:th and 8:h semesters are almost entirely clinical. The students work in groups of 6 to 8 under supervision of two teachers, mostly extraction of teeth.

Maxillofacial surgery 10:th semester is introduced with lectures followed by assistance and observation at the Department of Maxillofacial Surgery at Huddinge Hospital.

6. *Assessment methods*

Diagnostic course, 4:th semester has an integrated examination described under "general medicine".

Local anaesthesia. Written and clinical examination.

Clinical course (extraction). After introductory lectures, a small written examination. Then continuous assessment during clinical work, and during 10:th semester final written examination.

7. *Strengths*

Few students for each teacher. From 5:th to 10:th semester one teacher to four students.

8. *Weaknesses*

Few patients need extractions in Sweden today. Thus there are problems in recruiting adequate numbers of suitable patients. The students do 5 - 7 extractions, and they are of course interested in more training.

9. *Innovations.*

Dentoalveolar surgery performed via microscope camera to a monitor, either in the operation theatre or in an adjacent room. Excellent view for the students. Connection via "telemedicine" with other hospitals.

Separating the extractions course from the maxillofacial course, which allowed small groups of students, well-supervised by teachers.

10. *Plans for future changes*

Plans for extending the computerbased teaching i.e. within the fields of orthognatic surgery and dentoalveolar surgery.

13.2 Radiography and Radiology

1. *The course*

Radiography and radiology is taught during the 4:th and 9:th semesters.

2. *Primary aims*

1. To give the students knowledge about the nature, origin and biological effects
2. of x-rays.
3. To give the students training in intra- and extraoral radiographic techniques
4. and interpretation of radiograms.

3. *Main objectives*

1. Physical properties of x-rays.
2. Biological effects of x-rays.
3. Hygienic aspects.
4. Radiographic techniques.
5. Processing.
6. Interpretation of radiograms: normal anatomy.

7. Interpretation of radiograms: pathological changes in teeth and jawbone.
8. Radiographic diagnosis of pathological changes frequently seen in general dentistry.
9. Radiographic techniques for investigation of salivary glands, maxillary sinus and temporomandibula joint.

4. *Hours in curriculum*

4:th semester: 90 hours. With patients 40 hours.

9:th semester: 50 hours. With patients 30 hours.

5. *Methods of teaching/learning*

Lectures, demonstrations, practical training, theme conferences integrated with other disciplines.

6. *Assessment methods*

4:th semester:

1. Written examination on the propedeutic course curriculum
2. Integrated examination described under "general medicine"

9:th semester: Final written examination.

7. *Strengths*

The computerized part of teaching.

8. *Weaknesses*

Difficulties to demonstrate methods requiring special equipment such as CT and MR

9. *Innovations*

Development of computerized teaching.

10. *Plans for future changes*

Extended cooperation with the department of radiology, Huddinge Hospital.

VISITORS' COMMENTS

Surgical training is provided mostly at the comprehensive clinic. The department of oral and maxillofacial surgery is quite apart from the other dental clinics and its equipment and disposition do not permit sufficient student engagement in this field. The recommended number of extractions (5-7) in the courses of study is insufficient for graduates. We recommend that students should be involved more in the management of dental emergencies. There is insufficient experience in surgical techniques. We recommend that students should be integrated into operating teams not only to observe but to assist and to participate.

The mutual administration of local anaesthetics to fellow students is problematic and raises ethical question. We recommend that the school should consider the purchase of special mannikins for this purpose to permit preclinical instruction..

We were very impressed with the excellent computer assisted learning programme in dental radiography and radiology. We recommend more clinical integration of dental radiology. we also feel that there might be more integration with the nearby medical radiographic department.

Section 14: Oral Medicine and Oral Pathology

14.1 Oral Medicine

Oral medicine is the overall headline for the integrated courses during the 4:th semester (diagnostics and clinical introduction) and the 9:th and 10:th semesters (clinical diagnosis and therapy).

14.2 Oral Pathology

VISITORS' NOTE

We have deleted the reference to Oral Histology and Cell Biology as not germane to this section.

Oral Pathology

Oral pathology is taught at the end of year two (third semester). Its prime objective is to give the students detailed knowledge of diagnostic histopathology of the head and in particular the oral cavity. The course comprises five weeks with 48 lectures, 8 half-day microscopy sessions and two half-days with supervised practical diagnostic work. The students are given a written examination at the end of the course. The examination is divided into two parts, a first with questions which requires only a short answer and a second which requires two one page essays. In addition the students are requested to write biopsy reports to five unknown cases. During the course the students can practice on cases with radiographs, clinical images and microscopic slides. Teachers are available during the microscopy sessions and also through e-mail. Teaching materials are available through the department's home page.

VISITORS' COMMENTS

Oral medicine as such is not recognised within the Swedish specialist system and is not taught separately from oral surgery. discipline.

Oral pathology should be integrated with the relevant clinical dental disciplines. The reporting of five biopsies by each student is commended.

Section 15: Integrated Patient Care and Dental Emergencies and Special Needs Patients

15.1 Integrated Patient Care

A description of the CC-clinic and an evaluation after 3 years is presented in a paper **Eur J Dent Educ 1999;3:148-152.**

1. The course and its timing in the curriculum

The students undergo all clinical training in General Dentistry for adults in one Comprehensive Care Clinic.

Students enter clinical training in the 5th semester and continue through to their final semester in the 5th year.

2. Primary aims.

The course shall foster both personal and professional development. The students shall be aware that every professional relationship is based on respect for the patient as a person. Education shall be based on humanism as a frame of reference for ethical standpoints.

3. Main objectives

The one student is responsible for the total oral care of all his/her patients. Theoretical and practical clinical training shall be an integration of the various subjects, with a holistic view of the patient. Therefore the students shall be trained to view the patient's medical status in relation to the oral treatment and also to rank various treatment needs in order of priority.

Each completed treatment of the individual case shall be concluded with a quality control which shall form the basis of follow-up of treatment outcome. The aim of the clinical treatment is thus to try to achieve in every patient oral health, occlusal stability and function, and a good aesthetic result.

During the final semester, the patient treatment shall be based on discussions and loyal collaboration with the staff. The students shall assume full responsibility for diagnosis and treatment of the patients.

