

Undergraduate education

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The function of the teacher is not to give out information but to inspire the student to do the work.¹

In Britain most medical undergraduates become general practitioners and 10% of general practitioner consultations are for musculoskeletal complaints.² The situation is similar in North America.^{3,4} It follows that most doctors will spend much of their professional lives in the first line management of these problems. One might conclude that a significant proportion of undergraduate training should be concerned with the locomotor diseases and the thrust of rheumatological training aimed at the common complaints.⁵ Many medical schools, however, do not have a specific course of musculoskeletal diseases. Those that do often spend little time on the common conditions. There is no agreed curriculum for undergraduate rheumatology teaching. Few medical schools make comprehensive assessments of the results of rheumatology training but instead concentrate on the exam results of factual knowledge rather than on the impact on student skills and attitudes.

This chapter will briefly explore the aims of rheumatology undergraduate education, the different methods that can be used, ways of evaluation, current practices, and potential improvements.

Aims

The requirements of university clinical teaching are to impart a knowledge of the nature of health and disease and its management and in particular to teach the aptitudes, attitudes, and skills appropriate to the sound practice of medicine.⁶

Many would agree with the sentiments of this statement from the University of London, but what aspects of health and disease should an undergraduate know? What skills are considered important for a student who is most likely to become a general practitioner? How does one teach an aptitude? What is the 'right' attitude?

For simplicity consider that the impact of rheumatology education occurs in three main areas: knowledge, attitudes, and skills.⁷

KNOWLEDGE

A workshop convened by the Arthritis and Rheumatism Council in 1979⁸ outlined four categories: (a) the range of rheumatic disorders as exemplified by the diversity of different conditions, the differential influence of age, and the array of disease manifestations; (b) the

effects of rheumatic disorders, including the impact on the individual, the burden imposed on the community, and the calls made on the community; (c) the pathogenesis of rheumatic disorders; and (d) the experience of rheumatic suffering. Most rheumatologists believe that emphasis should be placed on common diseases and problems and that basic skills in history taking and physical examination are more important than disease related information.⁹ The table lists the knowledge objectives of one teaching rheumatological unit (Kirwan, unpublished data).

ATTITUDES

Thirty six consultant rheumatologists considered that the most important attitude was a holistic approach to a patient's problems and particularly to the management of chronic disease.¹⁰ They emphasised teamwork, realism, and the need to inspire the student with enthusiasm and confidence about rheumatic disorders, notably in relation to the results achieved with appropriate treatment.

SKILLS

Clinical

The ability to collect relevant data is at the basis of clinical practice. This will include history taking, clinical examination, and the selection of appropriate tests. Of course data collection is not at end in itself. The 'structured interview' pioneered by Hutchison¹¹ has become the hallmark of clinical teaching, but I wonder how many practising rheumatologists or general practitioners use the system? The evidence is that it is abandoned with experience.¹² It has

Knowledge objectives for rheumatology undergraduates at one British medical school

- 1 Outline the features and course of: Rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis/Reiter's disease/enteropathic arthritis, osteoarthritis, gout, prolapsed lumbar intervertebral disc, back pain, polymyalgia rheumatica/temporal arteritis, soft tissue rheumatism, systemic lupus erythematosus, pyogenic arthritis
- 2 Describe the anatomy of: Synovial joints in health, inflammatory arthritis, and osteoarthritis, rheumatoid nodules and intervertebral discs in health and disease
- 3 List the features examined in joint fluid, explain why they are examined, and give the indications for joint aspiration
- 4 Outline the nature of immunological findings and the HLA system in rheumatology
- 5 List six contributions made by physiotherapists and occupational therapists to the care of patients with arthritis
- 6 Outline the major lines of treatment—namely analgesics, non-steroidal anti-inflammatory drugs, disease modifying antirheumatic drugs, steroids, physiotherapy, occupational therapy, and surgery
- 7 Outline the major thrust of local research

been labelled the 'strategy of exhaustion' and suggested that, 'all medical students should be taught both how to do a complete history and physical examination and once they have mastered its components, never to do one'.¹³ Even Hutchison said of clinical histories, 'Nothing is more annoying than to be obliged to wade through a mass of verbiage in order to get at the chief facts of a case'.¹¹

Communication skills

The aim is to develop ways in which students can learn to communicate appropriately with patients, listen effectively, derive pertinent information from patients and their relatives, and provide clear information in return without exacerbating distress.

Critical appraisal skills

Critical appraisal of clinical data has been proposed as a method that encourages students to take nothing for granted.¹³ Critical appraisal skills can be applied to many situations. For example, one problem that is often difficult for the student to accept is clinical disagreement. It is well known (but not always acknowledged) that observer variation is high for many clinical signs.¹⁴ Specialists suggest different prognoses and clinical trials report conflicting results. Critical appraisal skills enable the student (and doctor) to distinguish the useful from the useless.

Self directed learning skills

Perhaps the ultimate aim in medical education is to make each student/doctor self sufficient in learning. This will allow the individual to keep up with advances in medical knowledge and incorporate them into his/her practice. Most students who have reached medical school are able to retain information from textbooks for only a short time, so perhaps it is more important to teach where and how to retrieve relevant information, and how to analyse data critically rather than to teach bald facts.

