The First Five Years
A Framework for Undergraduate Dental Education

General Dental Council
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Second Edition
August 2002
WORKING GROUP ON THE SECOND EDITION OF *THE FIRST FIVE YEARS*

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I am delighted to commend to you the second edition of *The First Five Years*, the General Dental Council’s requirements for the content and delivery of the undergraduate dental degree programme.

I congratulate the Working Group chaired by Professor John Murray on preparing a progressive and significant document. The Group has retained the structure of the first edition, which has been widely acclaimed since its publication in 1997, and reviewed the entire text in the light of developments in higher education and oral healthcare. The Group sought advice from all sectors of dentistry and benefited from an excellent response to a consultation document.

There are many new features in the second edition. It contains a major revision of the section on the teaching of pain and anxiety control, following the report of the GDC Working Party which investigated this most important topic. A completely new section covers student health and conduct. There is an emphasis throughout on the needs of the patient, the requirement for effective communication with the patient and other members of the dental team and on the obligation of the dentist to perform in accordance with the highest professional and ethical standards. Educators and students will be assisted by the identification of specific learning outcomes; these are designed to ensure that knowledge and clinical skills relevant to the 21st century are applied by the dental graduate. I am sure that the Universities with dental schools, the Funding Councils and the UK Departments of Health will recognise the importance of students receiving this training in a modern clinical environment. *The First Five Years* provides a framework for individual schools to create and develop course curricula, which will inspire students to a satisfying career in dentistry to the benefit of the public.

The GDC will satisfy itself as to the adherence to the principles and requirements in *The First Five Years* through its programme of dental school inspections. The reports of visitations will be published.

*The First Five Years* provides a cornerstone to the Council’s statutory responsibilities for education and registration. This second edition links closely with the Council’s Lifelong Learning initiative and the policy to bring all the professionals complementary to dentistry into a system of registration with the GDC. All these projects assist us in modernising the provision and regulation of dentistry in the United Kingdom.


Professor Nairn Wilson  
President  
General Dental Council  

August 2002
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APPENDIX - THE DENTAL DOMAINS
The purpose or aim of dental education is to produce a caring, knowledgeable, competent and skilful dentist who is able, on graduation, to accept professional responsibility for the effective and safe care of patients.

In realising this aim, the GDC applies the following principles:

- that dental graduates should be required to attain the highest standards in terms of knowledge and understanding, skills, including clinical skills, and professional attributes, in particular recognition of their obligation to practise in the best interests of patients at all times;
- that dental students should be provided with the high quality learning opportunities and experiences necessary to enable them to achieve those standards, including the opportunity to undertake clinical procedures and acquire competence across a range of skills;
- that learning opportunities and experiences should be underpinned by adequate and appropriate support, including both educational and clinical support;
- that learning opportunities and experiences in biomedical sciences and clinical subjects should be integrated over the course of the programme;
- that learning opportunities and experiences should be designed to encourage a questioning, scientific, and self-critical approach to dental practice and to foster the intellectual skills required for future personal and professional development;
- that learning opportunities and experiences should enable students to develop an understanding of audit and clinical governance;
- that learning opportunities and experiences enable dental students and those of the professions complementary to dentistry to work and train together;
- that learning opportunities and experiences prepare students adequately for the transition to vocational dental practice;
- that student progress is effectively monitored to ensure that only those who comply with relevant health and conduct requirements are allowed to complete the programme.
INTRODUCTION

RESPONSIBILITIES

1. The General Dental Council (GDC) is required by the Dentists Act, 1984, to ensure that dental schools meet the high standards of dental education at all its stages. As part of that duty, the GDC's *The First Five Years - A Framework for Undergraduate Dental Education* is published to direct and guide the dental authorities, who award degrees and licences in dentistry, in the design and implementation of courses of study. The GDC believes its directions and guidance are both achievable and necessary to ensure that dental graduates are of the highest quality and well-prepared to serve the public.

STATUS OF THE FIRST FIVE YEARS

2. This direction and guidance, together with such other guidance as may be issued by the GDC from time to time, indicates the minimum programme that the GDC regards as adequate. It will be used by visitors to the dental authorities inspecting courses and examinations in preparing their reports. All external examiners should make themselves aware of the content of *The First Five Years*.

3. The undergraduate dental programme places heavy demands on students, staff and supporting authorities in that a significant part of the course requires dental students to provide clinical care for patients. *The First Five Years* also specifically addresses the health service bodies, including providers and commissioners, who play an important part in the education of dental students. However, this does not reduce in any way the responsibilities of the dental authorities, that is, the universities and other examining bodies in the United Kingdom, whose role is as important as ever. The GDC wishes to see openness and clarity with regard to the funding of dental schools and to be made fully aware how each element of funding for the dental schools is being allocated.

CURRICULUM DEVELOPMENT

4. The GDC wishes to encourage the further development of progressive ideas and improved methods of study in what should be a dynamic educational process. The result should be that undergraduate dental programmes continue to be attractive and rewarding for those people who wish to enter the profession. It welcomes, for instance, the broadening of undergraduate dental education and the associated enhancement of the curriculum which is currently taking place. Curriculum development should allow the dental student to capture the national and international vision for excellence in oral and general health promotion.

5. The GDC expects that each dental school will undertake curricular initiatives designed to take account of changing systems of dental care. There is a need for undergraduates to gain experience of working with Professionals Complementary to Dentistry (PCDs) during the undergraduate programme. Dental schools will need mechanisms through which such experience can be gained.

6. Safeguards must be in place if curriculum development is not to have adverse effects. Foremost amongst these is consideration for the dental students and,
in the clinical part of the programme, for the patients to whom they will be delivering care. The GDC is concerned about the possible congestion of the undergraduate dental programme. Curriculum development initiatives must neither create nor exacerbate such problems.

7. Against that background the GDC expects to see changes resourced, continuously evaluated and neither prematurely terminated nor unduly prolonged if developments appear unsatisfactory. Schools should disseminate the results of such curriculum initiatives in an objective, non-anecdotal way.

DEVELOPMENT OF A PROFESSION

8. The practice of dentistry has always been characterised both by its closeness to the practice of medicine and its distinctiveness from it. Thus, whilst it is universally acknowledged that dentists subscribe fully to the core values of the doctor, certain features of the practice of dentistry have ensured that the identity of a separate profession has been maintained. In the United Kingdom, formal recognition of this situation came about in the late nineteenth and early twentieth centuries as first the Royal Colleges and then the Universities established licences and degrees in dental surgery. Initially, these were approved by the Dental Executive Committee of the General Medical Council (GMC) until in 1956 the GDC was founded and assumed this role as part of its statutory responsibilities.

9. On successful completion of the undergraduate programme, the graduate or licentiate of a dental authority is entitled to apply for registration and, once registered, practise without supervision. The programme and examinations have therefore to be designed to fit the graduate or licentiate to undertake that responsibility. In this regard, an important difference between medicine and dentistry was established because, since 1953, newly qualified doctors have had to undergo further supervised training in what came to be called the pre-registration year.

10. In October 1993, after a number of years as a voluntary scheme, a one-year period of vocational training within approved general dental practices became a mandatory requirement for the new dental graduate or licentiate who wished to practise eventually as a principal within the National Health Service. The GDC strongly endorses a gradual and controlled transition from the shelter of undergraduate education to unsupervised practice for all dentists, and supports the further development of a longer period of general professional training immediately following graduation. The student must be adequately prepared for the transition to independent and unsupervised practice, and at the same time recognise the need for further development of skills after graduation.

THE DENTIST AND SOCIETY

11. The GDC remains concerned to ensure that dentists continue to play an appropriate role in society not only through the care of individual patients but also by contributing to the health and well-being of the general public. The practice of dentistry demands that practitioners accept a wide variety of responsibilities ranging from health promotion through to illness prevention, diagnosis and treatment. The safety of patients depends on high ethical standards and on the
judgement and skills - both clinical and interpersonal - of the practitioner. Dentists should be capable of contributing to the general debate on the provision of healthcare to individuals, communities and society. All those involved in the design, delivery and evaluation of undergraduate dental curricula must be aware of these fundamental purposes.

THE CONTINUITY OF DENTAL EDUCATION

12. The primary dental degree or diploma represents only the first stage in an educational continuum which should last throughout a dentist's practising life. Graduation is usually followed at an early stage by a period of vocational training which under current proposals may evolve into a two-year period of general professional training. Some dentists may then choose to undertake a period of specialist training. Beyond these formal educational arrangements, the dentist will be required to undertake a minimum amount of continuing professional development as a condition of maintaining registration with the GDC. The curriculum must prepare students to undertake self-directed learning throughout their professional lives.

13. Dental education does not take place in isolation. It is subject to important external influences which themselves are always changing. Two of these influences are constantly monitored: the pattern of oral and dental disease and the methods used for prevention and treatment. Every effort has been made to take current changes into account in this document. A similar approach has been adopted to changes in higher education and medical education. The preparation of this edition of The First Five Years has been informed by the revised edition of the GMC's Tomorrow's Doctors, the Quality Assurance Agency's Subject Overview Report on Dentistry and Subject Benchmark Statement on Dentistry, and the GMC document on Student Health and Conduct.

THE DENTAL TEAM

14. The Council's approach to all the members of the dental team working together on a collaborative basis is founded on the positive response to its 1998 consultation paper on PCDs. The Council decided to register all groups of PCDs under an amended Dentists Act and regulate their work through educational curricula and ethical guidance, rather than through prescribed duties. The dentist has the role of team leader and is responsible for diagnosis, treatment planning and the quality control of the treatment provided. Funding streams must be identified to ensure those dental students and students of the professions complementary to dentistry have significant and appropriate opportunities to train and work together. This may require dental schools to devise innovative mechanisms through which such experience can be gained.

THE EUROPEAN PERSPECTIVE

15. The GDC considers that the directions and guidance given in The First Five Years are entirely consistent with the relevant statements in the European Directives and that, insofar as they exceed them in several respects, they should anticipate future requirements of the European Union. If that is not the case, the GDC will issue supplementary guidance to ensure consistency with European law.
16. Students should develop an understanding of audit and clinical governance, and their roles in ensuring a commitment by organisations and individuals in promoting the continuous development of quality in the delivery of patient care, including primary dental care and routine clinical practice. Students should be involved in the audit cycle and should understand the importance of evidence-based dentistry and how this relates to clinical practice. They should be able to evaluate the evidence and critically assess its relevance to treatment planning, advice and treatment provision.

THE AIM OF UNDERGRADUATE DENTAL EDUCATION

17. The aim of a dental curriculum is to produce a caring, knowledgeable, competent and skilful dentist who is able, on graduation, to accept professional responsibility for the effective and safe care of patients, who appreciates the need for continuing professional development, who is able to utilise advances in relevant knowledge and techniques and who understands the role of patients in decision making.

The undergraduate dental curriculum must:

• encourage recognition and acceptance of the obligation to practise in the best interest of patients at all times, as outlined in the GDC’s guidance on professional and personal conduct in *Maintaining Standards: Guidance to Dentists on Professional and Personal Conduct*;

• allow students to acquire the clinical understanding and competence to practise without supervision, on graduation, and at the same time enable them to be aware of their limitations and the need to refer for specialist advice;

• promote acquisition of the skills and professional attitudes and behaviour that facilitate effective and appropriate interaction with patients and colleagues;

• foster the knowledge, skills and attitudes that will promote effective lifelong learning and support professional development.