4. Hours in the curriculum

Each student spends approximately 825 hours treating patients in the Comprehensive Care Clinic.

The students treat patients during "clinical sessions" of 3 hours each.

Semester 5, 3 rd year	25 clinical sessions	i e 75 hours per student.
Semester 6, 3 rd year	45 clinical sessions	i e 135 hours per student.
Semester 7, 4 th year	80 clinical sessions	i e 240 hours per student.
Semester 8, 4 th year	40 clinical sessions	i e 120 hours per student.
Semester 9, 5 th year	40 clinical sessions	i e 120 hours per student.

Semester 10, 5th year 45 clinical sessions i e 135 hours per student.

5. Method of learning/teaching

This is described in detail in the above mentioned paper in Eur J Dent Educ 1999;3:148-152.

Clinical supervision is the responsibility of integrated, multidisciplinary teams of faculty members, namely specialists in cariology, endodontics, periodontology, prosthetic dentistry, oral physiology and oral surgery. All faculty members who formerly supervised the students in the departmentalised clinics now are in the CC-clinic. In the undergraduate clinics in Swedish dental schools, there are no general practitioners - except for some of the faculty members who are also part time general practitioners. Included in these teams are the faculty members who lecture in the theoretical courses. Each group of students is assigned a clinical tutor, who is responsible for overall treatment planning of their patients.

6. Assessment methods

Main criteria for a final pass in the course:

1. Clinical maturity in overall patient management,

By following students for two and a half years in the same clinic, the teachers gain a clear insight into each student's overall progress in the clinic, their clinical competence and their approach to patient care: this is regarded as a major advantage of CCC student evaluation systems.

2. Technical competence in conjunction with theoretical knowledge.

To ensure high standards of professional skills, the students must meet minimum procedural requirements with respect to items of treatment, to ensure that every student is competent in all basic clinical procedures and as a guarantee that every student is properly trained in these basic procedures.

The minimal procedural requirements are:

45 fillings in different materials;
endodontic treatment of 7 teeth;
crown- and bridgework, including a minimum of 10 crowns;
removable dentures: minimum 1 full denture and 2 partial dentures.

There is also a **written Clinical Case Management Test**. The test comprises a patient case, documented with intra-oral photographs, radiographs and patient records. On the basis of this material, the students are required to make a correct diagnosis and propose a treatment plan and prognosis.

7.8. 9. Strengths, Weaknesses, Innovations and Best Practices

See related paper

10. Plans for future changes

In assessing clinical competence at this CC-clinic, there is major emphasis on the development of student maturity and professional responsibility. Definitions and objective evaluation criteria for these important components of generalist competence are to be developed and discussed among the faculty.

15.2 Dental Emergencies

1. The course and its timing in the curriculum

Immediate diagnosis and treatment of oral surgery cases, traumatic injuries, pain of endodontic origin, acute periodontic-endodontic involvements and drug administration. All phases performed under supervision. Lectures and clinical duties. Semester 9 and 10.

2, 3. Aims and objectives

To develop the students' ability to independently diagnose and plan emergency therapy and to manage emergency dental problems, to consolidate knowledge previously acquired and to apply it. Students are also trained to make priority decisions with respect both to the individual's subjective problems and the objective data obtained from history, examination and diagnosis. Further to assess care priorities in accordance with the community's and the carer's resources and demands.

On completion of the course the student should be able to perform the following tasks:

1. independently carry out an examination, make a preliminary diagnosis and
2. plan treatment for adult patients seeking emergency care at the dental
3. school
4. independently keep case notes and diary notes about emergency treatment and
5. write the necessary referrals
6. independently provide emergency treatment for patients with acute problems
7. independently take steps to ensure that the patient is relieved of infection and
8. pain
9. independently evaluate subjective and objective observations in patients with
10. acute problems

4. Hours in the curriculum

80 hrs

5. Method of learning/teaching

Clinical course under supervision

6. Assessment methods

Compulsory attendance, participation in clinical work

7. Strengths

1. Great variety of different cases
2. Training in differential diagnosis

3. Training in making priorities
4. Training in time-planning
5. Training in emergency treatment procedures

8. *Weaknesses*

- Lack of understanding for emergencies from other disciplines within the faculty
- "Dental-school" conflict between "doing-maximal-treatment" versus "doing-minimal-treatment"
- Requires instructors highly qualified in emergency procedures and oriented towards oral medicine
- Emergency patients are often patients from low-income groups or with immigrant background
- Limited curriculum

9, 10. *Innovations and plans for the future*

- Extended opening hours, in order to reach emergency-groups at non-office hours (different clientele)
- Greater collaboration with major neighbouring hospital
- Extended co-operation with the neighbouring university (Södertörns Högskola) offering dental care to students with need for emergency-care.
- Approach based on oral medicine training-program on emergencies and oral medicine for all members of the staff (dental assistants and dentists/instructors)
- Improved co-operation with oral surgery and ENT-department.

15.3 Gerodontology, incl. Care of Special Needs Patients

1. The course and its timing in the curriculum

Within the course of gerodontology in the eighth and ninth semester the part geriatric dentistry deals with disabilities and diseases among the ageing population. This part is lectured in co-operation with physicians in geriatrics and researchers in behavioural science and caring sciences.

2. Primary Aims

The students are taught about geriatric diseases in order to be able to provide adequate oral care for the disabled elderly.

3. Main objectives

Main objectives: Different geriatric conditions such as dementia, Parkinson's disease, stroke, depression, confusion and malnutrition, and the physical and social consequences of these disabilities.

4. Hours in the curriculum (Theoretical course)

The lectures about disabilities in ageing are 28 hours.

5. Method of learning/teaching

The methods of learning/teaching are lectures and seminars.

6. Assessment methods

Assessment is written examination.

7. Strengths

The strength in the course is the co-operation between different sciences involved in geriatrics giving the students a community-wide, cross-sectional multidisciplinary view of disabled elderly, to manage the oral problems as one aspect part of well being.

8. Weaknesses

The weakness is the absence of clinical rotation in long-term hospitals and lack of resources for group discussions.

9. Innovations and Best Practices

Students to train in mobile dentistry in housing for chronically ill elderly.
Visits to hospital dentists working in long term hospitals.
Problems concerning age-related diseases as topic for special assignment.