Teaching methods to achieve these aims

The traditional British approach to medical undergraduate learning has been to view the student as an apprentice absorbing information by following a practising doctor around the wards, while facts are topped up during lectures usually oriented around a specific disease. Emphasis is placed on the 'structured interview' mentioned above, and students are expected to learn the specialist jargon enjoyed by the rheumatologist. An alternative approach has been adopted by at least one medical school.¹⁵ This method puts the emphasis firmly on teaching the student how to learn. Some aspects of both methods will be briefly discussed.

LECTURES

Many of us spent years at school sitting in a classroom copying down information supplied

by the teacher. Didactic lectures of this nature are popular with medical students at The Royal London Hospital, particularly when they supply information oriented towards examinations. There is good evidence to suggest that recall of facts learnt this way is poor, however.¹⁶ Our experience is that many clinical students cannot remember anatomical details, essential for the understanding of rheumatological problems, learnt during their preclinical years. Similarly, cramming from books may help to pass exams but may not supply the student with relevant facts in a form that he/she can easily apply to the clinical situation.

PATIENT ORIENTED PROBLEM SOLVING

The patient oriented problem solving alternative uses a clinical problem to stimulate the search for basic information. It has the advantage of teaching the student how to formulate a method for dealing with problems as well as teaching information gathering skills which will be useful for continued education throughout professional life. Problem oriented learning can occur individually or in groups. The latter has the advantage of encouraging critical evaluation of colleagues' opinions, thought processes, and diagnoses, increasing communication skills, and learning to pool information—all good training for a future member of a multidisciplinary team. Specific problems have been formulated for a number of topics and have been widely used in North America.¹⁷ This method may be time consuming for the teacher as it requires detailed preparation of relevant problems, personal surveillance of individuals or small groups, and the use of multiple problems in order to cover the range of topics thought to be of clinical importance. It can also be used, however, to simulate problem solving processes and self directed learning in a large group. For example, during a recent introductory course for new students a clinical question about screening for osteoporosis was set to the audience instead of giving a lecture. After a 10 minute introduction the students were split into three groups and each given additional facts about the cost of hip fracture, the cost of hormone replacement therapy, and the cost of bone density screening. The groups were asked to make estimates of the total cost of no treatment, treating all menopausal women with hormone replacement therapy, or treating women with low bone density after screening. The results stimulated much debate not only about the cost/benefit, but also about the important questions of patient outcome.

PATIENT EXAMINATION

There is no substitute for hands-on experience when it comes to learning clinical skills. Although the ward round is traditional, the less formal surroundings of the outpatient department may be more comfortable for the patient and student alike, allow for a one to one relation between teacher and student, and are likely to expose the student to the more common rheumatological conditions. Surface anatomy classes

and examination of colleagues make useful adjuncts.

ROLE PLAY

This novel technique has been developed to stimulate learning, teach clinical and diagnostic skills, and build confidence while retaining an element of fun for all concerned. A group of students is divided into pairs and randomly allocated a clinical rheumatological problem in single blind fashion. Each pair is given one week to research their problem. At a subsequent group meeting a pair is allowed 30 minutes to 'act out' an imaginary first consultation between a general practitioner and a patient. The students are encouraged to include 'red herrings' as well as relevant information. The audience ask questions and then a list of differential diagnoses is constructed. The teacher finishes the session by highlighting the important 'take home' points.¹⁸

CRITICAL APPRAISAL

Detailed discussion of the method is beyond the scope of this text, but techniques are developed for the reduction of errors in clinical measurement, assessment of the usefulness of a diagnostic test, evaluation of the effectiveness of a treatment, and so forth.¹²

OTHER METHODS

Tutorials, small group seminars, computer assisted programmes, video presentations, tape-slide programmes are other techniques that may be successfully used.

Evaluation of rheumatology education

If a rational attempt to choose the 'best' method of rheumatology undergraduate training is to be made some sort of assessment of the results of the different methods is needed. It has been proposed that any programme may be evaluated on three levels: structure, process, and impact.¹⁹

Structural evaluation includes variables such as the number of rheumatology teachers, the number of hours of rheumatology in the curriculum, and so forth. These variables can be measured easily and comparisons made between teaching centres, but they may bear little relevance to what the students learn.

Process measures relate to the working of the programme—the content of the curriculum, the spread of patients seen by students, and so forth. These are more difficult to measure.

The most difficult issue relates to educational outcome. Although knowledge might be reasonably measured by standard pencil and paper tests, the evaluation of clinical data collection, diagnostic skills, the ability to educate the patient or to interact with other members of the health team are more difficult to assess, particularly if large numbers of students and teachers take part in the teaching programme. Clinical skills can be directly observed at the bed side, or using problem solving ability noted in tutorials or individual discussions and some

computer based problems.²⁰ These methods may be very demanding of teachers' time.

