Middle Articles

Use of Closed-circuit Television in Teaching Surgery to Medical Students

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While considerable use is being made of television in schools, colleges, and universities, it is difficult to know how best to use it. In medical schools, particularly in undergraduate teaching, this lack of evaluation is even more pronounced in spite of the availability of closed-circuit television for a number of years. For demonstrations where the particular experiment or technique cannot be shown adequately to a number of students at one time, or where much repetition would be required as in dentistry, there is much to be said in favour of television. In similar vein, where it is not desirable to allow observers into a particular environment, valid reasons can be adduced for the introduction of closed-circuit television. For example, a large number of students in an operating-theatre increases the risk of infection. In the field of clinical teaching, however, the case is less convincing. What might be gained from the patient's point of view—namely, avoidance of being used for teaching a group of students round the bed—must be balanced against the loss of personal contact which students experience when watching the examination of the patient through the medium of television. Further, little is known about what the student learns and retains from such televised events. This paper outlines an experimental attempt to evaluate, in a very elementary fashion, the impact of television on clinical teaching of undergraduates. The results are compared with those obtained from the orthodox way of teaching surgery.

Method

The class studied were in their first term of surgery. There were 78 students, of whom 65 were from Britain, eight from the Commonwealth (West Indies, Ghana, Nigeria, Nyasaland, Sarawak, and Singapore), and five from Europe (Portugal, Norway, and Germany).

During the 10 weeks the students were taught in sections in the wards—three days a week in surgical wards, one day a week in medical wards. On one day a week the whole class had television teaching in surgery from 10.30 a.m. to 12 noon. During the term they had co-ordinated teaching on the gastro-intestinal system, including liver, biliary system, and pancreas, and on the locomotor system from the departments of medicine, surgery, pathology, bacteriology, materia medica, and chemical pathology. Such instruction occupied one to two hours a day and was supplemented with practical and tutorial classes, and seminars where apposite. In addition, static and clinical demonstrations were used in phase with the course. Thus any one part of a particular system might be taught from six different angles during the systematic lectures, amplified by the usual visual aids, and subsequently reinforced by ward teaching, demonstrations, and so on, together with the students' own reading. From this material questions, radiographs, and

specimens were selected which had been presented to the students during the term. This formed the basis for class A examination subjects at the end of the term.

Television teaching was conducted in a lecture theatre by one of us with a member of the pathology staff. A 27-in. (68.5-cm.) television screen was used to display pictures relayed from a small side-room in the ward where patients, specimens, and radiographs were displayed to the camera by the other of us together with a member of the radiology staff. There was two-way sound transmission between lecture theatre and studio. In the 10 television sessions some 80 patients suffering from various surgical complaints were shown. The students were presented with correlated information. For instance, they might be given a short history in the lecture-room, followed by a demonstration of physical signs on the patient relayed from the ward. After a brief discussion they would be shown the patient's x-ray films on the television and the various points demonstrated by the radiologist. After further discussion the pathology of the condition would be outlined. The following week the gross specimens and histology thereof would be demonstrated. The weekly television clinic was thus a combined surgical-pathological-radiological exercise in which only selected characteristics of the patient's history were summarized in a few lines on sheets handed to the students at the beginning of each session. The aim was to present the essence of a particular disease, the investigation thereof, and the underlying pathology with little emphasis on detailed treatment. Material taught only in this way was noted and used subsequently in the terminal examination under the heading of class B.

Testing Students

In testing the students, in addition to class A and B material, a further group, class C material, was used. To answer this, deductions based on facts assimilated from the preceding two groups had to be made. In the composition of class C, classes A and B were represented in equal proportions.

The actual testing was carried out in two ways. In examination I the class circulated round a demonstration-room where 45 units were laid out. These comprised short questions, radiographs, slides, and specimens with a one-minute time limit for each unit. This examination was like a "spotter" with which the students had become familiar during the anatomy course. In this particular phase there were class A, B, and C questions in the following proportions: 41/32/17. In the next phase of testing (examination II) the students sat in the television lecture theatre while material was shown on the screen and questions pertinent thereto were posed. In this phase the proportions of material from classes A, B, and C were 19/14/40.

Finally, it was suggested to the class that members might submit, anonymously if desired, a free critique of the use of

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television as a teaching aid in this particular context. In addition, suggestions, constructive or otherwise, were asked for. This resulted in 45 replies and one semi-scurrilous quasi-sonnet.