10. Plans for future changes

In the future the multidisciplinary approach will be strengthened thus integrating the oral problems as a part of total welfare of the disabled aged

VISITORS' COMMENTS

The reintroduction of comprehensive dental care education is commended. With the long tradition of the Karolinska Institutet in integrated clinical training, the department after reconstruction has now the unique possibility of setting innovative aims for better co-ordination of integrated preclinical training, patient centred holistic approach and computer assisted the clinical recall (with the proposed computerised record system). The clinical supervision seems to be insufficient. We hope that the computerised patient record will result in less bureaucratic paper work as this is presently a problem for the students.

We very strongly recommend that a significant proportion of clinical supervision in the the integrated clinic should be given by good general practitioners employed part time for this purpose.

We support the proposed developments in dental emergencies.

The course in special needs patients is given by a highly devoted lecturer. There should be discussion on exposing the students to practical training, integrated within other courses such as preventive dentistry. Students should be responsible for the care of an assigned group of handicapped patients.

Section 16: Behavioural Sciences

16.1 Behavioural Sciences

1. The course

The course “Man and society” comprises one-week full time in the third week of the first semester, and is a part of the introductory course. “Introduction to odontology, with introduction to science, prevention and psychology/ethics”. It consists of basic subject-matter about intercultural communication, group dynamics, language in health care, and ethics and empathy in oral care.

2. Primary aims

The primary aims are to illuminate 1) psychological and 2) ethical aspects of dental and medical treatment, and to discuss questions about 3) priority in health care, specifically in a multicultural society.

3. Main objectives

The main objectives are:

1. basic knowledge about intercultural communication,
2. basic knowledge and training in group dynamics,
3. introductory understanding of communication and
4. language in oral health care,
5. basic knowledge and training in dental ethics and
6. understanding the importance of empathy.

4. Hours in the curriculum

The scheduled time is 26 hours.

5. Method of learning/teaching

The teaching methods are mainly in the traditional lecture format together with a group assignment.

6. Assessment methods

The students’ knowledge is assessed at a concluding seminar, in which the students present their written assignments orally. The students use a traditional questionnaire to assess the course.

7. Strengths

The main strength of the course is the participation of very experienced academic staff, which also is mirrored in the students’ assessments.

8. Weaknesses:

The main weakness of the course is its short duration, which makes an internalisation of the subject-matter difficult for many students. However, the subject is followed up in the later part of the curriculum.

9. Innovations and best practices

The course uses traditional teaching methodology, i.e. lectures and seminars.

10. Plans for future changes:

For the time being there are no plans for more fundamental changes in the course.

16.2 Dental Ethics and Patient Communication

Ethical issues are taught throughout the undergraduate education and included in the clinical training.

1. Objectives

To create respect for fundamental human values in the context of the rapid developments in life sciences and to create good professionals by focusing on what a good professional really is.

2. Ethics and communication skills in the curriculum.

1st semester

An introductory theme "Man and Society" comprises an entire week. The theme highlights a number of essential ethical questions, empathy, professional demeanour and professional competence.

Ethical problems are continuously discussed within several different courses such as paedodontics and gerodontics as well as during the clinical phase as applied ethics and psychology.

5th, 6th, 7th and 8th semester

There are lectures concerning patient communication: how to give information, how to behave in front of the patient, partly illustrated with videotapes and as group seminars.

Elective courses in ethics.

3rd semester

There is an elective course called Medical Ethics I. The principles of biomedical ethics are introduced and discussed as well as informed consent, paternalism and autonomy. The students are trained to make ethical analyses and are introduced to qualitative research methods. Most of the lectures are seminars round the table. Finally the students account for an own ethical analysis of a given case and their conclusions are discussed in the group.

6th semester

The elective course Medical ethics II follows on from Medical Ethics I. The students are further introduced to phenomenology and hermeneutic interpretation as research methods in health care. They make a tape-recorded interview and the results are analysed according to a qualitative research method.

Knowledge gained from these courses can be the foundation of an examination assignment in the final (10th) semester.

16.3 Jurisprudence and Practice Management

1. The course

Jurisprudence and practice management is taught the 9:th semester during the course "administration, practice management and social odontology".

2. Primary aims

1. To give knowledge, skill and create attitudes so that the students can apply odontology with due respect to environmental and superior social factors.

3. Main objectives

2. Social, ethical and juridical factors.
3. Models for organization of dental practice.
4. Epidemiological methods.
5. Understanding of the theoretical base for changes in attitudes and behaviour.
6. How to give information about dental health to different groups.

4. Hours in curriculum

30 hours.

5. Methods of learning/teaching

Lectures. Seminars.

6. Assessment methods

Written examination.

7. Strengths

8. Weaknesses

9. Innovations

10. Plans for the future

VISITORS' COMMENTS

The introductory course "Man and Society" is well constructed and interesting. Medical/dental ethics, jurisprudence and practice management are well covered. More student centred joint seminars and practical exercises should be discussed; the integration of medical and dental and other health sciences students in the learning of ethics is recommended.

Section 17: Examinations, Assessments and Competencies

1. The approach to the assessments

The assessments are used primarily to establish whether the student has reached the educational goals. The different examinations should monitor the students' learning process, including the students' understanding of theoretical knowledge and development of professional attitudes as well as practical skills. The examinations are also used to monitor the teaching standards of the staff, creating continuous feed-back for the teachers and the course planners.

Both summative and formative examinations are used. In all clinical, pre-clinical and several other basic medical sciences summative written examinations are combined with a *viva voce* examination with strong formative characteristics. This combination is used to assess the whole subject, to ensure that no domains of knowledge are overlooked and to provide a more detailed picture of the students' understanding as well as the depth of knowledge in certain areas of the subject. After many (but not yet all) of the summative examinations a discussion of the examination together with the formal examiner is offered the student, in order to enhance the concept of the examination as an element of learning. Pure summative examinations are given in some of the shorter courses where the resources (time and examiners) do not allow for other examination methods.

2. Examination to motivate students

It is not the school's intention to rely on exams to motivate students. However, in a long education there will be moments when the individual student finds it difficult to perceive the relevance of each course to their future professional lives.. During these moments the examination will definitely be important as motivator.