GENERIC LEARNING OUTCOMES

In order to meet this aim, graduates must attain the following generic learning outcomes:

KNOWLEDGE AND UNDERSTANDING

18. The dental graduate must know and understand:

• the scientific basis of dentistry, including the relevant biomedical sciences, the mechanisms of knowledge acquisition, scientific method and evaluation of evidence;

• behavioural sciences and communication;

• disease processes such as infection, inflammation, disorders of the immune system, degeneration, neoplasia, metabolic disturbances and genetic disorders;
• the principles of health promotion and disease prevention;
• the organisation and provision of healthcare in the community and in hospital;
• the broader issues of dental practice, including ethics, medico-legal considerations, management, and the maintenance of a safe working environment;

SKILLS
19. The dental graduate must be able to:
• obtain and record a comprehensive history, perform an appropriate physical examination, interpret the findings and organise appropriate further investigations;
• undertake a range of clinical procedures which are within a dentist's area of competence, including techniques for preventing and treating oral and dental diseases and disorders;
• communicate effectively with patients, their families and associates, and with other health professionals involved in their care;
• share with patients provisional assessment of their problems and formulate plans for their further investigation and management;
• apply evidence-based treatment;
• acquire a wide range of skills, including research, investigative, analytical, problem-solving, planning, communication, presentation and team skills;
• use contemporary methods of electronic communication and information management;

ATTITUDES
20. The dental graduate must have:
• approaches to teaching and learning that are based on curiosity and exploration of knowledge rather than its passive acquisition;
• a desire for intellectual rigour, a capacity for self-audit and an appreciation of the need to participate in peer review;
• an awareness of personal limitations, a willingness to seek help as necessary, and an ability to work effectively as a member of a team;
• respect for patients and colleagues that encompasses, without prejudice, diversity of background and opportunity, language and culture;
• an understanding of patients' rights, particularly with regard to confidentiality and informed consent, and of patients' obligations;
• an awareness of moral and ethical responsibilities involved in the provision of care to individual patients and to populations;
• integrity, honesty and trustworthiness;
• an understanding of audit and clinical governance;
• an awareness that dentists should strive to provide the highest possible quality of patient care at all times;
• an awareness of the importance of his or her own health and its impact on the ability to practise as a dentist;
• an awareness of the need to limit interventions to the minimum necessary to achieve the desired outcomes;
• an awareness of the need for continuing professional development allied to the process of their continuing professional development, in order to ensure that high levels of clinical competence and knowledge are maintained.

KEY FEATURES OF DENTAL EDUCATION
ENTRY REQUIREMENTS

21. While the definition of criteria for the selection of dental students is a matter for the individual university, it is clear that a high level of academic achievement in appropriate aspects of the biological and physical sciences is a desirable prerequisite for any student embarking upon basic dental education, as is evidence of literacy, numeracy and an ability to communicate. Within these broad guidelines the GDC encourages flexibility in entry requirements. The structure of the programme should be further considered to encourage widening access, e.g. access for graduates with a relevant degree such as biomedical sciences, or Professionals Complementary to Dentistry and Professions Allied to Medicine.

22. Although the dental programme is more demanding than secondary schooling, there are few health problems, which once stabilised, offer a bar to entry. Certain infectious diseases are a risk to patients. In conformity with Departments of Health guidelines, all dental students must be immunised against blood-borne viruses, where appropriate vaccines exist, before commencing care of patients which involves exposure-prone procedures. Entry to the programme therefore should be conditional upon proof of non-infectivity and acceptance of immunisation which must be completed before any contact with patients occurs. In addition students should only be admitted if they are physically able to carry out all the tasks normally done by dentists; if this is in doubt such applicants may need to be assessed on an individual basis, perhaps in a clinical skills laboratory.

23. For the protection of the public it is important that dental schools ensure that appropriate checks, including disclosure of any criminal convictions, are made before prospective students are admitted to the programme.

LENGTH OF PROGRAMME

24. The Dental Directives of the European Union require a programme of not less than five years, leading to a primary qualification in dentistry. The curriculum set out in The First Five Years requires a programme occupying five academic years, subsequent to pre-dental studies covering the entry requirements in the basic science subjects. During these five years students shall be required to have engaged in full-time study at a dental or medical school, or hospital recognised for the purpose by one of the dental authorities.
EXEMPTIONS

25. Students with relevant qualifications may be exempted a portion of the five-year programme not exceeding two years. Exemptions should be allowed by the dental school only in relation to the areas of The First Five Years content previously studied and completed successfully as evidenced by documented results in examinations or other forms of assessment. The dental school may require a student to undertake a refresher course or be assessed to show that the knowledge has been retained.

COMPONENTS

26. The dental programme has three main components, which may be taught sequentially or concurrently in an integrated or modular arrangement. In the latter arrangements, co-ordination of subjects and subject areas within the curriculum should be ensured. Integration of the scientific, applied scientific and clinical elements throughout the whole five years, rather than polarisation of pre-clinical and clinical aspects, is encouraged.

The three components of the programme are:

• biomedical subjects and other topics common to medicine and dentistry, progressing from molecular and cell biology and biochemistry to anatomy and physiology of the whole body, pharmacology, pathology, microbiology, medicine, surgery, epidemiology, behavioural sciences (principally psychology and sociology), law and ethics. It is intended to provide an appreciation of normal human development, structure, function, behaviour and socialisation leading to an understanding of the maintenance of health and the prevention, diagnosis and treatment of disease;

• the oral and dental aspects of the biological sciences required for a detailed knowledge of the structure and function of the oral and dental tissues and of the related structures of the head and neck. These should lead to a progressive understanding of the diagnosis, causes, prevention and treatment of oral and dental diseases and disorders, and the effects of systemic disease on oral and dental tissues;

• the clinical and technical aspects of dentistry. It prepares students for the provision of comprehensive oral and dental healthcare for patients of all ages. The main emphasis in dentistry must be on the prevention of disease and the preservation of the natural teeth and their supporting structures. Accordingly, students need to be fully aware of the importance of preventive methods, acquire diagnostic skills and understand the necessity of treatment planning before treatment procedures are begun. They should gain an awareness of treating medically and physically compromised patients. Students will need considerable experience in the operative procedures which dentists undertake in general dental practice, so that, on graduation, they are fit for independent practice, whilst at the same time being aware of their limitations and the need to refer for specialist advice.
27. In order to obtain instruction and experience in the practice of dentistry the period of clinical studies shall be not less than the equivalent of three and one-third years of full-time study, during which students shall attend a dental hospital, general hospital or other suitable establishment recognised by a dental authority for the purpose.

28. The content of biomedical and related sciences within all the components of the programme should be not less than the equivalent of that obtained by two years of academic study for a primary science degree, an overall period of five years being maintained by recognising part of the clinical study period as appropriate for the purpose.

THE EDUCATIONAL ENVIRONMENT

THE UNIVERSITY

29. Dental schools generally exist within multi-faculty universities or colleges. They should benefit considerably from the administrative and academically-related support this brings and the contact with other faculties. All academic funding for undergraduate dental education and dental research is received by the accountable officer of the institution, usually the vice-chancellor or principal. The GDC notes that such persons therefore have a responsibility to ensure that the teaching of dental students on patients can proceed in a satisfactory manner, and expects the dental dean or equivalent person to cooperate closely with the accountable officer in that regard. The GDC expects universities to have a transparent system for transmitting funding from the Higher Education Funding Councils through their central administration to the dental schools.

30. Non-dental departments of the university may be responsible for the delivery of parts of the undergraduate dental curriculum, usually through the agency of departments in its medical faculty. This content must be planned together with the staff of the dental school, one of whom should be designated as course co-ordinator in each case.

31. The university will also provide library facilities and information technology resources. These should be sufficient to enable all dental students to undertake guided self-learning. Formal instruction should be given in the use of personal learning techniques, such as computer-assisted learning, with emphasis on the developing area of health informatics.

THE DENTAL SCHOOL

32. The dental school consists of a number of academic departments or units whose staff are led by a dental dean or equivalent person. The school will need to have its own staff accommodation, together with facilities for teaching and research. Common-user facilities for those purposes could be shared with other university departments, but dental school dedicated space should be a fair proportion of the whole. Some specialised facilities such as dental technology laboratories and clinical skills classrooms are required in addition to those
necessary for clinical teaching. The GDC would expect that excellence in teaching and scholarship in education should be as well rewarded as research in determining career advancement of dental academics. It should also be recognised that the intensity of the dental programme, clinical commitments, specialist training and learning how to teach make further significant time demands on dental academics.

33. The GDC does not wish to be prescriptive in respect of the staffing of a dental school. In general, it considers that most of the staff should have dental qualifications, but has high regard for those from other backgrounds who take a special interest in dental education and research, often throughout their academic lives. Accordingly, it is hoped that staff of either category would represent each of the subjects and topics described in the next section. The GDC particularly expects that dental hospital staff will continue to play an important role in teaching dental undergraduates. The contribution of part-time clinical teachers, who work in general practice and hold appropriate qualifications, is highly advantageous.

34. Clinical dental teaching staff have to combine advanced dental care skills with the high standards of teaching and research expected of a university teacher. These are essential attributes if clinical dental students are to be inspired by contact with inquiring minds and fresh approaches to dental problems. It is important that proper facilities for research should be provided in every dental school and that the staff should be given every encouragement to conduct research. It is important that staff are appropriately qualified and registered.

35. The demands laid upon clinical dental teaching staff are such that arrangements should be made so they can avail themselves of carefully constructed staff development programmes, which must include clinical training. Staff should also recognise that they are regarded by dental undergraduates as role models and they should act accordingly.

THE DENTAL TEAM

36. The dental student on graduation should understand the techniques and principles which enable the dentist to act as the leader of a dental team consisting of PCDs (dental hygienists, dental nurses, dental technicians, dental therapists, and any other groups which are created in the future). That will involve task analysis, scheduling, delegation, authorisation and monitoring of results. The collaboration of the dental student with PCDs must be a feature of the dental curriculum. The dental student should be made aware that being a leader of the dental team carries onerous responsibilities in terms of professional conduct. With increasing emphasis being placed on PCDs, there is the need for the undergraduate to have experience of working as an integral part of the greater dental team. All the members of the team benefit by becoming aware early on of the contribution each can make in the provision of oral healthcare. This also assists in the development of a team approach. Other elements for inclusion include managing a team, leadership, motivating others and delegation.
37. Dental students must learn the principles and practice of assisted-operating dentistry, which is the normal method used in clinical practice to ensure safety and provision of high-quality care of patients. For that purpose the GDC considers that dental hospitals must employ sufficient dental nurses to allow a substantial amount of assisted operating by dental students, and that the health authorities concerned should make provision in the near future for all dental procedures carried out by students to employ assisted-operating techniques. The GDC considers progress on this front has been slow.

38. Dental students should be aware of their professional and legal responsibilities to all staff, including the protection of all who work in a dental practice and of the requirements of relevant health and safety and employment legislation.

THE CLINICAL ENVIRONMENT
NHS TRUSTS

39. Each dental school works in close association with a dental teaching hospital which exists primarily to provide clinical facilities for dental students. Dental teaching hospitals are either part of large NHS Trusts or, in a few cases, may be NHS Trusts in their own right. In either case the ultimate responsibility for the dental teaching hospital will lie with the chief executive of the Trust who will be expected to cooperate closely with the dental dean or equivalent person to ensure that the clinical teaching of dental students on patients proceeds in a satisfactory manner. This can only be achieved with appropriate capital investment to maintain the facilities of clinical dental education.

40. The GDC expects mechanisms to be put into place by the UK Departments of Health and Departments for Education to ensure that clinical teaching of dental students on patients is not compromised by other demands. Mechanisms currently existing in many parts of the United Kingdom include acceptance of shared responsibility for medical and dental education and research by these departments, as embodied in the set of guidelines entitled the 'Ten Key Principles'.

