

## IN BRIEF

- An integrated human diseases course facilitates effective teaching in the areas of medicine, surgery, pharmacology, pathology and microbiology.
- Such integrated courses allow demonstration of the relevance of the material to the practice of dentistry.
- Improved education should increase practitioner confidence in the management of medically compromised patients.

## Human diseases – the Newcastle experience

M. Greenwood<sup>1</sup> and R. A. Seymour<sup>2</sup>

The second edition of *The first five years*, published by the General Dental Council in 2002,<sup>1</sup> identifies human diseases as a specific subject to be taught as part of the BDS curriculum. It states clearly the particular learning outcomes of such a course and then identifies a range of subjects (pathology, microbiology, medicine, surgery, pharmacology, therapeutics, accident and emergency services and medical emergencies) which should constitute the programme. Previously, many of these topics were taught and examined separately. In this article, we would like to share the Newcastle experience of developing a course in human diseases alongside the GDC guidelines.

### WHY A NEW COURSE?

The key comment in *The first five years* is the integration of teaching of medicine, surgery and allied subjects. We would totally endorse this view as a lack of integration was a major shortfall when these subjects were taught separately. Often in the BDS curriculum, pathology and microbiology were taught first (frequently in Year 3) and medicine and surgery in Year 4. Pharmacology and therapeutics were taught either in Year 3 or 4. Thus the students would know about the pathology of atheroma formation but have little knowledge of the clinical outcomes. Likewise, the students would be taught about the microbiology of infective endocarditis but have sparse insight into the clinical features of this

disease. Other examples would occur in pharmacology and one of the most obvious examples would be students receiving a lecture on anti-hypertensives with little or no knowledge of hypertension and its sequelae. As courses in pathology, microbiology, medicine, surgery and pharmacology were so embedded in the curriculum and followed rigorous time frames, a major change in direction was required.

There was also considerable overlap and repetition in the old style courses. Whilst some repetition was desirable, there was duplication, especially between medicine, surgery and general pathology.

A further problem often reported by dental schools was the quality of teaching, especially in the areas of medicine and surgery. Previously, it was the remit of the professors of these disciplines to provide the respective course. The job was frequently delegated which gave rise to problems of continuity. Often NHS consultants were asked to deliver parts of the course and this clashed with their hospital commitments (which took priority). As a consequence, teaching was further delegated, often at short notice, to junior staff. The outcomes were unsatisfactory.

The problems were further compounded by a lack of knowledge of what to teach the dental students or, more precisely, what depth of knowledge was required. This led to considerable confusion for all parties. Often such courses were poorly received and this was reflected in student attendance patterns.

Courses in both medicine and surgery also provided opportunities for patient contact in a hospital setting. These invariably took the form of ward rounds, where again, teaching was very variable. The emphasis in *The first five years* is on examination of the clothed patient, and whilst ward rounds may have had some value, it was difficult to see the relevance to the dental setting. Ward rounds were not always delivered by a consultant and the teaching experience was related to patient availability and willingness to participate. With the move to more day case procedures, the supply of 'useful' patients across the board has reduced. This background again provided an impetus for change.

The teaching of pharmacology and therapeutics was prone to similar problems, although to a lesser extent. Some schools had dedicated teachers to cover this topic, whilst others relied upon

<sup>1</sup>Consultant/Honorary Senior Lecturer in Oral and Maxillofacial Surgery, <sup>2</sup>Head of School of Dental Sciences, Newcastle University, School of Dental Sciences, Newcastle University, Framlington Place, Newcastle upon Tyne, NE2 4BW

\*Correspondence to: Mr M. Greenwood  
Email: mark.greenwood@ncl.ac.uk

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**Fig. 1 The integrated approach to the teaching of cardiovascular disease in the human diseases curriculum**

