resemble many oral medications in shape, being cylinders 11 mm in diameter and 3.5 mm in height. It is therefore not surprising that the inebriated or senile patient, the diabetic with impaired vision, or the patient attempting to take an oral medication in the dark might mistake these tablets for an oral medicine. If additional studies find that accidental ingestion of these pills is as common as our experience suggests, alternative methods of urine testing should be considered for patients who are likely to ingest these tablets accidentally—for example, alcoholic or senile patients or patients with visual or language problems, especially if they are taking many tablets. The manufacturer might also consider changing the size and shape of the tablets to lessen the likelihood of their being mistaken for oral medications.

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Medical Education

Role of self-instruction and self-testing in teaching pathology

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There has been considerable discussion in recent years on the use of self-instructional techniques in medical education, with considerable divergences of opinion as to their long-term value. Since 1971 the introductory course in the principles of pathology (general pathology) at this medical school has been based on a series of tape-slide presentations, effectively linear "programmes," and our experience during these six years shows that this approach has considerable advantages that merit its wider adoption. We describe the way the programmes are used and how the rest of the course has been planned round them.

Tape-slide programmes

The main topics of the course in general pathology, which is taught at the start of the first clinical year, are covered in 19 tape-slide programmes, which were produced by the staff of the department in 1971 and revised in 1975 (See Appendix). A programme consists of a series (about 50) of colour transparencies and a tape recording that lasts 20-25 minutes (uninterrupted playing). There are six copies of each programme: four ordinary versions and two longer versions that contain questions for self-testing. Each student receives a "hand-out" that summarises (in about 800 words) the contents of each tape, and also a longer version that includes the self-testing questions.

The student is expected to study the appropriate tape-slide programme (1 or 2) before each tutorial-practical class (see below) to benefit properly from the latter. Many students use the shorter version of the programme for this purpose and the longer version for revision later in the term (that is, before the examination). The programmes are studied in a self-instruction area in the museum, which contains 24 places and is available every day, including Saturdays and Sundays, until 2100. Each place consists of a table on which there is a tape play-back unit, a projector, and a compact inexpensive back-projection screen of our own design that "folds" the beam of the projector. Separate units generally cost less than integrated self-instruction machines, and when a fault develops only one unit has to be repaired or replaced.

At first the slides were changed automatically by "pulses" on a second track on the tape, but most students preferred manual control because it made it easier to stop and reverse the tape and slides for revision. The ready availability of the tape-slide programmes makes it easy to study them more than once. A crowded curriculum, however, means that this often has to be done in the evenings and at weekends.

Tutorial-practical classes

Large practical classes using demonstrators have been replaced by tutorial-practical classes (two a week), each lasting one and a half
hours. The 160 medical students are divided among 16 or 17 tutors, with nine or 10 students to each tutor. In some ways a class of nine or 10 students is undesirably large, but it is only with help from the staff of other departments of pathology in the region that it is possible to get the number as low as this. The tutor takes the class in a small lecture-theatre, if it is not large enough, in a section of a large practical classroom.

Altogether 74 histological sections of a wide variety of lesions are studied with the microscope during the course. Each tutor has a projector and a set of transparencies (one macroscopic and several phenochromographs relating to each histology section), which he uses to illustrate the important features of the sections. Each tutorial is introduced by a short discussion between tutor and the group lasting for 10-15 minutes structured around the projected transparencies before the students study the relevant histological slides under their own microscopes. Each set of histological slides relating to the relevant practical class is accompanied by a series of descriptions (about 500 words). This small-group approach facilitates much closer supervision and promotes freer discussion than in large practical classes of 60 or more students a room as in the past. Generally, the tutors find that the basic knowledge that students have gained from the tape-slides helps them with the histology. It also makes them more stimulating to teach.

Quiz-seminars

An early discovery was that formal lectures had become more difficult to give. The lecturer was uncertain as to how much the students knew, and the students complained that the lecturers often repeated what was in the tape-slides. An attempt was made to overcome this by emphasising the clinical aspects of the subject, even at the risk of failing to help the less able students grasp the basic pathological mechanisms.

For the past two years the 12 lectures have been replaced by six quiz-seminars. The quiz-seminars are intended to illustrate the role of pathology in a clinical setting, and each is based on six or seven short case histories that are a mixture of surgical and necropsy cases. They are given to the whole year (160 students) in a traditional large lecture theatre, and each student receives a hand-out that gives a short clinical history (about 50-100 words) of each case. The macroscopic and often the histological features of the case are projected on to the screen, and the student is expected to recognise these and insert the correct descriptive terms in the gaps provided in the case history. A completed case history is then shown on the screen and the lecturer follows this with a few more illustrations of related or similar cases, thus emphasising the basic pathological processes concerned. A set of case histories (with answers) and the transparencies are available during the following week in the self-instruction area, and towards the end of the term all six seminars are available there for revision purposes.