41. A dental teaching hospital also provides a supportive location for hospital dental services. The presence of these services is conducive to dental education because it allows students to observe the delivery of high-quality secondary and tertiary dental care, often to patients with special needs. The proper flow of a suitable case-mix of patients required for undergraduate education cannot be managed without the support provided by these services through the contracts awarded by health commissioners. The GDC expects those commissioning healthcare to behave appropriately and not to move resources away from dental education to meet the demands of the hospital dental services.

42. All consultant and other permanent staff in teaching hospitals and in hospital dental services should have a commitment to undergraduate teaching included in their contractual obligations.
PROVISION FOR HUMAN DISEASE TEACHING

43. Part of the undergraduate dental curriculum must be devoted to instruction in medicine and surgery (human disease) and to attendance at accident and emergency departments. A Trust, usually the host Trust, is provided with specific funding to supply the facilities and staff for this part of the curriculum and this funding must be used for that purpose in agreement with the dental dean or equivalent person. The study of human disease is of continuing importance in that developments in modern drug therapy and other treatments in medicine and surgery have an increasing influence on the provision of dental care.

SAFETY

44. In dental teaching hospitals the arrangements for infection control, control of substances hazardous to health and safety of equipment, including that involving ionising radiation, must be exemplary.

THE EXTENDED CLINICAL ENVIRONMENT AND OUTREACH TEACHING

45. The GDC expects dental schools to assist students to prepare adequately for the transition to independent and unsupervised practice which is permitted on primary qualification. An extended clinical environment and outreach teaching can potentially broaden the base of available clinical material and enhance the educational experience. Such activities should have clearly defined objectives and be co-ordinated by the school with effective quality assurance mechanisms. In pursuit of this students may, under supervision by university-recognised teachers, operate in the following situations (amongst others):

- General practice units established by the dental school;
- Approved community dental service clinics;
- Personal dental services;
- Other dental teaching hospitals in the United Kingdom and abroad;
- All systems for the delivery of primary dental care approved by the schools for these purposes;
- Other secondary care dental services such as those in regional hospital units.
BIOMEDICAL SCIENCES

46. The biomedical sciences range from molecular processes at the cellular level to anatomy and physiology of the whole body, and include nutrition and genetics. It may be useful to introduce pharmacology and basic aspects of therapeutics at an early stage, together with aspects of microbial metabolism. Students should be made aware of current developments in biomolecular sciences and the potential for ‘post-genomic’ biology to impact on dentistry in the future. The teaching should introduce the student to the principles of scientific thought and argument, including the evaluation of scientifically established facts, experimental design, statistics and biometry. Increasing constraints of resource have tended to lead to a reduction in practical laboratory teaching for the biomedical sciences in many schools. Whilst the development of new learning approaches and initiatives is to be encouraged, the practical skills and learning experience which are a result of laboratory experience must not be ignored. The GDC expects continuing emphasis on achieving a strong grounding in the biomedical sciences, but there is the need to ensure that these studies are appropriate to the particular requirements of the dental undergraduate. In the case where joint courses are provided with other healthcare workers, it is essential that these studies are relevant and that time is not spent on inappropriate material. Behavioural sciences including a knowledge of social and cultural influences and communication skills are a major priority, and these should be integrated with other components throughout the programme.

ORAL BIOLOGY

47. The oral and dental aspects of the biological sciences should include the theoretical and practical instruction necessary to provide a detailed knowledge of the structure and function of teeth and associated tissues and organs. A study of the physiological and biochemical concepts relevant to the mouth is also essential for the understanding of oral biological processes, such as salivary and masticatory activity, as well as the changes that occur with the onset of oral and dental diseases, and with ageing. The role of oral micro-organisms in plaque formation and in oral and dental disease should be integrated with other aspects of the programme. The student should be aware of the importance of dental tissues in forensic examination.

48. Oral biology courses should be designed to support and be supported by the other biomedical science courses and provide an excellent opportunity to link different parts of the curriculum by illustrating the relevance of basic biomedical subjects through their application in an oral context.

49. The GDC expects dental schools to recognise that they require an adequate number of oral biology staff, pursuing research programmes in oral and dental aspects of basic medical science, and provided with the facilities for this work. Ideally at least one of these individuals should be dentally qualified. The departmental arrangements for these staff could vary, from single members of staff with oral and dental research interests in the departments responsible for teaching anatomy, physiology, biochemistry and pharmacology, to a group comprising a multi-disciplinary research unit. All, however, must have a strong commitment to dental students and to interaction with clinical colleagues in teaching and research.
BEHAVIOURAL SCIENCES

50. Behavioural sciences should be taught throughout the dental programme with careful integration so that the subject matter assumes its proper relevance to the care of the patient. The subjects concerned are principally psychology and sociology.

51. The GDC is anxious to see that principles of the behavioural sciences are introduced at an early point in the programme integrated with the principles of basic medical sciences. It must be remembered that many dental students will have arrived at university having recently studied a small range of science subjects. It is essential that their experience is broadened as soon as possible in the dental programme.

52. The key to the provision of good dental care is the ability to communicate with patients from all backgrounds. An understanding of social issues must be an important part of the undergraduate curriculum.

COMMUNICATION SKILLS

53. Communication skills are an essential aspect of the education of the dental student. As with teaching in psychology and sociology, it can best be undertaken on a collaborative basis both by individuals dedicated to the subject and by clinical dental teachers. Initially, it may be taught in role-playing situations and with simulated patients. Eventually, however, it will be the basis of students’ care of their own patients. This is also an appropriate stage to introduce complaints handling procedures. There should be emphasis on the need to communicate to patients the knowledge and understanding of treatment proposed or advice given. The patient’s involvement in treatment planning must be stressed. Communication skills must be taught longitudinally throughout the programme so that all students achieve good communication skills before they graduate.

HUMAN DISEASE

54. The course in human disease provides dental students with an insight into the manifestations of human diseases and disorders and the diagnostic services used in their investigation and treatment. In addition to providing an excellent basis for studies of clinical dental subjects, the course allows the dentist to communicate effectively thereafter with physicians and surgeons about patients in their joint care. Integration of the teaching of medicine, surgery and allied subjects under the general heading of human disease could help decongest the undergraduate curriculum and emphasise the importance of biomedical sciences in clinical diagnosis and management.

PATHOLOGY AND MEDICAL MICROBIOLOGY

55. The courses in pathology and medical microbiology, which may be integrated with one another and with the other subjects in the human disease course, such as immunology, should teach the principles of the subjects concerned using examples from all regions of the body. The courses should be planned together with the staff of the appropriate university department and the dental school, one of whom should be designated course organiser. This course should be co-ordinated with the courses in oral pathology and oral microbiology.
MEDICINE AND SURGERY

56. Sufficient instruction in human disease should be given to enable the student to understand its manifestations insofar as they may be relevant to the practice of dentistry. Relevant topics include maintenance of the well-being of patients, the recognition of physical and mental illness, dealing with emergencies and communicating effectively with patients, their relatives and medical practitioners about professional matters. Courses require careful structuring and should involve clinical teaching on patients. This may be carried out in in-patient and out-patient medical and surgical departments or in specialist clinics situated in teaching or district general hospitals or in a relevant teaching environment within a dental setting or a primary care trust. The course should be co-ordinated by a member of staff of the dental school, who should liaise with NHS Trusts and the appropriate university department, which are required to provide the appropriate facilities and teaching support.

57. Students should acquire the skills necessary to elicit an appropriate medical history, with particular reference to cardio-respiratory diseases, haemorrhagic disorders, allergies and drug therapy. They must be able to observe and interpret physical signs in the clothed patient and know how to give intra-muscular, subcutaneous and intra-venous injections.

PHARMACOLOGY AND THERAPEUTICS

58. The variety and complexity of drugs used in medical and dental treatment, including those used in the control of pain and anxiety, add to the importance of pharmacology and therapeutics in the curriculum. Instruction should be given in prescription writing and the legislation concerning the supply of drugs and medicines. There are considerable advantages in teaching these subjects in courses specifically designed for dental students by teachers who have an interest in clinical, oral and dental problems. The teaching of therapeutics is best done at a point in the undergraduate curriculum when students have experience in the examination and treatment of patients.

59. The control of anxiety and pain is fundamental to the practice of dentistry and should be emphasised at all levels of clinical teaching and also in the teaching of therapeutics.

ACCIDENT AND EMERGENCY SERVICES

60. The GDC expects that all students will undertake an attachment to the accident and emergency department of a teaching or general hospital. During this attachment the students must not be diverted to dental emergencies but should gain experience of the treatment of acutely ill patients by observing the procedures of triage prioritisation in terms of airway, breathing, circulation, and resuscitation. It is also intended they will develop their interpersonal skills by observing interactions of doctors and other healthcare professionals with acutely ill patients.

MEDICAL EMERGENCIES

61. The GDC considers that at an early stage in the dental programme students must be given instruction in first aid, including the principles of cardiopulmonary resuscitation and its practice under realistic conditions. It is necessary for this
practice to be repeated on an annual basis throughout the programme. Students should learn how to recognise and take appropriate action in situations such as: anaphylactic reaction, hypoglycaemia, upper respiratory obstruction, cardiac arrest, fits, vasovagal attack, inhalation or ingestion of foreign bodies and haemorrhage.

62. Dental students must be aware of the relevant information concerning medical emergencies in the GDC’s document *Maintaining Standards: Guidance to Dentists on Professional and Personal Conduct* or its successors. It is essential that all premises where dental treatment takes place have available and in working order: portable suction apparatus to clear the oropharynx, oral airways to maintain the natural airway, equipment with appropriate attachments to provide intermittent positive pressure ventilation of the lungs, and a portable source of oxygen together with emergency drugs. Graduates should be able to use this equipment and administer drugs effectively.

**LAW, ETHICS AND PROFESSIONALISM**

63. Dental students should understand the legal and ethical obligations of registered dental practitioners, the permitted activities of PCDs and the regulatory functions of the GDC. Every student should be aware of the principles and practices involved in dental audit, of the ethical responsibilities of the dental profession in clinical investigation and research and in the development of new therapeutic procedures including the concept of risk assessment and management. The ethical aspects of professional relationships should also be drawn to students’ attention, and their reconciliation with personal and public morality. Dental students need to have some familiarity with the specific requirements of contemporary general dental practice, including reference to relevant regulations and the valuable role played by the dental defence organisations. Students should recognise and act upon the obligations of membership of the dental profession, as outlined in the GDC’s publication *Maintaining Standards*. The Disability Discrimination Act and the Human Rights Act are examples of how this area is rapidly changing and influencing many facets of professional life. Issues of professionalism such as student behaviour with respect to alcohol and the use of recreational drugs should be addressed.

64. The legal basis under which patients are treated should be discussed and the ethical responsibilities which the student assumes under these circumstances examined. No student should proceed to treat patients without a proper understanding of these matters, especially consent, assault, duty of care and confidentiality. The legal requirement to maintain full, accurate clinical records should also be appreciated by the student.

65. Students should understand the importance of communication between practitioner and patient. This helps to develop attitudes of empathy and insight in the student and provides the opportunity for discussion of contemporary ethical issues. Students should also be encouraged to understand their own responses to work pressures and their management. There may be opportunities for integrated or complementary teaching with other basic sciences on topics such as pain, stress and anxiety, and with clinical specialties on topics such as social class, poverty, and the needs of children and the elderly.
66. There should be guidance on the key ethical and legal dilemmas confronting the contemporary practitioner and on the basics of employment law. Students should also have opportunities to consider the ethical and legal dimensions of day to day practice. For example, students should learn how to:

* handle patient complaints;
* ensure that patients’ rights are protected;
* provide appropriate care for vulnerable patients;
* confront issues concerning treatment planning and the practice of medicine and dentistry within the context of limited financial resources;
* maintain confidentiality;
* deal with gender and racial issues;
* deal with colleagues failing their professional responsibilities.