- General introduction to the cardiovascular diseases, classification, clinical features and risk factors
- Atheroma formation and aneurysms
- Ischaemic heart disease, angina, myocardial infarction
- Valvular heart disease, rheumatic fever, infective endocarditis
- Microbiology of infective endocarditis
- Prophylaxis to prevent infective endocarditis
- Hypertension and stroke
- Drugs used for hypertension and angina
- Anticoagulants, antiplatelet and antifibrinolytic drugs
- Heart failure and cardiac arrhythmias 1. Pathology 2. Drugs 3. Clinical features and treatment
- Drugs used for heart failure and arrhythmias
- Management of vascular disorders including: gangrene, deep vein thrombosis, pulmonary embolism
- Valvular heart surgery, coronary bypass grafting and surgical correction of congenital heart defects
- CPR Demonstration
- Dental significance of cardiovascular disease:
  - Oral health as a risk factor for CAD
  - Management of a patient on oral anticoagulants and antiplatelet drugs
  - Adrenaline containing local anaesthetic solutions in patients with cardiovascular disease
  - Oral adverse drug reactions from cardiovascular drugs
  - Identify patients at risk from infective endocarditis
- Clinical and museum demonstrations

support from the pharmacology department. For some pharmacological topics, especially the ones relevant to dentistry – for example local anaesthesia, antibiotics, sedation agents etc – the staff within the school often provided the lecture programme. Courses in general pathology were usually organised by oral pathologists and some schools were fortunate to have dedicated teachers in microbiology.

It is against this somewhat chequered background that a change was required. The focus needs to be on the impact on patient management and relevance to dentistry. This has formed the basis of our course in Newcastle.

## THE HUMAN DISEASES COURSE

The current course in Newcastle extends over two years starting in the third year of the BDS degree. The course is organised on a body systems basis. At the conclusion of each system is a lecture or clinical demonstration on the dental relevance of the preceding subject matter.

An example of the integrated approach to teaching is given in Figures 1 and 2 which shows the cardiovascular module of the Newcastle course and its objectives. From this it can be seen that the

disciplines which make up human diseases are included but are not rigidly separated from one another. The dental relevance is given at every stage but also summarised in the final lecture or clinical demonstration. This may involve a degree of repetition but is done in a conscious way to facilitate learning rather than as a result of an uncoordinated approach.

A proportion of the lectures are still delivered by physicians and surgeons, but the majority are given by staff from within the school. This has significantly reduced the incidence of lecturer non-attendance which was a particular problem with the old course. There is also the added advantage that the dental relevance of medical conditions can be given at every stage.

Towards the end of the fourth year course, students are taught in small groups. The main aim of the initial tutorials is to ensure that the students are proficient in eliciting the vital signs and other basic clinical signs. Further tutorials are provided which enable the students to take medical histories in detail from patients or appropriately briefed actors. Attendance at these sessions is compulsory.

## Assessment

Professional examinations in human diseases occur at the end of the third and fourth years. It is felt necessary to include two examinations partly due to the sheer volume of subject material, but also the examination in the fourth year serves to consolidate some of the information which has been gained during the third year. The exams are assessed completely separately and performance in one examination is not taken into account with regard to the other. In the third year, students are assessed by means of an Extended Matching Item (EMI) question paper and a structured short answer paper. Vivas have been conducted for borderline and meritorious candidates.

We have felt that the use of vivas in this examination was useful, but are aware of the fact that viva examinations are somewhat controversial. In this examination vivas were only used to help candidates and this was made clear to the students. No student's mark was lowered as a result of a viva. In an attempt to be as objective as possible the vivas were structured to ensure a consistent approach. From 2008, in common with many other universities, the use of selective vivas will be discontinued.

The fourth year assessment includes a summative case report which assesses the students' ability to retrieve and critically evaluate current concepts in a particular area of general medicine or surgery relevant to dental practice. The examination itself comprises of a further EMI and structured short answer paper together with an Objective Structured Clinical Examination (OSCE). Vivas have been conducted as for the third year. The small group teaching at the end of the fourth year is assessed on a formative basis.