3. Strength of used examinations

1. Written exams (mainly summative)

The written tests allow coverage of large areas of a subject, and are not very resource-demanding. In addition 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 three largest examinations (structure and function, second semester; diagnostic block, fourth semester; major exam in clinical case management, eighth semester) are assessed by a group of examiners. In the examination of the diagnostic block, representatives of the dental community regularly participate along with faculty members in the evaluation of the test results. The use of groups of examiners means strengthened legal security of the assessment of the test result for the student as well as the examiners.

2. Viva voce (mainly formative)

Viva voce examinations allow assessment of in-depth understanding of a subject. Misunderstandings and / or weaknesses can be identified and corrected. The students may ask questions in areas they feel uncertain about. It is also easier for the examiner to explore why weak students are failing (language problems?) and help the student

with study priorities. In addition, it allows the examiner to assess other qualities i.e. how the student communicates his / her knowledge, attitude, etc.

4. Weaknesses of used examinations

3. Written exams

Written tests with several short answer questions may examine mainly “superficial knowledge”. Since the examination controls the students learning strategies to a very high degree, superficial assessment will promote superficial learning.

Viva voce exams

Vivas 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.

5. Innovation and/or best practice

4. The examination of the diagnostic block

After having passed written exams in all subjects included in the fourth semester, an end of semester examination is given to assess the students ability to integrate their knowledge. The examination is built around two clinical cases with anamnestic information (general medicine, medications) and clinical data (oral medicine and diagnostic methodology including oral radiology). The cases are constructed jointly by the organisers of the courses and are then pre-evaluated by two representatives of the dental community (from private and public dental clinics). The course organisers and the representatives then form the examination committee. Assessment of the exams are made in consensus. In close conjunction with the examination, the students and the course organisers discuss the cases.

5. The major examination in clinical case management

This comprehensive examination is designed to test academic ability in conjunction with the ability to understand how various clinical subjects are interrelated. The aim of the test is to complement ongoing assessment in the student clinic, and also to improve the students’ awareness of his or her own strengths and weaknesses. The test is compiled by a multidisciplinary faculty group and comprises a patient case: history, radiographs, status and intraoral photographs. Based on this information the student proposes a diagnosis, a treatment plan, including preventive measures, a prognosis, and an appropriate recall schedule. The tests are coded to ensure students’ anonymity. The same faculty staff, which compiled the test also grades the test.

Experience has shown that the test effectively discloses students already identified by clinical teachers as lacking the maturity for comprehensive case management in the clinical setting.

The test documents the student’s relative strengths and weaknesses in critical aspects of case management.

6. The congress

During the first year the students participate in a course which includes scientific methodology, statistics, oral presentation technique, study techniques and “man and society”. This very broad course is examined by a combination of different examination forms: two theoretical written exams, one seminar and finally the end of

course examination, which is 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 in a project that is to be presented and defended in English at the congress. 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.

7. OSCE in paedodontics

Observed Structured Clinical Examination is a method for the examiner to make an overall assessment of the students' clinical knowledge and at the same time let the student make a self assessment of his / her knowledge. This method is used in the pedodontics department.

8. Peer- and self-assessment in pre-clinical cariology

During the course in pre-clinical cariology several oral examinations are applied. In one of them, manual skills and professional attitude are assessed in an examination with two students and one examiner during one hour. The student shall criticise his / her own work and the fellow student shall also respectfully criticise the other students' work. The preparations, fillings, ability to objectively judge the quality of their own and other students' work are then discussed.

6. Future plans for changes

This includes only plans that are to be realised in the near future. Plans without funding (several computer-based projects) or plans which have not yet been accepted by the program committee are excluded.

9. Inventory

A change in the curriculum has recently been accomplished. The major work of creating this curriculum was done locally by the teachers. The changes are now to be evaluated. The program committee has therefore decided to perform a thorough inventory of current examination methods. The data are being collected during the present spring semester and analysis is planned for the autumn. The outcome of this inventory will form a basis for future changes.

10. Log-book-project

In order to find ways to teach the student self-reflection, elements of self- assessment have been included in several of the clinical subjects. One step further is to let the students follow their own development continuously. During the course in paedodontics a log-book has been applied in the assessment system for the past year. The log-book is used to promote continual self-assessment during the course including practical skills, theoretical understanding and professional attitude. There are now plans to extend this project to other clinical disciplines.

11. CDA

To train the student to objectively judge the quality of applied treatments, it is planned to expand the use of a well-established quality assessment program (CDA: Californian

Dental Associations guidelines for the assessment of clinical quality and professional performance.) This program is currently used by students to assess the quality of their restorative work in the comprehensive care clinic.

12. Choice in academic assessment

A main objective in modern pedagogy is that education should provide for the students individual learning styles. New pedagogic methods and new forms of training material and media have been developed. However, stereotypical written exams force the student to adapt their learning to that form of assessment, rather than to individual learning styles. Therefore, the possibility of developing a flexible instrument for examination in oral pathology is under investigation. This should offer the student a choice of examination mode according to his / her learning style. All examinations available for selection shall be constructed to be comparable and reflect similar levels and domains of knowledge in the subject. One goal is to avoid the risk of spoiling good efforts in pedagogy by using a form of examination that may not be suited for the individual students learning style.

7. External examiners

External examiners are presently used at three different examinations:

13. Periodontology

An external examiner from another faculty (Umeå) judges the questions set by the course examiner and his correction of the exams.

14. Oral pathology

An external examiner from another faculty (Copenhagen) constructs the written examination. Neither the course organiser nor the teachers are aware of the examination questions during the teaching period. In this case the external examiner is used primarily to control the focus and the level of the given teaching.

15. The diagnostic block

Two external examiners judge the constructed cases before the examination. The external examiners also participate actively in the assessment of the answers and grading of the exams.

8. Formal requirements for students to qualify and register as dentist.

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. Throughout the education the students gets ECTS (European Credit Transfer System) credits after each passed exam and clinical requirement. 200 ECTS credit points are required to register as dentist.

9. Recommended competencies

The main content of our education is in accordance with the competencies recommended by the EU Advisory Committee on the Training of Dental Practitioners.

VISITORS' COMMENTS

There is a heavy reliance on extensive written examinations. The school has experience in contemporary alternative assessment methods and should therefore try to create a holistic balanced assessment system.