67. Students should also understand the practical and ethical considerations that should be taken into account when seeking patients’ consent, such as:

* providing sufficient information about conditions and possible treatments;
* responding to questions;
* knowing who is the most appropriate person to give consent;
* gaining consent in emergencies;
* establishing a patient’s capacity to give consent;
* statutory requirements that may need to be taken into account;
* gaining valid consent.

68. Ethical and safety issues should form an important part of the ‘Introduction to Clinical Dentistry’ element of the curriculum. The course material must not ignore the moral and ethical dilemmas which confront the dentist in practice.

69. The ethical approach to patient care will subsequently be reinforced in the clinical dental course, being broadened as time passes to encompass the legal obligations of the practitioner. In that regard, special attention must be paid to the regulatory mechanisms of dentistry, particularly as they apply to general dental practice. Stress should be placed on good record keeping.

HEALTH INFORMATICS

70. Progress in information technology and particularly health informatics will continue to accelerate and become an important and integral part of dental practice. These technologies provide access to clinical and educational information in a wide variety of formats. Ideally students should enter the dental school equipped with sufficient skills to be able to use these from the start of the programme. During their clinical years they should develop an understanding of the advantages and limitations of electronic sources of health information, the electronic patient record, electronic decision support systems and teledentistry.
They should have an opportunity to use information and communication technologies for research, healthcare provision and health promotion. They must become aware of the law as it relates to data protection and patient confidentiality.

**INTRODUCTION TO CLINICAL DENTISTRY**

71. The moment of introduction to clinical dentistry involves first contact with patients and is a highly significant event in the life of a dental student. It is important that the introduction is carefully planned. Key safety procedures and ethical considerations should be emphasised at the same time. Preparatory teaching of technical skills prior to procedures being undertaken on patients has long been carried out in dentistry by means of instruction in dental technology, and the use of manikin heads. The GDC welcomes the use of manikins and also favours emphasis being given to behavioural and biological factors in clinical dental procedures. Technical skills should be tested before students are allowed to treat patients. These tests must show that students can work safely before they treat patients under supervision.

**HEALTH AND SAFETY AND INFECTION CONTROL**

72. With the introduction to clinical dentistry, even though working under close supervision, the student takes responsibility for the safety of patients. Wider aspects of this include the safety of staff and fellow students. Therefore topics which must be discussed at this stage include infection control, substances hazardous to health, fire regulations and safety problems associated with dental equipment, including dental radiographic equipment. A modern approach to health and safety in the workplace should be an essential component of this part of the curriculum. Students must be able to:

- adhere to health and safety legislation as it affects dental practice;
- understand the legal basis of radiographic practice;
- implement and perform satisfactory infection control and prevent physical, chemical or microbiological contamination in the practice of dentistry;
- arrange and use the working practice environment in the most safe and efficient manner for all patients and staff.

**TRANSMISSIBLE DISEASES**

73. Students should be advised that if they may be infected with transmissible diseases that could be a biohazard to patients or colleagues during the dental programme they must obtain medical advice and, if found to be infected, must receive regular medical supervision. Students must act upon any medical advice they receive, which might include the necessity to cease carrying out invasive dental procedures and therefore withdraw from the dental programme. This rule conforms to Guidance on Professional and Personal Conduct issued to all dentists by the GDC in *Maintaining Standards*. Any student who knows or has reason to believe that he or she is the carrier of a transmissible blood-borne virus has the responsibility to declare that fact to the dental dean or equivalent person.
RESTORATIVE DENTISTRY

74. Restorative dentistry is concerned with the management of the plaque-related diseases (dental caries and periodontal diseases), tooth wear and tooth loss. Management includes preventive, non-operative care as well as the restoration of teeth using the well-established techniques of conservative dentistry, including crowns and endodontics, the replacement of teeth by means of prostheses, and the treatment and maintenance of the supporting structures of the teeth by the procedures of periodontology. In restorative dentistry students should have continuous responsibility for the care of a number of adults in order to assess their overall needs, the efficacy of preventive measures, their behaviour, management and long-term success or failure of restorative treatment. Students should learn to manage adults requiring emergency care, carry out diagnostic procedures in such circumstances, formulate treatment plans and relate them to comprehensive dental care. All aspects of restorative dentistry may be required for medically compromised patients and those with other special needs. In its advanced forms restorative dentistry can involve extensive occlusal rehabilitation, sometimes requiring the use of dental implants. Students should appreciate that these forms of treatment may be delivered by specialists as secondary or tertiary care. They should be aware of when to refer such cases, understand the principles involved in their management and observe such treatment being carried out.

75. All restorative techniques can be invasive in nature, and some are irreversible. The GDC considers that dental students on graduation must be competent in procedures of restorative dentistry including non-surgical treatment of single- and multi-rooted teeth, crowns and simple bridges, removable partial and complete dentures and periodontal therapy. They should be fully aware of when patients should be directed to specialists for advice and treatment.

TECHNICAL SUPPORT

76. To meet the needs of this part of the curriculum, students will learn how to communicate effectively with a dental technician, so that indirect restorations and fixed and removable prostheses can be constructed. Students should be aware of the importance of high standards in that work and have practical experience of the processes involved. It is important that experience is gained in constructing indirect restorations and fixed and removable prostheses. However, once that experience has been gained, students should be able to have the appliances and restorations required by their patients manufactured by dental technicians. The primary purpose of dental technology teaching should be to ensure that students have sufficient understanding of the clinical preparations and laboratory processes so that they can appropriately evaluate their own clinical work and the work provided to and received from dental technicians. Students should appreciate the relevance of their preparations to the quality of technical work that can be produced.

GERODONTOLOGY

77. The student should be aware of the presentation of dental and oral diseases and disorders in elderly people, and the range of psychological and social factors involved in such situations. The student should be able to distinguish between normal and abnormal consequences of ageing, and learn to avoid stereotyping elderly patients.
Conditions including xerostomia, excessive tooth wear, root caries, recession of the gingival tissues and the special difficulties of providing removable prostheses, whilst not restricted to the elderly, are most prevalent in that group of patients. The student should be able to formulate management strategies for the dental care of elderly people, and participate with members of the dental team in implementing them. Given the profound demographic changes affecting the population and the significant increase in the numbers of older adults with some natural teeth, the GDC would expect to see specific emphasis on this throughout the curriculum.

**DENTAL IMPLANTS**
78. The provision of dental implants and implant-retained crowns and bridges requires a team approach. The student should understand the principles of implant therapy and see implants being maintained within healthy tissues.

**DENTAL BIOMATERIALS SCIENCE**
79. Instruction in the properties, correct manipulation and the science underpinning the use of dental materials is needed to equip the student with the knowledge to select and handle those materials safely and effectively. Dental students need to understand how such materials, and the biological responses to them, are evaluated. This equips them to cope with future developments in this area. The GDC considers it is essential that staff teaching this part of the programme work in close collaboration with clinical colleagues.

**CHILD DENTAL HEALTH**
80. The study of child dental health should encompass the inter-relationships between orthodontics and paediatric dentistry together with the general growth and development of the individual. It should be related to social and psychological factors and to the recognition, preventive treatment and operative management of the common disease processes.

**PAEDIATRIC DENTISTRY**
81. Paediatric dentistry is concerned with understanding normal growth and development and the promotion and maintenance of oral health for children. In paediatric dentistry students should have continuous responsibility for the care of a number of children in order to assess their overall needs, the efficacy of preventive measures, their behaviour, management and restorative treatment. Students should also learn to manage children requiring emergency care, carry out diagnostic procedures in such circumstances, formulate treatment plans and relate them to comprehensive dental care for children. They should be made aware of the special dental needs of children with disabilities and have experience in the recognition and management of developmental dental abnormalities.

**ORTHODONTICS**
82. Orthodontics is concerned with the development and growth of the face and occlusion, the extent of normal variation in the form and function of both the hard
and soft tissues of the mouth and face, and particularly the ways in which such variation produces differences in occlusion. The study of these factors should emphasise their inter-relationship with the general and psychosocial development of the individual. Changing patterns of orthodontic care have been influenced by changes in the perception of simple orthodontic treatment by both patients and practitioners. Most orthodontic treatment is now delivered by specialists. Students should be able to:

- carry out orthodontic assessment;
- identify treatment needs;
- understand the role of orthodontics in overall patient care;
- recognise and describe developing and manifest malocclusions;
- understand the appropriate timing of interventions and what these interventions are likely to be;
- see and assist in the delivery of all forms of orthodontic treatment;
- make safe all forms of orthodontic appliances;
- know when and how to refer for specialist advice;
- recognise and manage those problems of the mixed dentition where interceptive treatment is indicated, including space maintenance.

PREVENTIVE DENTISTRY

83. Dental students should be made aware of the successes and limitations of preventive dentistry, and the potential for further progress. The ethos of preventive dentistry should prevail in every clinical dental department, so that new preventive dentistry techniques are taught to students as they become available. Students should be conversant with the practice of preventive care including oral health education and oral health promotion. Students should recognise the increasing evidence-based approach to treatment and should be able to make appropriate judgements. The student should appreciate the need for the dentist to collaborate in prevention, diagnosis, treatment and management of disease with other healthcare professionals and with patients themselves. The student should be aware of the economic and practical constraints affecting the provision of healthcare.

DENTAL PUBLIC HEALTH

84. In addition to teaching directed towards the treatment of individual patients, students should be imbued with the concept of the profession’s wider responsibilities towards the community as a whole. Teaching in dental public health should emphasise the sociological aspects of healthcare, including the reasons for the widely varying oral and dental needs of different sections and age groups within the population. Knowledge of the social, behavioural, environmental and economic influences on oral and dental health is important, as is an understanding of epidemiological techniques used to determine such effects. The curriculum should include behavioural and epidemiological science relevant to dentistry, the interpretation of data, and the aetiology and natural history of diseases. It should also include an understanding of the social, cultural and environmental factors which contribute to health or illness, the capacity of healthcare professionals to influence
these, the principal methods and limitations of disease prevention and health promotion, and the contribution of research methods in dentistry. Students should understand basic statistical and epidemiological concepts and the complexity of dental service delivery. This understanding should include:

- the different methods of payment and employment of dentists;
- the role of different professional groups;
- equity of service provision and access to care and treatment for people with special needs.

85. Dental students should learn that health promotion involves helping individuals and communities to benefit from increased control over their own health with the intention of improving it. Although many groups and organisations in addition to those composed of healthcare professionals are involved, doctors and dentists can play an important role. Dental students should understand the principles of health promotion and apply them when in contact with patients and at other times, particularly in matters of tooth brushing with fluoridated dentifrices, diet and nutrition, tobacco avoidance and public health measures such as fluoridation.

COMPREHENSIVE ORAL CARE

86. Whilst the arrangement of a dental school into units or departments ensures that all important aspects of the curriculum are given proper attention, it can result in students in a particular unit assuming that patients only require one type of dental care. To overcome this, many schools have arranged for students to practise and receive instruction in units or clinics devoted to comprehensive dental care. The work of such a unit or clinic can be organised in several ways, but however organised it is important for students to diagnose patients’ needs and prepare comprehensive treatment plans.