The OSCE has an important role in the assessment of a student who is coming to the end of the human diseases course. It provides an opportunity to assess the students' interaction with simulated patients and their ability to elicit a relevant history as well as the performance of some practical procedures. Examples of the latter include cannulation and cardiopulmonary resuscitation.

In Newcastle, we run three simultaneous OSCE circuits which may accommodate up to 20 students per circuit. This has led to the use of simulated patients

(actors) rather than 'real' patients as the circuits must be identical. This would be very difficult to achieve with patients. The use of appropriately briefed actors enables a degree of reproducibility to be achieved.

Where a patient is essential the use of video recording has been employed. This is particularly useful when the history forms the basis of the subject to be examined. On our course we have employed this technique for testing students on the assessment of psychiatric patients.

**Student feedback**

Feedback for the old medicine and surgery course was gained via the staff/student committee. The feedback covered several domains and was universally less than satisfactory. Particular problems were a lack of integration, a lack of lecturer knowledge of what was required and lecturer non-attendance. Feedback for the human diseases courses gained in the same way and has been uniformly positive. Figure 3 includes a synopsis of the feedback scores for the human diseases course. The year providing the feedback comprised 64 students but it can be seen that the feedback was obtained from 53. Whilst it is accepted that the feedback from the 11 students who did not reply would be very valuable, even allowing for this factor the feedback is positive.

**The role of the human diseases course coordinator**

*The first five years* recommended that each dental school should have a nominated representative whose remit was to coordinate the teaching of human diseases to undergraduate dental students.

Most of the course coordinators in the dental schools are drawn from the speciality of oral medicine with some schools using maxillofacial surgeons. The majority of these clinicians are qualified in both medicine and dentistry and therefore have the advantage of an education in, and often experience of, the conditions on which they are lecturing. We believe that this is beneficial for the students. It is essential for the course coordinator to have full support from his/her colleagues and those that contribute to other parts of the programme. The course coordinator ensures content, quality and structure.

**Patient contact**

We have commented that the old courses in medicine and surgery provided opportunities for patient contact. The guidelines of *The first five years* emphasised that students must be able to observe and interpret physical signs in the clothed patient. Whilst ward rounds on the 'old' course may have provided some insight into the workings of a hospital it is more relevant to dentistry for students to have awareness of the workings

of an oral and maxillofacial surgery unit and the accident and emergency department. When qualified, dental practitioners are likely to refer patients to oral and maxillofacial surgeons and referrals may be treated as in-patients. Likewise, unfortunate circumstances may occur in dental practice which would require referral to the accident and emergency department. Experience of these aspects of hospital practice is therefore beneficial.

**Fig. 2 What the student should know at the end of the module**

- The clinical features and underlying pathology of the frequently encountered cardiovascular diseases including: hypertension, ischaemic heart disease, angina, myocardial infarction, valvular heart disease, heart failure, infective endocarditis, rheumatic fever and aneurysms
- The risk factors for cardiovascular diseases and the role they play in the pathogenesis of specific diseases
- The basic physiology of the cardiovascular system, in particular, the mechanisms that control cardiac rhythms, blood pressure and haemostasis
- Indications for anti-hypertensive drugs, together with their mode of action and unwanted effects
- The various drugs used in the treatment of cardiac arrhythmias and angina, together with any dental implications associated with their usage
- Drugs which interfere with the various stages of haemostasis and the dental management of a patient with impaired haemostasis
- The microbiology of infective endocarditis and the role of dental-induced bacteraemia in the causation of this disease
- Chemoprophylaxis in the prevention of infective endocarditis
- The surgical procedures associated with coronary artery and valvular heart disease and the correction of congenital heart defects
- The causes, effects and complications of atherosclerosis, gangrene, deep vein thrombosis and pulmonary embolism, and methods available to prevent these complications
- The need for competency in CPR
- The effect of cardiovascular diseases on the delivery of dental care including oral health as a risk factor for coronary artery disease, adverse oral drug reaction and drug interactions arising from patients on cardiovascular drugs that affect haemostasis and the risk of infective endocarditis arising from dental treatment