Section 18: Other Influences

18.1 Regional Oral Health Needs

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. However, studies by the National Board of Health and Welfare (NBHW) in 1997 and 1999, showed that 88% of individuals between 20-65 years of age had visited a dentist during the last two years and 35% had visited a dental hygienist. Three groups of individuals showed a lower frequency of visits namely the unemployed, social care recipients and low income groups.

Oral health in children, according to statistics compiled by NBHW, showed a significant improvement during the years 1990-1998, but there are some regional variations. During the past decade, there have been no nation-wide studies of adult oral health. The National Bureau of Statistics reported that in 1996-1997, only 3.4% of the population between 16-74 years of age was edentulous, compared with 15.4% in 1975. Some regional epidemiological studies show that the decreasing number of edentulous individuals is most pronounced among the elderly. No more than 20% have full dentures at the age of 75 and 10% have extensive bridges and crowns. 8% were found to have severe periodontitis. As those over 65 are the only age group that will increase their percentage of the population the next two decades (from 17.4% today to 22.1% in 2020), much of the future dental treatment need will be found in the elderly.

18.2 Evidence Based Treatment

Evidence based dentistry as outlined in Cochrane Library is not yet implemented in the curriculum. However, all treatment procedures are of course based on scientific evidence paired with the clinical experience of the teachers as outlined in the instructions issued by The National Board of Health and Welfare. However, since the institution has three teachers involved in a recently started national project about the efficacy of dental treatment in collaboration with The Swedish Council on Technology Assessment in Health care, we plan to include a more formal training in Evidence Based Dentistry for the undergraduate students.

18.3 Involvement in Other University Activities and Sport

The Dental Student's Union now comprises dental, dental hygiene and dental technology students and doctoral students.

The union was formed in 1888 and has subsequently become associated not only with other unions in the Stockholm region, but also in Scandinavia and the rest of Europe

The forms for exchange vary. Through Erasmus for example we are able to send our members to spend some of their student time at universities abroad, but we also have contact through sporting activities. The Swedish dental students' unions collaborate, in addition to their ordinary activities, in a special committee which meets and evaluates, compares and exchanges experiences a few times a year.

In addition to these activities, students are represented on different boards and committees within Karolinska Institutet and the Institute of Odontology, for example the undergraduate education board, the curriculum committee for dental, dental technology and dental hygiene undergraduate education, the international committee and the research board.

18.4 Recreation

The employees at the School of Dentistry can use one hour per week for their own physical activity.

The Karolinska Institutet provides a gym and have gymnastics, aerobics, jogging and power walks. In the gym there are changing rooms and showers. The gym is open from Monday to Sunday 6 am to 10 p.m.

Close to the school there is an outdoor track which the employees can use for walking and running.

18.5 Student Selection Procedures

Admission procedures to all full-length programmes at university level has been until 1993 centralised in Sweden. Until then students who wanted to apply to a university course had to apply direct to the national unit for admission. The criteria for admission has varied over the years, but the main discriminate is grades from secondary school and marks from a university standard aptitude test (USAT).

However, in 1988 the Parliament decided to introduce specific selection methods. The university could from 1991 receive permission from the Ministry of Education to admit students with an individualised admission system.

Admission to the Dental Program at Karolinska Institutet in the individualised way is allowed for at most two thirds of the students. The remaining one third is admitted in the traditional way by grades from secondary school and marks from USAT.

The Individualised Admission Procedure.

The main objectives of the individualised admission system is to seek out highly motivated students with comprehensive ability and high academic achievement and to avoid admitting students deemed unsuitable to the profession.

The Admissions Committee (AC) is appointed by the Vice Chancellor and comprises seven senior staff members, male and female. A student representative attends AC meetings as an observer. The AC has also a consultant psychologist.

The admission procedure has three stages.

Stage 1: The students must meet the specific requirements set by the Karolinska Institute. Applicants who fulfil these requirements and have attained a certain minimum grade for secondary school matriculation or USAT, are selected to proceed to stage 2.

Stage 2: The prospective students are required to write three separate assignments; a self-description, a personal motivation and an essay on one of three given topics. The AC works in pairs and based on the ratings by the pairs the full committee decides which applicants are to proceed to stage 3.

Stage 3. Each of the remaining applicants is interviewed separately by two members of the AC. The AC then goes through the entire list of the applicants from stage 3, studying the scores and deciding which applicants to admit.

The individualised admission procedure has been described and evaluated in two articles by Karin Röding:

"A new admission procedure to dental education at the Karolinska Institute-An initial evaluation". Eur J Dent Educ 1997, 1:114-122..

"Competence in Final Year Dental Undergraduates: Assessment of Students Admitted by an Individualised Selection Procedure and through traditional modes".

Accepted for publication in Eur J Dent Educ.

18.6 Labour Market Perspectives

The number of registered dentists in Sweden 1998-01-01 was 13,547 (58% men and 42% women), of whom 7,677 were working in Sweden: 4,227 in the Public Dental Service and 3,440 in private practice. 2,648 were 65 years of age or more. Since 1990, the total number of dentists working in Sweden has decreased by almost 2,000.

The distribution of dentists in different provinces varies from one to every 655 inhabitants in Stockholm to one to every 1.285 in the north of Sweden (Västernorrland).

The number of unemployed dentists has decreased from about 300 in 1996 to 150 in 1999. According to an investigation by the Swedish Dental Association into dentists who graduated during the last three years and were living in Sweden in March 1999, about 7% were unemployed. However, the figures were higher for those born abroad.

During the years 1991-99, 979 left Sweden while 406 dentists moved to Sweden. Most of them were born abroad. The majority of those who left Sweden went to Great Britain and Norway. According to an inquiry in 1998 into Swedish dental graduates in Great Britain, unemployment in Sweden was one important reason for working in Great Britain. This reason was true for 30% of those born in Sweden and for 50% of those born abroad. 90% of the dentists were satisfied with their work and living and the majority did not intend to go back to Sweden. Higher income, lower taxes and "higher status" as a dentist were the most common reasons.

In 1979 a new curriculum for dentistry was introduced. This curriculum comprised 9 semesters at the Faculty of Odontology at Karolinska Institutet and 1 year of vocational training. The vocational year was organized within the Community Dental

Welfare system. During the vocational year the dentists worked with temporary registration under the supervision of a senior registered dentist. This was regarded a very satisfactory solution since there was a need for dentists in the society, and it gave the new dentists an opportunity to start their career in a smooth way. The vocational year was completed with an examination. This examination was designed in two parts to test Children's and Adolescent Dentistry and Adult Dentistry. The tests were built around clinical cases.