Although the quiz-seminars are not part of the scheme of continuous assessment that operates in this medical school, it is hoped that the added stress of trying to find the correct answers makes the occasion more memorable than a passive lecture. It certainly keeps the class more awake. The seminars provide a form of instant “feedback” to the students on their progress. The completed hand-outs are in effect structured lectures on a series of lesions of clinical importance, with coloured illustrations available in the self-instruction area when needed. This too makes for easy revision.

Supplementary reading

Lists are provided of relevant chapters in books etc that the students are expected to read to supplement the basic information supplied by the tape-slide programmes. Nevertheless, for several years after the system was introduced some students failed to appreciate the need for supplementary reading, and this requirement is therefore emphasised at the start of the course. Some tutors, however, still think that the students tend to rely less than previously on textbooks, believing that the course provides all they need to know. This could be a weakness in any course using self-instruction.

Biopsy/necropsy conferences

Once a week a conference lasting not more than 30 minutes is held at which a surgical specimen or a recent necropsy case with features of particular interest or relevance is presented. The clinical history is given (in less than 10 minutes) by the clinician responsible for the clinical care of the patient, and the pathologist, in the same amount of time, illustrates (with colour transparencies) the main pathological features. Discussion follows, and student participation is good. Recent cases, still fresh in the clinician’s mind, are chosen.

These conferences are effectively clinicopathological conferences in miniature and emphasise the importance of pathology in the clinical setting at a time when the student is motivated in that direction—that is, at the start of the medical or surgical clerkship.

Museum specimens

A well-dissected and well-preserved museum specimen is a unique teaching aid, and a selection of specimens of this type (many re-mounted in Perspex) illustrating the principal pathological processes (inflammation, thrombosis, neoplasia, etc) has been brought together to form a separate section in the museum.

Each specimen is accompanied by a card giving a brief clinical history and a description of the main pathological features. The students study these on their own initiative, and many are used by the tutors in the tutorial-practical classes to supplement the slides.

Cost

The initial capital costs of the tape-slide programmes were considerable. The projectors had to be capable of virtually continuous running. The Kodak Carousel was therefore chosen, partly for this reason and partly because its unspillable magazine, though bulky, is otherwise ideal. The magazines are not “locked” and in practice the transparencies are not discharged or mislaid. A few sets of headphones and one tape play-back unit have been stolen, and a “loop” security system has been installed to prevent thefts of the relatively expensive Carousel projectors. Minor mechanical faults develop not infrequently and remedying these and maintaining the projectors (bulbs, fuses, etc) takes a certain amount of technician’s time. Secretarial help is also needed to prepare handouts, which total about 50 pages for the tape-slide programmes alone—that is, about 10 000 stencilled sheets a year for the 160 students.

Acceptability

The students like the system and especially the facility for self instruction and revision; and they certainly greatly prefer the quiz-seminars to formal lectures. They complain about having to attend the self-instruction area in the evenings and at weekends and would like to be able to find a place during a ‘normal’ working day.

Examination

At the end of the course there is an examination consisting of about 90 multiple-choice questions of which 24 have a visual component—that is, the question is based on a picture projected on to a screen. The examination is held in a large hall with the lighting adjusted to a level that allows the students to see their question book and mark sheets and also a series of projected test pictures simultaneously. Four projectors, each with its own screen, are used synchronously to ensure that no student is more than 9 m (30 ft) from a screen. Students who are colour-blind or who have a problem with vision are usually seated near the screen.

The examination is computer-marked and the results are available within a day. Subsequently, an item analysis is available for each individual question. A “bank” of questions has been accumulated, and the detailed item analysis permits continual monitoring of the quality of the question used. The test, which also includes questions on the virology and bacteriology section of the course, is part of the school’s continuous assessment system and is not therefore of the pass/fail type, each student being graded into either A, B, C, D, or E (whereby A = excellent, B = very good, C = satisfactory, D = unsatisfactory, and E = very unsatisfactory). Actual percentage scores, however, are available, although not published, and despite the fact that the test has not been made more difficult the mean score has risen considerably (table). The rise may be partly attributable to the higher quality of student intake in recent years but our-
pression is that the availability of self-instruction facilities has helped and that both staff and students have learned to use these more effectively.