**Fig. 3 Summary data of the BDS Staff/Student Committee 2005**

Standard taught course questions	Satisfaction Scores (%)	
	End of Term 8	End of Term 12
The course stimulated my interest	94	100
The course was presented in an enthusiastic manner	98	100
Course material was consistent with objectives	74	85
Students were made to feel welcome seeking help or advice in or outside class	93	98
Ideas/concepts were well explained	93	100
Different components of the course were well integrated	80	85
The study guide helped me with the course	83	87
<b>SUPPLEMENTARY QUESTION SPECIFIC TO HUMAN DISEASES</b>		
The clinical demonstrations increased my knowledge/application of the subject	94	100
n = 53		

To meet the challenges of observation in the clothed patient, we provide a series of patient contact seminars where a range of medical conditions are discussed and their relevance to dentistry emphasised. This involves a cohort of real patients. Obvious examples include diabetics, solid organ transplant patients, asthmatics, patients with valvular heart disease and other cardiovascular disorders. The patient is the focus of the seminar. Students take medical and drug histories and then have an opportunity to discuss the possible impact of their medical condition on the delivery of dental care.

The seminars are led by members of the teaching team and groups of students rotate between cases. A large pool of patients is utilised for this exercise. Cases which have a significant dental complication such as drug-induced gingival overgrowth or diabetes exacerbated periodontal disease do help to enhance the dental relevance of this exercise.

### Relevance of the human diseases course to dental practitioners

We have stressed throughout this article that the new course in human diseases should have significant relevance and implications for dentistry and the delivery of dental care. The educational experience should then be taken forward into the dental practice setting and help facilitate the management of the medically compromised patient in the primary care setting. For the most part, dentists need to be reassured on the management of the patient. This involves knowledge of drug interactions, preventing or managing medical emergencies and medically compromised patients. The dentist needs to

recognise whether any oral changes are drug-induced or related to the patient's underlying medical condition.

Many medically compromised patients can be, and are, treated in primary care. New information on the management of patients on oral anticoagulants,<sup>2</sup> long-term corticosteroids<sup>3</sup> and the need for chemoprophylaxis<sup>4</sup> has facilitated this. It is important that management is underpinned by a sound theoretical and practical knowledge.

### Human diseases and the Bologna Process

The Bologna Process is an intergovernmental initiative which aims to create a European Higher Education Area (EHEA) by 2010 and to promote worldwide the European system of higher education. It was launched in 1999 and now has 45 signatory countries.

The main objectives of the Bologna Process were to remove obstacles to student mobility in Europe, to enhance the attractiveness of higher education and to establish common structures. Medicine and dentistry are integral to this process.

Human diseases teaching (but not specifically designated as such) does form a significant separate area in discussion documents, but some of the competencies and skills that are highlighted in other domains are also crucial to successful education in the sphere of what we designate as human diseases. Obtaining and recording a comprehensive medical history and performing an appropriate physical examination are regarded as major competencies. Also included in 'major' competencies are infection control and familiarity with pathological features

and the dental relevance of disorders of the major organ systems. Knowledge of oral manifestations of systemic disease and knowledge of disease processes are all highlighted. Infection, inflammation, disorders of the immune system, degeneration, neoplasia, metabolic disturbances and genetic disorders are also specifically designated as major competencies.

There are fundamental differences in some countries of Europe. For example, in Italy the initial qualification of a dentist is a medical degree which inevitably alters the way that teaching in a human diseases context will be delivered compared to a more conventional dental training.

### CONCLUSION

The interaction between the increase in life expectancy and advances in medical science means that increasing numbers of medically compromised patients will be requiring dental care. Our course provides the necessary background information for undergraduates to recognise these problems and then to be able to manage them safely in the clinical environment.

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