In 1994 the dental society had changed. There were so many dentists that several qualified registered dentists were unemployed. The Community Dental Welfare decided that they could no longer host temporarily registered dentists and train them. This meant that the vocational dentists could not find positions to finish their education and thus could not get their registration and accordingly not move e.g. abroad to work as dentists. The Dental Faculties demanded that the Community Dental Welfare should be forced to host the vocational trainees. A queue system to get vocational training positions was suggested. The students' organisations demanded to get their education the way they were promised when they started their education. In the Government Bill on Economics the 11th of January 1994 the Government suggested that the vocational training should be abolished and the undergraduate Dental education be prolonged to 5 years. In June, 18, 1994 the government decided according to the proposition put forward in January that year.

In September 1994 the Community Dental Welfare announced that the students that studied on their 9th semester would get their vocational training positions, but no more students after them. The Dental Faculties thereafter decided to prolong the dental education to 10 semesters, that is 5 years.

VISITORS' COMMENTS

The planned collaboration with the public health service in many aspects of clinical dentistry will lead to better meeting the regional and national oral health needs. The admission procedure in 3 stages with a high applicant ratio of 5/1 is commended.

Section 19: Student Affairs

19.1 Basic Data from Dental School

- a. Average number of dental students qualifying per year: **51**
- b. Average number of dental students admitted to the first year: **60**
- c. Length of course in years and/or semesters: **5 years (10 semesters)**
- d. Is there a separate period of vocational training following graduation as a dentist in your country? **No.**

19.2 Postgraduate Courses

Complete postgraduate clinical courses for dentists are available for Swedish and foreign citizens. All courses require two years of training in general dentistry prior to admission.

Courses for a formal qualifications in all of the eight dental specialities recognised in Sweden; Periodontology, Oral Surgery, Prosthodontics, Orthodontics, Clinical oral physiology, paedodontics, Oral Radiology, and Endodontics are provided at the Institute. All courses are under the supervision of the State Board of Health and Social Welfare. Courses require Swedish registration as a dentist for formal recognition. In addition there are equivalent courses in Cariology and restorative dentistry.

Presently there are 12 postgraduates undergoing specialist training.

Most programs are for three years, full time, only the orthodontics program is for four years. 50 - 70 % is clinical work with patients within the speciality. There are clinical and theoretical seminars according to weekly schedules. Courses in appropriate related specialities are required.

The program for foreign dentists (without a Swedish licence) is a Clinical Master of Science program which is a substantial scientific introduction, including two published papers in recognised scientific journals. The clinical part is between 50-70% of full time.

Postgraduate students within the Clinical Master of Science programme are presently working in the Dept. of Orthodontics (5), Oral rehabilitation (1), Oral radiology (2) and Cariology.

At the Karolinska Institute, minor postgraduate courses, usually at the 5p level, are available, free of charge, for a wide range of health professionals including dentists and dental hygienists (supplemented). Courses for dentists or dental hygienists are presented by the Institute of Odontology.

There are also courses (leading to a diploma) administrated by the Swedish Dental Association given at the Institute for dentists or dental hygienists usually corresponding to 5p. During the past year courses in periodontology, implant prosthodontics and oral radiology were presented.

There is a programme schedule (supplemented) for 5p. courses to be arranged by the Odontological Institute running from the late semester year 2000 to the early semester of year 2003 with 3 - 4 courses each semester. They are specially tailored to the needs of postgraduate dentists in the various specialties working at the Institute and at other universities.

The courses for dentists scheduled for the year 2000-2001 are: Oral radiology, cariology, ear-nose-throat, implant prosthodontics, clinical oral physiology, internal medicine, leadership, periodontology, inflammation and immunology, genetics and cranio-facial anomalies, juvenile psychology and psychiatry (supplement).

The corresponding courses (supplement) scheduled for dental hygienists for the year 2000 - 2001 are: Preventive dentistry focussed on periodontology (10p), preventive dentistry focussed on cariology (10p), scientific methodology, leadership, statistics, inflammation and immunology, juvenile psychology and psychiatry, articles in preventive dentistry in cariology or/and periodontology. Some of them are the same as the postgraduate courses for dentists.

The programme is designed to suit the actual need of additional postgraduate courses for dental hygienists within the Institute and is supposed to meet the requirements from other universities as well.

19.3 Auxiliary/Technology/Other Courses and Number Who Qualify per Year

1. Undergraduate programme for Dental Technicians (3 years). The average number of technology students qualifying per year: **19** (admitted: 20).
2. Undergraduate programme for Dental Hygienists (2 years). The average number of hygienist students qualifying per year (1998-1999): **16** (admitted 20). Currently, 40 are admitted per year.

19.4 Student Counselling Services in the University

Student counselling services comprise a central and an internal section.

The central section has an outreach function, for presumptive students, i.e. to try to assist students to decide on choice of education, profession and employment. The aim is to increase public awareness of Karolinska Institutet's undergraduate courses. The main function of the internal service is to support students enrolled in Karolinska Institutet's various courses. There are student counsellors for all courses at Karolinska Institutet.

Student counselling provides the following services:

- To try to ensure that the right student enrolls in the right course, through information and pre-admission requirements
- Provide information about the course and employment prospects on completion

- Participate in exhibitions and open house days. Co-operate with high schools in the region
- Participate in compiling information
- Contribute towards ensuring that students complete their courses
- Track students' achievement and offer assistance with planning of studies, but also to try to give students who should discontinue their courses the insight to withdraw.
- Provide information about regulations for studies at Karolinska Institutet.
- Support students with special needs
- Provide information about study abroad
- Support disabled students and ensure that the correct aids are made available
- Look after the legal rights of students

The student counsellors for dental, dental technology and dental hygiene courses belong to Karolinska Institutet's central student counselling services, but has offices in close proximity to the premises of the Institute of Odontology.