Results

The scores were represented as percentages within the classes A, B, and C, and were calculated separately for examinations I and II. The results are set out in the Table as the mean score, the standard deviation, and the range for each class in each examination. Finally, the marks for each class in the two examinations were averaged and are set out in the Chart, in which the class C average score for each member is ranked, and the corresponding A and B average scores are plotted in. In this last evaluation the mean score, the standard deviation, and the range for classes A, B, and C are also set out in the Table.

Percentage Scores of 78 Students Examined in Two Different Ways (I and II) on Three Classes of Subject Material (A, B, and C)

		A	B	C
Examination I	Mean $\pm$ S.D.	58.5 $\pm$ 13.1	49.9 $\pm$ 12.4	52.5 $\pm$ 16.8
	Range	92-33	75-17	82-12
Examination II	Mean $\pm$ S.D.	57.1 $\pm$ 11.4	46.7 $\pm$ 15.7	46.7 $\pm$ 9.4
	Range	84-37	93-7	68-25
Average scores from I and II	Mean $\pm$ S.D.	57.9 $\pm$ 9.8	48.3 $\pm$ 11.9	49.6 $\pm$ 11.3
	Range	80-39	80-13	71-26

Scores of 78 medical students ranked according to their performance in questions requiring deductive reasoning (class C questions—continuous line). Scores for class A material (taught in lectures) are shown as open circles and for class B material (taught on television) as closed circles.

Examination of Results

From the Table and the Chart it appears that scoring in class B material is lower than for class A material in both environments by about 10%. Class C mean score lies closer to B than to A. Several interesting points, however, emerge from further analysis of the material.

Thus in the top 15% of the class (12 students) in examination I the mean score for A was 79%, with range of 92-70; for B, 66%, with range of 75-56; and for C, 64%, with range of 82-41. In only one instance did a B score exceed the corresponding A score, and then by a probably insignificant margin (B—75, A—71). In one other case the scores were almost equal (A—70, B—67). In examination II, of the top 15% of the class only five students from the top 15% of examination I were represented. These scored within a few marks of their performance in examination I. In the top 15% of students in examination II the mean scores for classes A, B, and C were 72%, range 84-63; 69%, range 93-50; and 58%, range 68-43 respectively. Now, however, there are seven students out of the 12 with B scores greater than or equal to A scores. At first sight it might appear that in examination II the only change has been that the performance in A material has been poorer relative to examination I. This, however, is not the case.

The seven students who feature in the top 15% in examination II but not in examination I all scored higher marks for A material in examination II than in examination I. Their appearance in the top 15% of the class is largely due to a conspicuously better score on television than on the demonstration-room examination. But the improvement is not limited to class A material. Out of this group (top 15% in II) seven scored B more than A in examination II and nine had a better B score in examination II than in examination I. It may be that these particular students were able to recall material which had been presented only once, on television, weeks previously. This is an interesting observation since it is generally agreed that the top 15% of an average class of medical students will learn almost regardless of the teaching methods employed. Yet here is an example of seven students out of a class of 78 moving into the top 15% of performers, owing, apparently, to a particular examination and teaching technique—television.

If we apply this analysis to the remaining 66 students in both examinations, it is found that, in examination I, 12 students produced a greater score for B than for A material. The mean values for A, B, and C were 46%, 60%, and 51%, while a further 10 students scored B=A; the mean values for A, B, and C material being 51%, 51%, and 47% respectively. Thus in contrast to the top 12 students in I, where only one student had a slightly better B score and one other had B=A, out of the remaining 66 students 22 had B better than or equal to A performance. In a similar fashion in examination II, of the remaining 66 students eight scored B greater than A, mean values for A, B, and C being 49%, 56%, and 43%. Of these eight, only three had scored B better than A in examination I. In a further 16 performance in B equalled that achieved in A, the mean values for A, B, and C being 50%, 49%, and 44% respectively. Of these, five scored B equal to or greater than A in examination I. In the 66 students there were thus 24 with B scoring equal to or better than A. Eight of these had performed in a similar manner in examination I.

If the results in both I and II are collated it appears that in one or both examinations 44 students produced scores where B was greater than or equal to the corresponding A score. Among these 44 were 11 students who produced B scores equal to or greater than A scores in both I and II. It is tempting to assume that these 11 students have more highly developed the facility for visual recognition of something seen only once. Now, on testing previous years of medical students for this particular facility the figure of 5-6% emerged. It follows that if television is to be employed solely as an unaccompanied visual aid, benefit might be expected to accrue in only about 5% of students. If, however, as in the present experiment, television is used as an ancillary visual aid, integrated with teaching co-ordinated between three departments, then a much larger number of students will benefit from its employment, particularly those who on orthodox forms of examination fall outside the top 15% of a class.

