Middle Articles

Blackboard Drawing in Medical Teaching

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Although it is accepted that visual methods facilitate learning, it appears that only the newest and most sophisticated aids attract publicity. In this article I should like to draw attention to the Cinderella of visual methods—the blackboard drawing.

Is There Still Any Need for Blackboard Drawings in the Course of Medical Lectures in England?

This question first needs answering. Almost every teaching hospital in England has its own medical illustration department. At fairly short notice lantern slides can be made by qualified artists. Numerous new sophisticated visual aids appear yearly, and coloured moving pictures can be obtained on almost every medical subject. They should all be welcome and put to their best advantage, as any form of illustration is better than no illustration, and for each subject and occasion there is one which is best suited. The different types of visual aids should not be mutually exclusive. When they are it is the blackboard drawing which usually suffers, as its technique has to be learnt by the medical educator himself. He should try to do so, because in my view blackboard drawing still remains the simplest, most flexible, least expensive, and *most useful* visual aid.

Simplicity and inexpensiveness need no further elaboration; the claim for its being the most useful of the available visual aids needs justification. Blackboard drawings are the most useful because they command the most attention, and because they are the easiest to reproduce. It is instructive to see how the laziest day-dreaming student reaches for pen and paper when the lecturer turns towards the blackboard. The student probably feels that if the lecturer has taken the trouble to memorize a diagram it must be important, and also if the lecturer attempts to draw it on the blackboard it will be within his capacity to reproduce it on his notepaper. Trying to copy an illustration is not only useful for the student because he can later refer to it, but, also, because he is actively involved through it in the lecture he will most likely remember it later. Lastly, as a by-product, he may learn the value of simple diagrammatic illustration in learning for himself (as I did myself as a student from an anatomy lecturer).

With blackboard drawing, too, words and pictures are best integrated into a whole (visio-audial effect), and by building them up step by step the lecturer is less likely to lose his audience.

To give only one example, a graph like this (Fig. 1) when projected on the screen may make a few minutes' impression, but the lecturer will most likely whisk it away before explaining exactly what the abscissa and ordinate mean and allowing time for its reproduction. In most cases the lecture-room also will be in semi-darkness, preventing the students, even if they had enough time, from taking any notes.

Very often the integration of more sophisticated forms of visual aids into a lecture is poor. An all-too-common aberration

is the type of lecture where the lecturer uses his lantern slides only as a visual prompter, reminding him as they appear on the screen of the major points of his speech. Other times, especially with medical films, the illustrations are not really any part of the talk; they only come at the end of it as a reward for sitting through and, perhaps, even listening to the lecture (Ollerenshaw and Hansell, 1950).

With projected slides there is also a curious lack of excitement, very similar to that one feels when listening to a lecture which is not delivered from memory but read. Perhaps a lecturer unaided with written text and projected slides is more appreciated because of his courage "to go it alone." Perhaps, on the other hand, the audience watches him more closely because they hope maliciously that he might forget the next sentence or the next line; but, whatever the psychological explanation, the lecture that is unread and blackboard-illustrated becomes undoubtedly more of a live performance. That it is a live, interesting performance is, to my mind, the main reason why a routine lecture can be more useful than an hour's reading of a well-illustrated textbook on the same subject.

Much more concrete than the above speculative and arguable advantages of regularly practising blackboard drawing in the course of medical lectures is that the lecturer who does so builds up for himself a mental store of simple diagrams and acquires a skill to think up new ones almost instinctively. This is at his disposal in the everyday, *ad hoc* medical teaching of students on subjects determined at short notice by the availability of clinical material. He will on these more numerous and important occasions easily reproduce them on a piece of paper or available blackboard.

FIG. 1.

Technique of Blackboard Drawing

"Visual aids are aids for the student and not for the teacher." Drawing on a blackboard does not come naturally to most

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people, and even those who are gifted have to plan and rehearse it beforehand. The first step is to review the text of one's lecture with one specific aspect of it in mind—namely, what part of it could be visually represented.

Talking about carcinoma of the colon, for example, one could start with a simple sketch of the colon, the incidence of tumour illustrated by different-sized circles with the figures of comparative frequency written inside them (Fig. 2).

FIG. 2.