Section 20: Research and Publications

1997-1999

Number of publications	333
Number of textbooks	13
Number of chapters in textbooks	10
Number of invited presentations at international meetings	103
Grants received > 1 000 Euro (1998).	102

Presentations at international meetings have been to e.g.:

Köpenhamn, Danmark; Nice, Frankrike; Seattle, USA; Kyoto, Japan; Helsingfors, Finland; Riga, Lettland; Arnhem, Holland; Washington, USA; Montpellier, Frankrike; Barcelona, Spanien; Florens, Italien; Chiba, Japan; Hiroshima, Japan, London, England

VISITORS' COMMENTS

The full list of publications is impressive and can be seen at <http://www.ki.se/odont/annual.html>

We have made some important comments on research funding in our executive summary.

Section 21: Quality Development or Continuous Improvement Policies/Schemes

Faculty Development

There are two important prerequisites for creating a credible and enduring atmosphere for working with quality and improvement in an organization. Firstly there must be a personal, active and obvious commitment from the leaders at every level, to give first priority to whoever “one is there to serve” (students, patients etc). Secondly, all staff members must be given working conditions in which they feel confident to carry out and develop their duties. Each and every one must therefore see his/her roll in the whole, have clear goals, the necessary resources and feedback about the results achieved.

In the daily running of operations, there must be an inbuilt concept and activity encouraging constant improvement. Everyone in the organization should know how ideas and measures for improvement can be channelled, presented, tested, evaluated and accepted or rejected. Routines, methods, strategies and policies should continually be the subject of critical scrutiny as to how well they fill their intended function. This is accomplished by finding out what the users want, and by comparison with others both within and outside the organization, to see how well others have succeeded. Thus decisions about change will be based on facts. This meets conditions necessary to react more quickly to changed requirements, and to work preventively. A process oriented approach to the organization, in which the big processes such as undergraduate education of dentists, dental technicians and dental hygienists, treatment of patients and research, are seen as major processes, facilitate collaboration between different categories of employees and subject areas. Process orientation offers logistic advantages with respect to both the students’ progress through their courses and the patients’ progress through treatment.

The project “Practical leadership” as training in leadership for personnel and students, developed according to a completely new concept, is one example of how the Department of Odontology is working to develop leadership and participation. On the basis of self selection, about a year ago about 20 people, guided by two external consultants, produced and carried out a course in leadership. The 20 “self-chosen” are a heterogeneous group comprising undergraduates from all three courses, and lecturers, dental assistants and administrative personnel. Those who have now completed the first course as participants were recruited from the same target groups and according to the same principles. As well as five full days of seminars and group exercises, the course also included an assignment, where the theme was to work with something which will help to develop the Department and which one feels a personal commitment to.

Another example of how the Department is trying to encourage participation and utilize the creativity of employees in development and improvement work is the commitment to working with constant small improvements according to the Kaizen method. For a few years, personnel from the Department have been in touch with a public dental clinic in the County of Stockholm which started applying this method in 1995. In recent years this clinic has shown positive trends in a number of important

areas of quality, and independent observers have emphasised the use of the Kaizen method as one of the major contributing to their success. During the month of March, four employees from the adult dental care clinic will undergo training in the Kaizen method and this instrument will then be implemented as soon as possible in the organization. The above-mentioned public dental clinic will be available for support. After evaluation to ascertain whether the method is appropriate for our organization, further implementation can proceed, possibly even at undergraduate level.

Another highly topical project is “client satisfaction”: in this case how our most recent graduates and their employers/ chief public dental officers consider that our undergraduate training meets their needs, wishes and expectations. In co-operation with some dental students and lecturers in dental hygiene, questions were compiled and tested in a small pilot study. The recent graduate is contacted and requested to answer a written questionnaire. The graduate’s chief dental officer receives a copy of the same questionnaire and they answer these independently. Subsequently the two can have a discussion, based on the issues raised in the questionnaire. This has been a positive experience and may be seen as encouragement towards a review of progress. The aim is to subsequently find a method for continuous feedback about the level of competence “the market” wants from our graduates, by making this compulsory. Two other Swedish departments of odontology have also been contacted and expressed interest in conducting this evaluation as a collaborative project.

Staff Development

For an overview, see Introduction and General description

International Contacts – Undergraduate programme

Established student exchange

The following institutions participate in the exchange of students:

Denmark	University of Copenhagen
Finland	University of Helsinki
Great Britain	University of Sheffield
Hungary	Semmelweis University, Budapest
Ireland	Trinity College, Dublin
Netherlands	University of Nijmegen
Norway	University of Oslo University of Bergen
Spain	Universidad Complutense de Madrid Universidad de Barcelona

The Erasmus/Socrates agreements with Barcelona, Dublin, Madrid, Nijmegen, Oslo and Sheffield are bilateral, for two students each academic year. The Erasmus/Socrates agreement with Budapest is also bilateral but only one student per year. With Bergen, Copenhagen and Helsinki there is a bilateral Nordplus agreement for one student each academic year. From faculties with an Erasmus/Socrates agreement with the medical institution, free-movers are accepted after approved applications.

During the academic year of 1999/2000, 12 foreign students have spent from one to four months at the Department of Odontology. They came from Canada, Estonia, Finland, Hungary, Ireland (2), Italy, The Netherlands (2), Norway (2) and Romania.

Elective periods

1. The course and its timing in the curriculum

During the Elective Courses in 3rd and 6th semester the students have the option to choose to work on a project or undertake a course abroad.

The curriculum for the elective courses is 4 weeks full-time at the end of 3rd semester and 3 weeks at the end of 6th semester.

2. Primary aims

The primary aims are to let the student experience dentistry in foreign countries and for the teaching staff to make contacts at foreign dental schools.

3. Methods of learning/teaching

Teaching methodologies vary greatly. The tutors assess the courses. Usually the student submits a written report of his/her experience.

4. Strengths

The main strength of the course is its formative approach, which in many cases could have a great impact on the students' ability.

5. Weaknesses

A weakness is that there is a risk that the student exploits the visit for personal matters. This is difficult to control.

6. Innovations and best practices

The exchange with the University of Toronto is nowadays formalized. Each two students visit Toronto in order to participate in various projects.

7. Plans for the future

We plan to make the students reports more accessible by transferring them to electronic media.

Staff visits abroad

Since Sweden became eligible to participate in the Erasmus programme, the Institute of Odontology has given priority to student exchange. The aim has been to establish smoothly functioning cooperation between the different universities and a properly functioning organization at Karolinska Institutet to support the exchange students coming to Stockholm.