87. To be effective, comprehensive care should be taught in co-ordination with other subjects. Restorative dentistry, oral surgery and oral medicine are obvious examples. So too are the disciplines of paediatric dentistry and orthodontics, where it may be appropriate to develop joint arrangements to teach the comprehensive dental care of children. Importantly, comprehensive dental care should be taught in association with dental accident and emergency care. Finally, its teaching should make a major contribution to the preparation of a student to cross the interface between undergraduate dental education and vocational training.

88. For the provision of comprehensive oral care dental students should have the opportunity to work with all members of the dental team. They should appreciate the benefit of working with a dental nurse and learn the principles and practice of assisted operating. They should also be in a position to refer to and interact with other PCDs.

89. The GDC has always regarded it of importance that some of the staff of each dental school choose to have part-time appointments, spending the remainder of their time in general or specialist dental practice. Amongst the many contributions which such individuals can make, an obvious strength is in the teaching of comprehensive dental care.
DENTAL ACCIDENT AND EMERGENCY CARE

90. The student should learn to manage patients of all ages seeking emergency dental care, some of whom will be distressed and in pain. The care of such patients will involve reassurance, the diagnosis of problems and formulation of provisional treatment plans, as well as the management of dental disease conditions, sometimes by extraction of teeth and other invasive procedures. It is essential that Trusts understand their obligation to provide the patients and facilities for such an educational experience.

ORAL SURGERY

91. Practical experience in oral surgery should include those procedures commonly undertaken in general dental practice. On graduation, all dental students should be able to undertake the extraction of teeth and the removal of roots, where necessary utilising surgical techniques involving the raising of a mucoperiosteal flap, bone removal, tooth sectioning, the use of elevators and intraoral suturing. They should be able to assess a surgical extraction. They should be aware of their surgical limitations and understand when to refer for secondary or tertiary care.

92. In addition, the student should have an understanding of the range of surgical procedures which may be used to manage diseases and disorders of the mouth and jaws. They should also be aware of the principles of trauma management and have observed a selection of cases being treated. Dental students can gain valuable experience in oral and maxillofacial surgery, oral medicine and aspects of medicine and surgery by attendance at selected units in teaching and district general hospitals. However, when undertaking dental procedures at such units they must be supervised by staff who are appropriately qualified and registered with the GDC.

ORAL MEDICINE

93. It is important to ensure that the dental student is taught the clinical presentation, diagnosis and management of the common diseases of the oral mucosa, of other oral soft tissues, of the salivary glands, of the facial bones and joints, as well as the oral manifestations of systemic diseases. The various manifestations of facial pain of both dental and non-dental origin, its diagnosis and management must also be considered.

94. Teaching in oral surgery and oral medicine should include clinical instruction in the prevention, diagnosis and management of potentially malignant and malignant lesions and conditions of the oral mucosa.

ORAL PATHOLOGY AND ORAL MICROBIOLOGY

95. The course in oral pathology and oral microbiology should integrate with pathology and medical microbiology. Initially, the processes underlying the common oral diseases and methods of their diagnosis, prevention and management should be described. The teaching should continue through the clinical course and the full range of oral and dental diseases should be considered, with particular attention being given to potentially malignant and malignant lesions and conditions of the oral mucosa.
DENTAL RADIOLOGY AND IMAGING

96. Students should receive instruction and practical experience in the referral criteria, taking, processing and interpretation of intra- and extra-oral radiographs and the writing of radiology reports. They should be aware of alternative imaging techniques. It is highly desirable that instruction in this part of the programme is under the direction of a registered specialist in dental radiology.

97. Students should understand the principles which underlie dental radiographic techniques, the equipment employed and the methods of processing films and the practice of digital radiography. They should be fully instructed in the hazards of ionising radiation and understand the current UK/European regulations pertaining to those hazards so they can undertake proper radiation protection measures for their patients, staff and themselves.

98. The programme must provide “adequate training” as specified in the Ionising Radiation (Medical Exposure) Regulations, 2000 or in any subsequent regulations. This includes the nature of ionising radiation and its interaction with tissues, principles of quality control and quality assurance applied to equipment and technique, justification and optimisation of all radiation exposures (including the importance of utilising previous radiographic information and that available from other diagnostic techniques) and the current safety regulations affecting general dental practice.

99. Students must undergo practical instruction in radiographic technique using equipment normally available to dental practitioners, and in taking the various film views used in general dental practice. They should also be aware of digital imaging techniques. Opportunities should be readily available for students to take radiographs under close supervision for the patients they are treating. Trusts with dental teaching hospitals should be aware of this requirement and ensure that sufficient equipment and staff are available for the purpose and that this may be in addition to service needs.

100. Students should understand the appearance of normal structures on a radiograph, and be able to assess image quality, apply differential diagnosis to abnormal appearances, write informative reports of findings, and apply clinical audit procedures to the process. This part of the course should be well integrated with the teaching of other clinical dental disciplines so that students appreciate the relevance of radiology to treatment.

PAIN AND ANXIETY CONTROL

101. The control of anxiety and pain is fundamental to the practice of dentistry and requires full awareness of the social and psychological needs of the individual patient. Building on a sound knowledge of the prevalence and nature of dental phobias and anxieties in respect of dental treatment and the relevant basic sciences, students should be able to assess the suitability of the various methods of managing and controlling anxiety. They should recognise those patients requiring referral for specialist care. In addition students should be able to advise patients on the advantages, limitations and advisability of different forms of pain and anxiety control appropriate to treatment to be undertaken.
102. The value and range of behavioural non-pharmacological methods of anxiety management must be emphasised. In order to assess and manage an anxious patient, dental students should have learnt a range of methodologies that can be reasonably matched to individual circumstances.

103. By the end of the undergraduate programme students should be competent to administer all forms of local and regional analgesia for dental operations and procedures and have been trained in the management of the complications which may arise in the application of such methods of pain control.

104. All dental students must have a range of practical experience in the administration of inhalational and intravenous conscious sedation including assessment and preparation, care under treatment, and recovery and discharge of patients receiving conscious sedation. All dental students should also have practical experience of providing different forms of treatment for sedated patients and be familiar with the drugs, techniques and equipment for the safe sedation of adults and children. Dental students should graduate with a full recognition of their limited experience in the use of conscious sedation techniques and of the necessity for postgraduate study and instruction in such forms of pain and anxiety control.

105. The theoretical principles of general anaesthesia should be taught to students and they should have this knowledge reinforced by attachment to an anaesthetist who is administering general anaesthesia to dental patients. Practical experience should be gained in operating on patients under general anaesthesia and in their care, including management of the airway. Practical experience should also be gained in the pre-and post-operative care of patients requiring treatment under general anaesthesia. All dental students should receive instruction in the referral of patients for treatment under general anaesthesia in a hospital setting.

**COMPLEMENTARY AND ALTERNATIVE MEDICINE**

106. Many patients are interested in, and may choose, complementary and alternative therapies. Students should be aware of the existence and range of such therapies.

**ELECTIVE STUDIES**

107. Students may gain useful educational experience outside the confines of the formal curriculum by participation in research projects under supervision or in elective programmes, whether in the United Kingdom or overseas.

108. It is desirable, though not essential, for dental students to visit other dental schools or dental clinical centres, either in the United Kingdom or abroad, during the period of clinical study. The main objective should be to broaden the undergraduates’ education by exploring the dental problems and dental management systems in another context. As far as possible, curricula should be designed to facilitate opportunities for elective studies. Elective visits might be arranged around a project consisting of either audit or research, and the results should be presented on return by students in written form or verbally before an audience.
THE INTERCALATED SCIENCE DEGREE

109. Dental students who undertake intercalated honours science degrees contribute to the scientific base of dentistry. The students also assist themselves because there are now many career pathways in dentistry that demand research activity and early experience of research is of great benefit to students in their career development. The education and training in a science degree programme provide excellent preparation for such activities.

110. Whilst not wishing to indicate that an intercalated science degree programme is part of the minimum curriculum for a dental student, the GDC suggests that those planning curricula should do so in a manner which facilitates the process rather than inhibits it. That will mean arranging dental course components so that a student’s secondment to a science degree course at the end of the second year or possibly later is facilitated, as is the return of students to the dental programme in the subsequent year.

SPECIFIC LEARNING OUTCOMES

111. Specific learning outcomes have been identified from the subjects and topics listed in Part 2 on pages 18-30. These are expressed in three levels:

Be competent at: students should have a sound theoretical knowledge and understanding of the subject together with an adequate clinical experience to be able to resolve clinical problems encountered, independently, or without assistance.

Have knowledge of: students should have a sound theoretical knowledge of the subject, but need have only a limited clinical/practical experience.

Be familiar with: students should have a basic understanding of the subject, but need not have direct clinical experience or be expected to carry out procedures independently.

The dental graduate should:

BIOMEDICAL SCIENCES AND ORAL BIOLOGY

• have knowledge of anatomy, physiology and biochemistry relevant to dentistry;
• have knowledge and understanding of biomedical sciences and of oral physiology and craniofacial, oral and dental anatomy in the management of their patients;

BEHAVIOURAL SCIENCES

• be competent at communication with patients, other members of the dental team and other health professionals;
• be familiar with the social and psychological issues relevant to the care of patients;

HUMAN DISEASE

• have knowledge of the scientific principles of sterilisation, disinfection and antisepsis;
• have knowledge of the pharmacological properties of those drugs used in
general practice including their unwanted effects;
• be familiar with the pathological features and dental relevance of common
disorders of the major organ systems;
• be familiar with the role of therapeutics in the management of patients requiring
dental treatment;
• be familiar with the general aspects of medicine and surgery;
• be familiar with the main medical disorders that may impinge on dental treatment;
• be familiar with the work of healthcare workers;
• be familiar with the place of dentistry in the provision of healthcare;

MEDICAL EMERGENCIES
• be competent at carrying out resuscitation techniques and immediate
management of cardiac arrest, anaphylactic reaction, upper respiratory
obstruction, collapse, vasovagal attack, haemorrhage, inhalation or ingestion
of foreign bodies, and diabetic coma;
• have knowledge of diagnosing medical emergencies and delivering suitable
emergency drugs using, where appropriate, intravenous techniques;

LAW, ETHICS AND PROFESSIONALISM
• be competent at maintaining full, accurate clinical records;
• have knowledge of responsibilities of consent, duty of care and confidentiality;
• have knowledge of patients' rights;
• have knowledge of the permitted activities of PCDs;
• have knowledge of the regulatory functions of the General Dental Council;
• be familiar with the legal and ethical obligations of registered dental practitioners;
• be familiar with the obligation to practise in the best interest of the patient at all
times;
• be familiar with the need for lifelong learning and professional development;

HEALTH INFORMATICS
• be competent at using information technology;
• be familiar with the law as it applies to records;

INTRODUCTION TO CLINICAL DENTISTRY
• be competent at obtaining a detailed history of the patient's dental state;
• be competent at obtaining a relevant medical history;
• be competent at using laboratory and imaging facilities appropriately and efficiently;
• be competent at clinical examination and treatment planning;
• be competent at arranging appropriate referrals;
• be competent at maintaining an aseptic technique throughout surgical procedures;
• be competent at obtaining informed consent;
• have knowledge of managing patients from different social and ethnic
backgrounds;
• have knowledge of dental problems that may manifest themselves in older
patients and of the principles involved in the management of such problems;
• have knowledge of working as part of the dental team;
• be familiar with the complex interactions between oral health, nutrition, general health, drugs and diseases that can have an impact on dental care and disease;