Current practice

A detailed survey of 30 British medical schools was undertaken by the British League against Rheumatism in 1979.²¹ Rheumatology teaching was considered obligatory in 25 (83%). In just over one third of medical schools there was no academic recognition of rheumatology. The average weekly teaching time was only five hours (with no teaching at all in two schools) and mean total rheumatological teaching 36 hours. Twelve schools (40%) did not give preliminary basic instruction in how to elicit evidence about the musculoskeletal system. Rheumatology was taught in combination with orthopaedics in only eight schools (27%). A course of systematic lectures was organised in all but one school, but tutorials were scheduled in only 18 (60%) and a formal rheumatology programme was organised in only 12 (40%). Bedside teaching was conducted in 22 schools (73%), rotation through a rheumatological firm in 20 (67%), and outpatient teaching in 17 (57%). Electives were an option in 13 schools (43%). The mean size for tutorial groups was 41 students and the mean for outpatient and bedside teaching was 10 and nine respectively. Seventeen schools (57%) always included rheumatology questions in final examinations and 26 (86%) occasionally included a rheumatological case in the clinical examinations. Only 14 schools (47%) had made some sort of evaluation of rheumatology teaching. Six schools held formal examinations (three multiple choice questions), three schools provided a questionnaire, one school used progressive assessment with a series of small examinations, one school used an oral examination, and one based assessment on discussion between two teachers. The results were variable.

In Canada, analysis of Arthritis Society undergraduate statistics for 1982 indicated that an average medical student received 17.5 hours of lectures, 10.4 hours of clinical bedside demonstrations, and 8.9 hours of direct supervision of rheumatology patients by rheumatologists.²² A survey of the results of 1722 Canadian medical students who sat a national multiple choice examination between 1978 and 1982 showed no correlation between the students' performance and the amount of rheumatology education given at a university. In United States medical schools 25% in 1975²³ and 10% in 1980²⁴ had no rheumatology teaching and only about 65% provided a structured rheumatology education programme. It is noteworthy that whereas 91% of schools taught serological tests in rheumatology, only 59% taught about low back pain.²⁴

Although the situation might have changed in the last decade, a number of medical schools in the United Kingdom still have only rudimentary rheumatology training, often only a few hours' lecture time incorporated into a general medical module. There is clearly a need for further assessment of rheumatology undergraduate training in the United Kingdom.

What next?

Merging of the preclinical medical colleges of The Royal London and St Bartholomew's Hospitals has allowed a new curriculum to be designed, which started in 1990. It will be briefly outlined here highlighting the rheumatology input as it includes many of the features already discussed. The five year course has been divided into three phases.

Phase I (five terms) constitutes the major course in basic medical sciences. It is taught predominantly as modules based on body systems rather than individual disciplines. Thus the 'locomotion, bones, and joints' module is an integrated teaching programme organised and run by a multidisciplinary team including anatomists, physiologists, biochemists, immunologists, clinicians, etc. This module provides a basic understanding of the structure and function of the limbs. It runs in parallel with the 'molecules, cells, and tissues' module during the first term. The following topics are covered: gross anatomical structure of the limbs as shown by dissection, surface and radiological anatomy of the limbs; control of movement of the shoulder and hand; posture and locomotion; arterial supply and venous drainage of the limbs; general pathological changes in joints; clinical examples of conditions affecting limb movement. The number of formal lectures is limited to two a day. An equal amount of time is allocated to student centred learning. This is intended to be used by the student according to his/her perception of his/her individual learning requirements. To facilitate this process programmes using case oriented problem solving, computer aided teaching, and small group learning tutorials are implemented. A series of clinical demonstrations are written into the module to illustrate actual patient problems. Student assessment is half by pencil tests, including multiple choice questions, and half by in-course assessment.

Phase II is a transitional period occupying two terms and integrating aspects of the behavioural sciences, medical ethics, and clinical medicine. The module includes the acquisition of clinical and communication skills, behavioural sciences, medical statistics, medical ethics, and the law relating to medicine. There is an introduction to clinical studies and nursing experience, and objective structured clinical examinations are used to evaluate the acquisition of these skills. Not less than two days a week are spent on a project in any subject where an expertise relevant to medicine exists within the City and East London Confederation. A number of laboratory, hospital, and community based rheumatological projects are planned.

Phase III includes clinical programmes, which are split into an introduction to medicine and surgery (16 weeks), compulsory rotations (48 weeks), optional rotations (10 weeks), half day topic oriented teaching programmes, pathology, and final rotations, culminating in final examinations. Student assessment is by in-course assessments, project write up, etc. Rheumatology is taught in parallel with orthopaedics and accident and emergency medicine in a 'locomotor disease' module lasting six

weeks. In both phases II and III teaching is by small group tutorials, video, role play, and larger group discussion. Clinicians take part in the communication skills as well as the clinical skills course.

Conclusions

- (a) Rheumatology undergraduate education is important because most students become general practitioners and a significant proportion of a general practitioner's workload is the first line management of musculoskeletal complaints.
- (b) Rheumatology undergraduate education should concentrate on the diagnosis and management of common conditions.
- (c) It may be more important to teach how to learn than bald facts.
- (d) Further evaluation of rheumatology undergraduate education programmes in the United Kingdom is need.

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