The Institute of Odontology has bilateral agreements for both student and academic staff exchanges, with the dental schools in Copenhagen, Bergen and Helsinki. At present a few teachers plan to spend some time at foreign dental schools. This will not be arranged within the framework of any existing agreements, but concerns dental schools with which the teachers have previously had contact.

VISITORS' COMMENTS

Plans for future quality assessment concerning good laboratory practices, good clinical practices etc. are supported and should be discussed among all preclinical and clinical disciplines.

Section 22:**Visitors Executive Summary on School**

Before visiting the Karolinska Institutet Department of Odontology we were aware of its international reputation as a centre for dental education and research. Nothing that we have seen on our visit has disturbed that reputation. However, the trend towards a smaller school with few younger academic staff raises a number of problems that the school will need to address if it is to maintain its position. We firmly recommend that the foundation of that review must be a coherent philosophy of dental education with a clear description of the qualities and attitudes that graduates will be expected to have attained. This clear statement should be drawn up as a consensus of the school plus those other departments within the Karolinska Institutet that contribute to dental education, with an appropriate input from students and, preferably, from recent graduates. Only when that has been done can the school look to see what pedagogical methodology and course content will best serve to attain those ends.

The school has undergone a major re-organisation in the past number of years with a reduction in student numbers, staffing and facilities. The school now has a unique possibility to reorganise the departmental structures, merging disciplines into integrated units, adapting to regional and national oral health needs with new research profiles, re-evaluating dental education, and starting new integrated courses in biological sciences, preclinical sciences, clinical sciences and general medicine. The recently introduced Co-Builder Project (“Leadership in Oral Health”) is contributing to the academic atmosphere under the leadership of the head of the newly created Department of Odontology.

The dental school has experienced a significant downsizing in recent years, involving a 40% reduction in student intake (from 100 to 60 per year) with a consequent reduction in staffing and facilities. The school has managed to turn the clinical downsizing into a major refurbishment. The new clinical facilities that we have seen are impressive and have the potential to provide an interesting and stimulating environment for clinical learning. However, the major staff redundancy programme has resulted in the loss of a large number of younger staff and this lack of younger staff should be a cause of great concern to the Institutet.

The refurbishment has produced modern facilities. The school now has an exciting opportunity to complement these with a radical examination or refurbishment of the curriculum. The current course is heavily lecture based. Lecture based courses may be satisfactory for staff with a heavy research or clinical commitment but may not always be ideal from a pedagogical point of view. We are not suggesting any specific method of instruction but we would urge a fundamental re-examination of both pedagogical methodology and of the course structure in the light of international developments in dental education. We have noted particularly that there is virtually no clinical dentistry, whether with patients or in the form of laboratory simulation, in the first three semesters. We would strongly recommend an approach based on greater vertical

integration that would introduce preventive and clinical dentistry at an earlier time while extending the learning of preclinical sciences in the opposite direction i.e. into appropriate clinical courses.

The school's own vision statement refers to "self-directed learning and responsibilities for one's own training in which the lecturers . . . function as guides and experts." If this is to be actual rather than aspirational, then the school must consider carefully to what extent this vision is in conflict with the current teaching methods.

It is clear that the primary focus of the Karolinska Institutet is on research. The school produces 40% of all Swedish output of dental publications peer-reviewed journals. Some of the research either derives from the semi-autonomous Centre for Oral Biology (COB) in the Novum Centre or is collaborative work lead from the COB. We are again concerned that relative absence of younger staff will have a serious effect on research output.

It seems to us that the dental school suffers from a significant disadvantage in the distribution of research funds in that it must compete directly with the medical sciences which tend to attract a disproportionately large amount of public research funding. This has had a further disadvantageous effect in the last several years as supervisors must now be able to guarantee stipends to PhD students for a minimum of four years. Also, the small size of the dental market in equipment, materials and drugs means that there are not the same opportunities for industrial/commercial collaboration as in medicine. There are few opportunities for additional research grants from such sources. We recommend that the Karolinska Institutet should introduce mechanisms to compensate for these disadvantages.

Strengths:

- Well planned reconstruction commenced in 1999 and is to be completed in 2001.
- Integrated courses in:
 - Biological sciences (now under review)
 - Pre-clinical sciences
 - General medicine
 - Clinical dentistry (re-introducing comprehensive care)
- Bridging the gap between basic sciences and clinical dental sciences for postgraduate dental PhD students by introducing the postgraduate research course
- High level of research in all units, developing collaboration with the Centre for Oral Biology (COB) which is now the 12th unit of the school.
- Clearly formulated research themes for the future.
- Selection procedure for two thirds by three stage process
- Two electives periods for students, plus international exchanges, specialised courses provided by KI and various other individual activities.
- Mandatory student research projects defended publicly each year; c. 5 to be published later.
- Library and IT

Weaknesses

- Too little integration of clinical topics in the philosophy of the school.
- Lack of communication between (and even within) Units.
- Unequal allocation of personal and curricular resources to different topics.
- Preclinical simulation (propaedeutics) is not well developed.

- Excessive “paper work” for students.
- Restricted use of evidence based contemporary dental materials.
- Inadequate experience in surgical procedures.

Recommendations

- We support the plans to introduce students into the central emergency dental services of the City of Stockholm and into mobile services.
- The integrated general medical course should be based more on bedside teaching.
- The integrated course in biological sciences is now under review and the re-organisation should carefully be discussed between the medical departments and the dental clinical Units.
- In relation to the self assessment approach, the reflective part and the log books are an important innovation in paedodontics and should be discussed for all courses.
- The traditional links in paedodontics with the community dental services should be extended to orthodontics, dental care for special need patients, elderly patients etc.
- Consideration should be given to starting the preventive dentistry course in the first semester.
- We recommended strongly that the courses for hygienists should be integrated with those for dental students (for example gerodontology, special needs etc.).
- We recommend the integration of PhD and specialist clinical training programmes, for more effective academic career tracks.
- We recommend the integration of medical, dental and other students of the Karolinska Institutet in elective courses (e.g. medical ethics, philosophy, history of medicine etc.).
- The school should examine the effectiveness of clinical supervision in the integrated care clinic.