RESTORATIVE DENTISTRY
• be competent at diagnosing and planning preventive, non-operative care for the individual patient who presents with dental caries, periodontal diseases and tooth wear;
• be competent at completing a periodontal examination and charting, diagnosis and treatment plan;
• be competent at supragingival and subgingival scaling and root debridement, using both powered and manual instrumentation, and in stain removal and prophylaxis;
• be competent at knowing when and how to prescribe appropriate anti-microbial therapy in the management of plaque-related diseases;
• be competent at completing a range of procedures in restorative dentistry including amalgam and tooth-coloured restorations, endodontic treatments of single- and multi-rooted teeth, anterior and posterior crowns, post crowns, simple bridges, and partial and complete dentures;
• be competent at deciding whether severely broken down teeth are restorable;
• be competent at designing effective indirect restorations and complete and partial dentures;
• have knowledge of when periodontal surgery might be advised;
• have knowledge of how missing teeth should be replaced, choosing between the alternatives of no replacements, bridges, dentures or implants;
• have knowledge of the design and laboratory procedures used in the production of crowns, bridges, partial and complete dentures and be able to make appropriate chair-side adjustment to these restorations;
• be familiar with the diagnosis and management of temporomandibular joint disorders;
• be familiar with dental implants as an option in replacing missing teeth;

DENTAL BIOMATERIALS SCIENCE
• have knowledge of the science that underpins the use of dental biomaterials;
• have knowledge of the limitations of dental materials;
• be familiar with those aspects of biomaterial safety that relate to dentistry;

PAEDIATRIC DENTISTRY
• be competent at diagnosing active caries and planning appropriate non-operative care;
• be competent at fissure sealing, preventive resin restorations, and pit and fissure restorations;
• be competent in undertaking approximal and incisal tip restorations;
• have knowledge of preformed stainless steel crown and pulp therapy in primary molar teeth;
• have knowledge of the role of sedation in the management of young patients;
• have knowledge of the management of trauma in both dentitions;
ORTHODONTICS
- be competent at carrying out an orthodontic assessment including an indication of treatment need;
- be competent at managing appropriately all forms of orthodontic emergency including referral when necessary;
- be competent at making appropriate referrals based on assessment;
- have the knowledge to be able to explain and discuss treatments with patients and their parents;
- have the knowledge to be able to design, insert and adjust space maintainers;
- have the knowledge to design, insert and adjust active removable appliances to move a single tooth or correct a crossbite;
- be familiar with contemporary treatment techniques;
- be familiar with the limitations of orthodontic treatment;

PREVENTIVE DENTISTRY
- be competent at oral hygiene instruction, dietary analysis, topical fluoride therapy and fissure sealing;
- be familiar with an evidence-based approach to treatment;

DENTAL PUBLIC HEALTH
- be familiar with the prevalence of certain dental conditions in the UK;
- be familiar with the importance of community-based preventive measures;
- be familiar with the social, cultural and environmental factors which contribute to health or illness;
- be familiar with the principles of recording oral conditions and evaluating data;

COMPREHENSIVE ORAL CARE
- be competent at working with other members of the dental team;
- have knowledge of providing a comprehensive approach to oral care;

ORAL SURGERY
- be competent at undertaking the extraction of teeth and the removal of roots where necessary;
- be competent at undertaking minor soft tissue surgery;
- have knowledge of the management of acute infection;
- be familiar with the principles of assessment and management of maxillofacial trauma;
- be familiar with the diagnosis of oral cancer and the principles of tumour management;
- be familiar with the principles of treatment of dento-facial anomalies including the common orthodontic/maxillofacial procedures involved;
- be familiar with the basic principles of oral surgery practice;
ORAL MEDICINE
- have knowledge of the drugs commonly used in oral medicine and of their side effects and drug interactions;
- have knowledge of appropriate special investigations and the interpretation of their results;
- be familiar with the pathogenesis of common oral medical disorders and their treatment;

ORAL PATHOLOGY AND ORAL MICROBIOLOGY
- have knowledge of the role of laboratory investigations in diagnosis;
- have knowledge of the pathogenesis and classification of oral diseases;
- have knowledge of the aetiology and processes of oral diseases;
- have knowledge of matters relating to infection control;
- have knowledge of the causes and effects of oral diseases needed for their prevention, diagnosis and management;

DENTAL RADIOLOGY AND IMAGING
- be competent at taking and processing the various film views used in general dental practice;
- be competent at radiographic interpretation and be able to write an accurate radiographic report;
- have knowledge of the hazards of ionising radiation and regulations relating to them, including radiation protection and dose reduction;
- be familiar with the principles which underlie dental radiographic techniques;

PAIN AND ANXIETY CONTROL
- be competent at infiltration and regional block analgesia in the oral cavity;
- be competent at when, how and where to refer a patient for general anaesthesia;
- be competent at managing fear and anxiety with behavioural techniques and empathise with patients in stressful situations;
- have knowledge of inhalational and intravenous conscious sedation techniques;
- have knowledge of conscious sedation techniques in clinical practice.
STUDENT HEALTH AND CONDUCT

112. Dental schools are aware of the very small number of clinical students who may have difficulty in the later parts of the clinical course and who may need to be referred to a committee that is competent to deal with fitness to practise issues. The GDC commends the approach of the GMC as described in its document on Student Health and Conduct (1997) and suggests a very similar approach for dental students, summarised in the following paragraphs.

BACKGROUND

113. Once they have graduated dentists have the right to apply for registration with the GDC. For this reason, it is important that students whose health or conduct may lead them to be a risk to patients should not be allowed to graduate with a registerable degree.

LENGTH OF PROGRAMME

114. A small number of students take several years longer than usual to graduate. Where this occurs, for example because of periods of ill-health, the normal maximum time from entry to dental school until graduation should not exceed seven years, excluding the pre-dental year, intercalation and PhD or other research programme.

DUTY TO PROTECT PATIENTS

115. Students entering dental schools should be told that their degree programmes will bring them into contact with vulnerable people and that this carries with it a number of responsibilities. From their first day they should be aware of the standards set by the GDC which will apply to them as future dentists. The GDC expects dental schools to discuss with students its guidance on professional conduct, Maintaining Standards. See also paragraph 73.

OPTIONS FOR THOSE NOT SUITED TO DENTISTRY

116. All students who express doubts about a career in dentistry and those about whom the dental school has doubts should receive counselling as soon as possible, including up-to-date advice about alternative careers. Sometimes a short period of leave of absence may help a student who has doubts. If these students are in the first two years of the programme, they may be able to transfer to other degree programmes and the procedure for doing so should be explained. If the student has completed three years of the programme to a satisfactory academic standard, we would commend the option, which is available in most dental schools, of a worthwhile exit with the award of an ordinary degree with no further examination. This offers a positive way forward when a student is faced with a difficult and unexpected change of career plan. Although such a degree is unclassified, it enables students to graduate and may facilitate entry to a number of other professions and occupations.

SPECIFIC ISSUES - ANXIETY AND STRESS

117. Dentistry is a demanding profession and, at times, all dental students will be subject to stress and anxiety. Both of these range in intensity from a normal
reaction to an abnormal one. People under great stress are unable to function adequately. High stress levels may cause students to drink and smoke excessively, to take drugs and in some cases to withdraw from the programme. Dental schools should have mechanisms in place to identify symptoms of stress which may give early indications of mental illness. They should encourage students to seek advice before more serious symptoms develop.

**CARE FOR THE STUDENT**

118. Minor emotional problems, or psychiatric disorders, constitute up to one-third of primary consultations with general medical practitioners. Therefore, even though most dental students are physically and psychologically healthy, it is likely that a significant number will develop minor psychiatric disorders, especially depression and anxiety. Dental students should be encouraged to seek pastoral help as soon as possible if a problem arises.

119. When the dental school becomes aware of psychiatric illness in one of its students, it is important to ensure that he or she is given adequate care as quickly as possible. Failure to treat early may result in the condition becoming chronic or an increased risk of suicide, as well as impairment of academic standards and, in a few cases, a risk to patients. Dental schools should ensure that there is a rapid route to psychiatric referral, assessment and management. If the psychiatrist considers that the student is suffering from a recurrent or episodic condition but is in remission at the time of the examination, the school should also seek advice about whether the condition may in future be expected to render the student unfit to practise.

**BEHAVIOURAL PROBLEMS**

120. Universities should devise procedures to deal appropriately with disciplinary problems, differentiating between simple misbehaviour and misbehaviour due to illness. Although it is appreciated that student confidentiality should be respected, present or future patient safety is of paramount importance. Since dental students come into close contact with patients their behaviour must be of a high standard. It is, therefore, essential that action is taken if a student's behaviour might cause present or future risk to patients. This applies even if an incident takes place outside the university. Misconduct should always be taken seriously but the following require particularly firm action: abuse of others, violence or the threat of violence, dishonesty, and drug- or alcohol-related intoxication.

**DRUG AND ALCOHOL ABUSE**

121. Dental schools must ensure that students involved in substance abuse are offered help. It is also important to decide whether they are fit to proceed to qualification and thus potentially to registration.

In making this decision the dental school will need to consider the following:

- Is the drug or alcohol abuse a single, aberrant act or recurrent and persistent?
- Is the misuse of drugs or alcohol associated with underlying anxiety or depression? If so, do these require treatment?
- Is the abuse recognised as a problem by the student?
- Does the student accept that there is a need for change?
- Will the student accept help?
Similar considerations apply when a student behaves violently because of alcohol or drug misuse or for some other reason. Students who act violently and aggressively outside the dental school may be a risk to patients.

ASSESSMENTS

PRINCIPLES

122. The form and content of assessments have a strong influence on shaping students’ learning styles and approaches to the curriculum. Accordingly, both assessments and examinations should be designed with the aim and generic and specific learning outcomes in mind. Students should be fully aware of the particular role of any assessment. Summative assessments indicate whether a student has reached an appropriate standard. These act as suitable “hurdles” so that students whose progression is unsatisfactory can be given reasonable opportunities for improvement until they have achieved the necessary level to proceed or it is clear that the individual is incapable of doing so.

The processes of assessment should be transparent; explicit criteria facilitate effective learning and allow for the provision of effective and meaningful feedback. Methods of assessment adopted in dental schools should:

- be appropriate to the relevant learning outcomes;
- reflect student progression through the programme;
- encourage integration of knowledge, skills and attitudes;
- enable students to demonstrate their level of attainment and to demonstrate a full range of abilities;
- provide accurate, constructive feedback to students on their performance;
- allow records of student academic and clinical performance to be collated;
- allow the participation of external examiners;
- engage in mechanisms of quality assurance;
- provide information for course and programme organisers on the quality of provision;
- avoid congestion and duplication;
- encourage reflection and self-assessment.

STUDENT RECORDS

123. Each dental authority is required to keep records of the academic and clinical performance of each dental student. The records should be arranged so that external examiners and other authorised persons can assess the amount and quality of clinical work completed by the student.

IN-COURSE ASSESSMENT

124. Schools should make regular formative assessments of their students, feeding back the results and discussing them with each student. In-course assessment systems may be used to establish the progress of students toward achievement of attitudinal outcomes as well as testing knowledge and skills.

125. Schools are required to have effective systems of monitoring student progress in all years so that students have been adequately assessed with regard to their
clinical skills and acumen before proceeding to the final examination. In addition, students should take practical examinations in the programme of those assessments and external examiners should be given an opportunity to attend and participate. The assessment of students in this part of the programme should include an evaluation of awareness of limitations, of situations in which to refer patients and the importance of clinical governance, including peer review and audit.

EXAMINATIONS

126. Candidates’ knowledge and understanding of the subjects studied must be effectively tested. It is not necessary that there should be a separate paper or other examination in each subject. It is preferable that subjects should be appropriately grouped and that the examination in each group should take place soon after the completion of the relevant courses. At least two examiners should participate in the adjudication of all parts of the examinations when possible and appropriate. In assessing a candidate’s performance both external and internal examiners should be empowered to take into account the records of the work done by the candidate throughout the course of study in the subject of the examination.