Students' Comments

Forty-five students—over half the class—submitted written comments on the television teaching. There were, of course, adverse comments about the quality of the picture and the camera work. This we expected, because everybody is familiar with very high standards of production on broadcast television. Most of the students were restrained in their criticisms of these technical points, and two even thought a few technical hitches were a good thing as they allowed relaxation of attention and introduced some humour—"son but no lumière."

As regards the value of television as a teaching medium in surgery, of 36 students who expressed opinions 29 approved

of the technique and thought it should be continued. The most frequently mentioned advantage was the fact that the whole class could see a particular patient, and that the view on the screen was better than could have been obtained in any other way except by almost individual tuition at the bedside. The demonstration of physical signs was particularly well received, instruments and pathology specimens less so. Curiously, x-ray films, which after all are black-and-white in reality, were thought unsuitable for showing on television by 19 students. This is probably due mainly to the difficulty which many students have in learning to interpret x-ray films.

Nine students complained of difficulty in understanding the orientation of things shown on the screen. We found during the programmes, for example, that it was important when showing a close-up view of an abdomen to be sure that everybody knew which was the head end of the patient. If difficulty with orientation can be overcome, the selective view taken by the camera has a potential advantage in directing attention to the important points, to the exclusion of others. Several students commented on this, saying that their attention was held and that learning was made easy and enjoyable.

The remoteness of the patient evoked a good deal of comment. Lack of colour, lack of direct contact and personal relationship with the patient, and lack of tactile sense were all felt to be a disadvantage. But privacy for the patient and consequent freedom for discussion of pathology at any stage in the presentation somewhat offset this.

Conclusion

Television makes possible the presentation of many visual images in motion in a short space of time. We tried to exploit

this facility, with the result that 22 students complained that too much material was shown too rapidly. We also kept the lecture-room in darkness during actual demonstrations, not because this was necessary to see the screen, but to prevent immediate note-taking. There were complaints about this at the time, and in the written critiques. We wished, however, to try to ensure that students concentrated on the programme. We hoped that a single visual impression of this sort could be effective without further reinforcement, and without the use of lecture notes, which are such a feature of Scottish university education.

The relatively high scores obtained encourage us to think we have succeeded, especially with students of average ability, who, after all, constitute the bulk of any class.

Summary

An attempt has been made to evaluate the use of television in the teaching of some aspects of clinical surgery. A class of medical students taking surgery for the first time has been studied. The students' examination performance on material taught in the orthodox fashion has been compared with that on material taught by television. It appears that more than half the class benefited in their learning from the use of television. Teaching by television appears to help those outside the top 15% of performers as categorized by orthodox examination results.

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Student Opinion on General Practice Attachment

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Most medical schools offer senior students an opportunity of seeing general practice (British Medical Students' Association Report, 1961). Though some of these schemes have been running for a number of years, there have been few factual reports on their value to students. This paper presents the findings from questionnaires returned by 69 fifth-year students who had voluntarily spent an average of two weeks with general practitioners; most of these students had participated in the scheme run by the University of Aberdeen, but a few had made arrangements with doctors of their own choice in or near their home town.

The Aberdeen attachment scheme is voluntary on the part of both students and doctors. A list is maintained of general practitioners who are willing to take a student in either the spring or summer vacation; fifth-year students attending the course in social medicine are informed of the aims and methods of the attachment, and are shown the list of general-practitioner tutors. Choice of doctor is left to the student, who is then introduced by letter to his tutor and thereafter detailed arrangements are made at mutual convenience.

Of the 50 practices willing to take students in the north-east of Scotland the majority are outside the city of Aberdeen; this probably reflects the greater ability of doctors with smaller lists to give the time required for demonstration and explanation. Some of these rural and semi-rural doctors offer the student accommodation in their own homes, an offer that students much appreciate, since it enables them to get a more complete picture of the general practitioner's life.

Student Response to the Scheme

Data are not available for the early years of the scheme, but in 1963 and again in 1964 about one-half of the fifth-year class spent one or two weeks attached to a general practice. Persuading students to complete and return a questionnaire is rarely wholly successful, so a few who did not respond may in fact have arranged an attachment of their own. The 69 student replies analysed below do, however, represent over 90% of the students known to have taken part in these two years.

Most of the questions were so framed as to allow students plenty of scope for comment, opinion, and impression. Though a few questionnaires consisted of rather stereotyped replies, most

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