We believe that the examination itself has educational value and that the visual component is important for several reasons: (1) it reduces the monotony of the examination; (2) the student has to be familiar with the macroscopic and microscopic appearances of many pathological conditions and is correspondingly motivated to learn those during the course; (3) the students regard it as a very searching test; and (4) only common and important clinical conditions are chosen for the visual questions, and as with the quiz-seminars it is hoped that the stress of the examination will ensure that the main features of these are remembered. If the lesions are not recognised another opportunity is provided in a post-examination "post-mortem."

Preclinical period

Although the teaching of pathology undoubtedly makes the greatest impact at the time the student is starting his clinical studies, the pathologist can make a unique contribution to the preclinical period. For this reason pathologists take part in several courses in that part of the curriculum, illustrating and discussing abnormalities of structure and function in human tissues, for instance, in the normal histology course. In this way, they help to relate the subject to clinical practice, and at the same time they hope to awaken the students' interest in pathology to the extent that they will approach the subject with receptive minds when they meet it later in the curriculum.

Conclusions

The wide range of audiovisual methods now available are still not used to maximum advantage in medical schools in Britain, and, although it is some time since a number of centres started using the relatively unsophisticated technique of tape-slide programmes for self-instruction, relatively few schools in Britain have adopted the method. Our experience suggests that the use of this technique to provide the means of self-instruction and self-testing in the basic subject-matter of the introductory course in pathology is worth while, and constitutes an appreciable advance on the conventional methods still in wide use. It has greatly influenced the way the whole of the course in general pathology is organised in this school and led to the abolition of formal lectures and large practical classes. The students prefer it to the latter, and our conviction, formed over six years, is that it is an effective means of instruction.

Considerable effort is needed to prepare the tape-slide programmes but once prepared they work well on their own. The incorporation of self-testing into the programmes, and into the quiz-seminars, is thought to be a motivating factor in learning. The inclusion of a visual component in the test at the end of the course appears to have the same effect. It also makes the test more interesting to the students and more discriminating about their performance. Tape-slide programmes function best in combination with tutorial-type classes and should not be regarded as a means of economising in staff.

Nevertheless, they could be useful in medical schools with relatively few staff but with the necessary capital for the equipment.

Appendix

The tape-slide programmes are on the following subjects.

- Acute inflammation I: vascular response
- Acute inflammation II: cellular response
- Acute inflammation III: parts 1 and 2: varieties of acute inflammation
- Chronic inflammation I: general principles
- Chronic inflammation II: examples
- Healing and repair
- Thrombosis
- Embolism and infarction
- Degeneration, necrosis, and infiltration
- Abnormalities of cell growth and development (hyperplasia, hypertrophy, atrophy, etc)
- Atherosclerosis
- Neoplasia I: general principles
- Neoplasia II: classification of neoplasms
- Neoplasia III: spread of neoplasms
- Carcinogenesis I
- Carcinogenesis II
- Carcinogenesis III
- Carcinogenesis IV

References


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Are people ever electrocuted (as opposed to burnt) by electric under-blankets?

Official statistics show that on average one person or less a year dies from electrocution from electric blankets. People are more often burnt to death from fires caused by electric blankets and such an accident happens about 12 to 15 times a year in Britain. Electrocution is, of course, extremely unlikely as electric blankets are doubly insulated, and the element consists of a high resistance. If this element should break, although the potential difference between the ends would be about 250 volts, the amount of current would be limited by the resistance, and it is unlikely that a significant pathway could be formed between the ends unless by some freak of circumstance two breaks occurred in the element and a shock was transmitted from one limb to another. Electric shocks are far more hazardous if they take place from one arm to another if they merely take place from one small area of skin to an immediately adjacent one. A considerable shock, however, could occur if the patient was at the same time in contact with earth, though this is unlikely because there is no earth connection to an electric blanket, and it is unlikely that there would be a metallic connection at earth potential near the bed. Nevertheless, a metal bed-side lamp might form an earth pathway, and this could represent a risk. Minor shocks from electrostatic charges are sometimes found in association with electric blankets but these are a nuisance only. Electric blankets now contain adequate numbers of thermocouple switches that protect against fire. Water on an electric blanket is also unlikely to produce an electric shock. Common sense dictates that when an electric blanket is used it should always be unplugged and switched off before going to sleep, and it is much more satisfactory to use an overblanket and switch it off before getting into bed than to continue to lie in bed with an electric blanket switched on. Electric blankets can have local areas of high temperature that may produce skin damage in the elderly, and going to bed with the electric blanket on is to be discouraged.