EXTERNAL EXAMINERS

127. It is essential, to ensure that standards are maintained, that external examiners should participate in all assessment processes that may affect the progress of a student towards the award of a degree, arbitrate or adjudicate on problem cases, and comment on programme content, balance and structure and on assessment procedures. In all written examinations the questions in each subject should be set in consultation with the external examiner in that subject. If some candidates are not to be examined in a part of an examination, the basis for exemption should be made known to the candidates and agreed by the external examiners. No candidate should fail any professional examination without the concurrence of an external examiner. When candidates’ practical abilities are assessed in whole or in part by a process of continuous assessment, the procedures followed should be discussed with and have the approval of the external examiner or examiners concerned. Every candidate should be examined by an external examiner in at least one part of a clinical examination. External and internal examiners should normally be appointed for at least three consecutive years. It is essential that the external examiner should be a teacher, or have recently so been, at a university dental school other than the institution at which students to be examined were trained.

FINAL EXAMINATIONS

128. All external examiners should make themselves aware of the content of The First Five Years. Final qualifying examinations in dental subjects should be designed to include the end-point assessment of candidates’ clinical ability across a wide variety of procedures and of their skill in interrelating the various disciplines within dentistry. Assessment of diagnostic and treatment planning skills must involve the presence of patients. The examinations may include patients treated previously or during the examination and should preferably include an element of in-course assessment. The final examinations should be a searching examination in the final year, which examines clinical competence and the culmination of
knowledge and understanding gained throughout the programme. There should be anonymous, double-blind marking of written papers. As the integration of subjects is now more evident within the main subject areas, it is appropriate to have a comprehensive examination at the end of the programme. There has been an expansion in the use of in-course assessment as part of final examinations since the last round of visitations. The GDC strongly supports this development. Each university must be clear in its reasons for using in-course assessment and the structure of the assessment process. Relevant information must be made available to staff, students and external and internal examiners.

**THE ASSURANCE OF QUALITY AND STANDARDS PROCEDURES**

129. The GDC requires that dental graduates should be required to attain the highest standards and that dental schools should provide the high-quality learning opportunities and experiences to enable students to achieve them.

130. In order to discharge its obligations, the GDC has adopted rigorous procedures for monitoring the standards of awards and the quality of provision. In a six-yearly cycle the GDC appoints visitors to visit places where instruction is given to undergraduate dental students and to be present at their final examinations. The reports of these visits will be published on the GDC website following consideration by the Education Committee and the Council. The visitors’ recommendations are followed up in a formal monitoring process. The visitors’ General Reports on the visits to dental schools in 1993-95 and to Final BDS/BChD examinations in 1998-2000 have proved influential documents, describing respectively in a UK perspective the provision of teaching and clinical experience and the procedures for assessment. Recommendations are made for good practice and improvement.

131. If the GDC considers that the programme of study or the examinations to qualify for a degree or licence are not such as to ensure that graduates or licentiates possess the requisite knowledge, skills or attitudes necessary for the effective practice of dentistry, it may make representations to the Privy Council, which may order that a degree or licence shall cease to confer the right to apply to be registered in the Dentists Register.

**STAFF DEVELOPMENT AND PARTICIPATION**

132. The GDC recognises that staff of dental schools must participate fully in quality assessment and enhancement activities, particularly when these are conducted because of a statutory requirement. For its part, the GDC will seek to minimise that burden by co-operating with other bodies as far as possible in order to avoid unnecessary duplication of effort. The GDC would wish to see the dental schools demonstrate a commitment to the training of staff in the theory and practice of education.

133. To assist members of staff new to the role of examining, the GDC encourages the practice of observers being present at all types of examination.
CURRICULUM ENHANCEMENT

134. The GDC strongly supports measures taken by dental schools to enhance and develop dental curricula. The process must be conducted through the means of a curriculum committee or similar structure which will contain student members and representation of those involved in the vocational training scheme. Students play an essential role in commenting on curriculum development. Student membership on all levels of non-confidential committees should be encouraged in our dental schools.

135. The establishment of vocational training presents particular challenges to the deans and staff of dental schools, as well as to those in vocational training, to coordinate new developments in curriculum and vocational training initiatives, to participate in joint planning and to share information. In this last regard, it is highly desirable that students maintain a portfolio of experience and achievements which will be of value in preparing them for their future training and careers.

136. General professional training schemes have been piloted and are becoming established in several parts of the UK. They offer a valuable extended training experience in different settings for young dentists but must not be considered as a substitute for thorough undergraduate training.
As a Working Group, we have sought to build on previous GDC documents concerning the undergraduate dental curriculum, in particular the first edition of *The First Five Years*, published in 1997. Our original consultation exercise in July 2000 produced 45 responses that were considered carefully and informed our first draft, which was considered by the Council in November 2001. We also took note of relevant documents from QAA, GMC, GDC, and other educational services. Our second consultation exercise produced 82 responses, all of which were considered by the Working Group in January-February 2002. A draft document was circulated again to dental schools in February 2002 so that the Education Committee could consider further comments in March 2002. The Working Group agreed the content of the second edition of *The First Five Years*, which was submitted to the Council in May 2002. Our report devotes more space to:

- IT skills
- Law, ethics and professionalism
- Integration with PCD education
- Health and safety issues
- Outreach teaching
- The need for continuing professional development
- Pain and anxiety control

We do not want to develop a “bolt on” approach to these and other issues, which would further congest the curriculum, and acknowledge that all dental schools have incorporated these subjects into their programme. Rather, we wish to encourage the longitudinal approach, embedding these subjects wherever possible throughout the programme.

We have suggested areas where further integration of subject matter could be considered, which in our view would be desirable educationally, and might be more efficient in time allocated within the curriculum. These include:

- Further integration with Biomedical Sciences
- Integration of subjects comprising Human Diseases

A section on Student Health and Conduct has been included, based on the relevant report from the GMC. We have placed greater emphasis on the need to educate and support teachers. These two issues are important and may require further staff time, but do not in themselves overburden the curriculum. We have developed a series of "specific learning outcomes" which have been informed by the QAA Benchmarking exercise, and the extremely helpful responses arising from the second round of the consultation exercise. We also recognise and applaud the way dental schools have approached the need to encourage students to pursue topics of individual interest, by means of electives, intercalated degrees or research projects. Overall, our intention has been to define what are the important topics that should be included in an undergraduate dental programme.
BIBLIOGRAPHY


Bligh J, Ireland R & H Meadows, A Survey Examining the Attitudes of General Dental Practitioners towards Change in Undergraduate Dental Education (British Dental Journal, Volume 184, Issue 8, 25 April 1998)

BPS Core Curricula in Pharmacology for Dental Students (British Pharmacological Society, 2001)


Bonass W A & J J Marley, The Teaching of Molecular Biology to Undergraduate Dental Students within the UK (British Dental Journal, Volume 184, Issue 6, 28 March 1998)

Clitter C, New Undergraduate Curriculum Requirements from the General Dental Council (The General Dental Practitioner, May 1997)

Code of Practice for the Assurance of Academic Quality and Standards in Higher Education; Section one: Postgraduate research programmes; Section two: Collaborative provision; Section three: Students with disabilities; Section four: External examining; Section five: Academic appeals and student complaints on academic matters; Section six: Assessment of students; Section seven: Programme approval: monitoring and review; Section eight: Career education, information and guidance (Quality Assurance Agency for Higher Education, January 2001)

Davis LG, & R B Winstanley, The Introduction of Dental Team Education (British Dental Journal, Volume 182, Issue 11, 14 June 1997)

Dental Education in Europe, Update (September 2000 - February 2001) by GDC Director of Education (GDC Education Committee, Item 6.6, 20 March 2001)

Developments in the Undergraduate Curriculum, Teaching of Orthodontics (GDC Education Committee, Item 2.3, 19 September 2000)

Dorrell, Sir C D, Pearson C, & Professor J Williams (Eds), Informatics in Undergraduate Medical and Dental Curricula (Report of a National Workshop, 11 December 1996)


Doran G A, Dental Education - Invited Review, Reviewing the Role of Educational Domains and Problem-based Learning in Dental Curricula. Part 2: Problem-based learning and skills expected from students (SADJ, Volume 55, No 9, September 2000)

Evans M, Doctors Order a Dose of Ethics (The Times Higher Education Supplement, 15 June 2001)

Fitness to Practise in the Medical Profession, a Report to Universities UK and the Council of Heads of Medical Schools (Eversheds, July 2001)

Future Pharmacists. Consultation on the Criteria and Syllabus for Pharmacy Undergraduate Education (Royal Pharmaceutical Society of Great Britain, September 2001)

GDC Report on Monitoring of BDS/BChD Courses Following the General Visitation of Dental Schools 1993-5 (General Dental Council, 1999)

The GDC Visitation of Examinations 14 Individual Reports (General Dental Council, 1998-2000)

The GDC Visitation of Examinations - General report of the visitors to the final BDS, BChD and LDS examinations (General Dental Council, 2001)

Grace M, A Culture for Learning (British Dental Journal, Volume 190, Issue 9, 12 May 2001)

Greenhalgh T, Computer-assisted Learning in Undergraduate Medical Education (bmj.com, 11 January 2001)

Guidance Notes for Dental Practitioners on the Safe Use of X-Ray Equipment (RPB/DoH, June 2001)

Leadership for the Future: the dental school in the university, 75th Anniversary Summit Conference (American Dental Education Association, 12-13 October 1998)

Learning from Bristol: the report of the public inquiry into children’s heart surgery at the Bristol Royal Infirmary 1984-1995 (Bristol Royal Infirmary Inquiry, July 2001)

Lightelm, Professor A J, Guest Editorial (SADJ, Volume 55, No.11, November 2000)

Maintaining Standards - Guidance to Dentists on Professional and Personal Conduct (General Dental Council, Revised November 2001, November 1997)

The Manchester University Faculty of Medicine, Dentistry and Nursing, Procedure for a Committee on Fitness to Practise (Manchester University)


The Moving Finger Types (Dental Update, July/August 1999)

The New Ionising Radiation Regulations – an Overview (BDANews, Volume 14, No. 2, February 2001)

The Next Two Years, General Professional Training (General Dental Council, August 1998)


Report of the Working Party on the Teaching of Pain and Anxiety Control (General Dental Council, 19 September 2001)

The Role of Outreach Teaching in the Dental Curriculum of the Future, Report of a Workshop Held at The Manchester Dental Education Centre (University of Manchester and University of Liverpool, February 2001)


The SHEFC, HEFCW and QAA Reports on Dental School Inspections (13 individual reports and 2 overview reports, 1996-2000)

Student Health and Conduct, Protecting Patients and Guiding Doctors (General Medical Council, February 1997)


Ten Key Principles, as set out in the Fourth Report of the Steering Group on Undergraduate Medical and Dental Education (SGUMDER, 1996)

Training in Basic and Advanced Life Support in UK Medical Schools; Questionnaire Survey (BMJ.com, 10 July 2001)

Tomorrow's Doctors Revised Edition, June 2002 (General Medical Council, December 1993)

Undergraduate Dental Curriculum – South Africa (Compiled by Committee of Dental Deans, 1999)

Walsh L T & G J Seymour, Dental Education in Queensland: 2 Principles of Curriculum Designs (SADJ, Volume 56, No. 3, March 2001)

## THE DENTAL DOMAINS

The Dental Domains have been drawn up from the Aim of Undergraduate Dental Education (paragraphs 18, 19 and 20) and the Specific Learning Outcomes (paragraph 111) to illustrate the scope and depth of the undergraduate dental programme.

### What the dentist is able to do

<table>
<thead>
<tr>
<th>Clinical Skills</th>
<th>Practical Procedures</th>
<th>Patient Investigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>obtain and record a comprehensive history, perform an appropriate physical examination, interpret the findings and organise appropriate further investigations</td>
<td>undertake a range of clinical procedures which are within a dentist’s area of competence, including techniques for preventing and treating oral and dental diseases and disorders</td>
<td>be competent at using laboratory and imaging facilities appropriately and efficiently</td>
</tr>
<tr>
<td>be competent at obtaining a detailed history of the patient’s dental state</td>
<td>be competent at carrying out resuscitation techniques and immediate management of cardiac arrest, anaphylactic reaction, upper respiratory obstruction, collapse, vasovagal attack, haemorrhage, inhalation or ingestion of foreign bodies and diabetic coma</td>
<td>be competent at the principles of radiographic interpretation and be able to write an accurate radiographic report</td>
</tr>
<tr>
<td>be competent at acquiring a relevant medical history</td>
<td>be competent at obtaining informed consent</td>
<td>have knowledge of appropriate special investigations and the interpretation of their results</td>
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<tr>
<td>be competent at clinical examination and treatment planning</td>
<td>be competent at oral hygiene instruction, dietary analysis, topical fluoride therapy and fissure sealings</td>
<td>have knowledge of the role of laboratory tests in diagnosis</td>
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<tr>
<td>be competent at maintaining an aseptic technique throughout surgical procedures</td>
<td>be competent at knowing when and how to prescribe appropriate anti-microbial therapy in the management of plaque-related diseases</td>
<td>be familiar with the principles which underlie dental radiographic techniques</td>
</tr>
<tr>
<td>be competent at diagnosing and planning preventative non-operative care for the individual patient who presents with dental caries, periodontal diseases and tooth wear</td>
<td>be competent at supragingival and subgingival scaling and root debridement, using both powered and manual instrumentation and in stain removal and prophylaxis</td>
<td></td>
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<tr>
<td>be competent at completing a periodontal examination and charting, diagnosis and treatment plan</td>
<td>be competent at completing a range of procedures in restorative dentistry, including amalgam and tooth-coloured restorations, endodontic treatments of single- and multi-rooted teeth, anterior and posterior crowns, post crowns, simple bridges and partial and complete dentures</td>
<td></td>
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<tr>
<td>be competent at designing effective indirect restorations and complete and partial dentures</td>
<td>be competent at assessing, designing, placing and maintaining冠, bridges, partial and complete dentures and be able to make appropriate chair-side adjustment to these restorations</td>
<td></td>
</tr>
<tr>
<td>be competent at diagnosing active caries and planning appropriate non-operative care</td>
<td>be competent at knowledge of the management of trauma in both dentitions</td>
<td></td>
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<tr>
<td>be competent at carrying out an orthodontic assessment including an indication of treatment need</td>
<td>have the knowledge to be able to design, insert and adjust space maintainers</td>
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<tr>
<td>be competent at managing fear and anxiety with behavioural techniques</td>
<td>have the knowledge to design, insert and adjust active removable appliances to move a single tooth or correct a crossbite</td>
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<tr>
<td>have knowledge of diagnosing medical emergencies and delivering suitable emergency drugs using, where appropriate, intravenous techniques</td>
<td>have knowledge of matters relating to infection control</td>
<td></td>
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<tr>
<td>be familiar with the diagnosis and management of temporomandibular joint disorders</td>
<td>have knowledge of inhalational and intravenous conscious sedation techniques</td>
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<tr>
<td>be familiar with contemporary treatment technique in orthodontics</td>
<td>have knowledge of conscious sedation techniques in clinical practice</td>
<td></td>
</tr>
</tbody>
</table>
### How the dentist approaches practice

<table>
<thead>
<tr>
<th>Patient Management</th>
<th>Health Promotion and Disease Prevention</th>
<th>Communication</th>
<th>Data &amp; Information Handling Skills</th>
<th>Understanding of Basic &amp; Clinical Sciences and Underlying Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>share with patients provisional assessment of their problems and formulate plans for their further investigation and management</td>
<td>understand the principles of health promotion and disease prevention</td>
<td>have knowledge of behavioural sciences and communication</td>
<td>use contemporary methods of electronic communication and information management</td>
<td>understand the scientific basis of dentistry, including the relevant biomedical sciences, the mechanisms of knowledge acquisition, scientific method and evaluation of evidence</td>
</tr>
<tr>
<td>be competent in when, how and where to refer a patient for general anaesthesia</td>
<td>have knowledge of the organisation and provision of healthcare in the community and in hospital</td>
<td>communicate effectively with patients, their families and associates, and with other health professionals involved in their care</td>
<td>be competent at maintaining full and accurate clinical records</td>
<td>disease processes such as infection, inflammation, disorders of the immune system, degeneration, neoplasia, metabolic disturbances and genetic disorders</td>
</tr>
<tr>
<td>be competent at making appropriate referrals</td>
<td>be familiar with the complex interactions between oral health, nutrition, general health, drugs and diseases that can have an impact on dental care and disease</td>
<td>be competent at communication with patients, other members of the dental team and other health professionals</td>
<td>be competent at using information technology</td>
<td>have knowledge of anatomy, physiology and biomedical sciences relevant to dentistry</td>
</tr>
<tr>
<td>be competent at arranging appropriate referrals</td>
<td>be familiar with the prevalence of certain dental conditions in the UK</td>
<td>be competent at working with other members of the dental team</td>
<td>be familiar with the principles of recording oral conditions and evaluation data</td>
<td>have knowledge of the aetiology and processes of oral diseases</td>
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<tr>
<td>be competent at obtaining informed consent</td>
<td>be familiar with the importance of community-based preventive measures</td>
<td>have knowledge to be able to explain and discuss treatments with patients and their parents</td>
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<td>have knowledge of the scientific principles of sterilisation, disinfection and antisepsis</td>
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<td>be competent at making appropriate referrals based on assessment</td>
<td>be familiar with the social, cultural and environmental factors which contribute to health or illness</td>
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<td>have knowledge of the science that underpins the use of dental biomaterials</td>
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<tr>
<td>have knowledge of managing patients from different social and ethnic backgrounds</td>
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<td>have knowledge of the limitations of dental materials</td>
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<tr>
<td>have knowledge of the pharmacological properties of those drugs used in general practice including their unwanted effects</td>
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<td></td>
<td>have knowledge and understanding of biomedical sciences, of oral physiology and craniofacial, oral and dental anatomy in the management of patients</td>
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<tr>
<td>have knowledge of the role of sedation in the management of young patients</td>
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<td></td>
<td>have knowledge of the causes and effects of oral disease needed for their prevention, diagnosis and management</td>
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<td>have knowledge of management of acute infection</td>
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<td>have knowledge of the hazards of ionising radiation and regulations relating to them, including radiation protection and dose reduction</td>
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<tr>
<td>have knowledge of the drugs commonly used in oral medicine and their side effects and drug interactions</td>
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<td>be familiar with the pathological features and dental relevance of common disorders of the major organ systems</td>
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<td>have knowledge of the role of conscious sedation in dentistry</td>
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<td>be familiar with those aspects of biomaterial safety that relate to dentistry</td>
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<tr>
<td>have knowledge of dental problems that may manifest themselves in older patients and of the principles involving the management of such problems</td>
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</table>
### The dentist as a professional

<table>
<thead>
<tr>
<th>Professional Development</th>
<th>Personal Development</th>
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<tbody>
<tr>
<td>• possess a wide range of skills, including research, investigative, analytical, problem-solving, planning, communication, presentation and team skills</td>
<td>• approaches to teaching and learning that are based on curiosity and exploration of knowledge rather than its passive acquisition</td>
</tr>
<tr>
<td>• respect for patients and colleagues that encompasses, without prejudice, diversity of background and opportunity, language and culture</td>
<td>• a desire for intellectual rigour, a capacity for self-audit and an appreciation of the need to participate in peer review</td>
</tr>
<tr>
<td>• integrity, honesty and trustworthiness</td>
<td>• an awareness of personal limitations, a willingness to seek help as necessary, and an ability to work effectively as a member of a team</td>
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<tr>
<td>• an awareness of the need for continuing professional development allied to the process of their continuing education, in order to ensure that high levels of clinical competence and knowledge are maintained</td>
<td>• be competent at working with members of the dental team</td>
</tr>
<tr>
<td>• have knowledge of the permitted activities of PCD’s</td>
<td>• have knowledge of working as part of the dental team</td>
</tr>
<tr>
<td>• have knowledge of the regulatory functions of the General Dental Council</td>
<td>• be familiar with the need for lifelong learning and professional development</td>
</tr>
<tr>
<td>• be familiar with the work of healthcare workers</td>
<td>• be familiar with the obligation to practise in the best interest of the patient at all times</td>
</tr>
<tr>
<td>• be familiar with the place of dentistry in the provision of healthcare</td>
<td>• be familiar with the need for lifelong learning and professional development</td>
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</tbody>
</table>

#### Appropriate Attitudes, Ethical Understanding and Legal Responsibilities

- understand the broader issues of dental practice, including ethics, medico-legal considerations, management, and the maintenance of a safe working environment
- an understanding of patients' rights, particularly with regard to confidentiality and informed consent, and of patients' obligations
- an awareness of moral and ethical responsibilities involved in the provision of care to individual patients and to populations
- an understanding of audit and clinical governance
- an awareness that dentists should strive to provide the highest possible quality of patient care at all times
- an awareness of the importance of his or her own health and its impact on the ability to practise as a dentist
- be familiar with the legal and ethical obligations of registered dental practitioners
- be familiar with the law as it applies to records
- be familiar with social and psychological issues relevant to the care of patients
- apply evidence-based treatment
- an awareness of the need to limit interventions to the minimum necessary to achieve the desired outcomes
- be competent at deciding whether severely broken down teeth are restorable and how missing teeth should be replaced, choosing between the alternatives of no replacements, bridges, dentures or implants
- be competent at knowing when and how to prescribe appropriate anti microbial therapy in the management of plaque-related disease
- have knowledge of how missing teeth should be replaced, choosing between the alternatives of no replacements, bridges, dentures or implants
- have knowledge of providing a comprehensive approach to oral care
- have knowledge of when periodontal surgery might be advised
- be familiar with dental implants as an option in replacing missing teeth
- be familiar with the limitations of orthodontic treatment
- be familiar with an evidence-based approach to treatment

#### Appropriate Decision Making, Clinical Reasoning and Judgement

- be competent at deciding whether severely broken down teeth are restorable and how missing teeth should be replaced, choosing between the alternatives of no replacements, bridges, dentures or implants
- be competent at knowing when and how to prescribe appropriate anti microbial therapy in the management of plaque-related disease
- have knowledge of how missing teeth should be replaced, choosing between the alternatives of no replacements, bridges, dentures or implants
- have knowledge of providing a comprehensive approach to oral care
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#### Approaches to teaching and learning that are based on curiosity and exploration of knowledge rather than its passive acquisition

- a desire for intellectual rigour, a capacity for self-audit and an appreciation of the need to participate in peer review
- an awareness of personal limitations, a willingness to seek help as necessary, and an ability to work effectively as a member of a team
- be competent at working with members of the dental team
- have knowledge of working as part of the dental team
- be familiar with the need for lifelong learning and professional development
- be familiar with the obligation to practise in the best interest of the patient at all times