The age distribution next would be best illustrated by a graph, drawn and not projected, of course. For the macroscopic appearances of the tumour the same sketch of the colon would suffice, drawing in the main types at the usual sites (cauliflower, annular, and malignant ulcer). This could be followed by slides of actual pathological specimens and slides of the microscopical appearances. That is an example of how the various visual

aids are not mutually exclusive. When using projected slides or photography it is often useful to draw first on the blackboard the salient features of the subsequent picture; it will be better understood and perhaps even better remembered by the students.

Turning to the clinical picture, a sketch of the colon would again be helpful to underline the differences in symptomatology of carcinoma at different parts of the colon, etc. (Fig. 3).

FIG. 3.

Topics which less obviously lend themselves to illustration can be made more interesting and memorable by a few well-chosen simple diagrams. The lecturer should not forget that more than two-thirds of the English population have a predominantly visual memory.

Here are a few random examples (Fig. 4). Many of these drawings can be found in various textbooks, of course, but unfortunately very rarely appear on the blackboard. With a little practice one starts to plan a lecture almost instinctively with illustrations, and finds that large parts of almost any medical subject could be condensed into a few graphs, charts, and diagrams. Should, however, anybody feel very inadequate or lacking in visual imagination, there is no reason why he

should not discuss his text with a member of the medical illustration department. I feel this would be a much better use of the staff of these departments than overloading them with requests for useless slides and photographs. Whether one uses projected slides or a blackboard (and the choice includes many

FIG. 4.—A, The pain distribution of angina. B, The importance of elevating a limb in the course of its physical examination for arterial deficiency. On the same drawing the sites where one usually feels for pulses and applies the oscillogram cuff can also be illustrated. C, The care of the airways in an unconscious patient and the various causes of diminished gas exchange.

other visual aids) depends on a number of factors: the availability of a good blackboard or projector, the importance of the facts conveyed in the particular picture, and the advisability of them to be copied by the student, etc. There is very little justification ever to project any graph or tables of figures. These are extremely easy to draw on the blackboard, and when projected they are most frustrating to an audience because of the seemingly irresistible temptation to the lecturer to change them too quickly or use too many of them.

Some diagrams, although useful and educational, are too complicated and time-consuming to draw on the blackboard in the course of a lecture. For instance, the common site of ventricular septal defect and its anatomical relation (Fig. 5). Photographed pathological specimens or even diagrams of this condition projected are very rarely grasped, let alone copied, by any student. An easy device with these types of illustrations is to multiply them with the stenograph machine, which is available in any teaching hospital, but not completely finish them. The sheets with the half-completed diagrams should be distributed among the students before the lecture, and the lecturer should prepare the same half-finished sketch on the blackboard and complete the drawing later,

FIG. 5.

accompanied by the appropriate verbal explanations. In this present example the labelling of the different anatomical landmarks, the marking in of the common site of the defect, and the course of the atrioventricular bundle should be drawn in in the course of the lecture.

Unless the above-described method is used, drawing on the blackboard before a lecture is not advisable, in my opinion, as it tends to suffer from the same disadvantages as projected slides—namely, the audience has difficulty in comprehending and reproducing them. Incidentally, previously made or half-made blackboard drawings (and the same applies to x-ray films, pathological specimens, and, in fact, any visual aid) should not be displayed, if possible, before the time they are referred to, as the audience tends to moon over them, trying to guess their meaning instead of attending to the lecture.

A lecture, especially when given for the first time on a certain subject, needs to be rehearsed. The proposed diagrams should also be sketched from memory on a piece of paper together with a rehearsal of the text. The integration and co-ordination of the two parts are achieved only by at least one

FIG. 6.

trial. The pieces of paper used for this rehearsal with only the sketches and a few keywords written on them are useful later as a prompter in the course of the lecture (one should resist the temptation to take the whole written text to the lecture-room). If the lecturer is not familiar with the lecture-room a reconnaissance visit to it is imperative.

The placing (and of course the size) of the drawings on the blackboard should be carefully planned, especially when using many drawings as in anatomy. It is often useful to refer back to a previous diagram and most annoying to find it wiped off. Frequent cleaning of the blackboard can be avoided by planning. (To be covered in chalk is unpleasant enough, but, who knows, there might be an occupational pneumoconiosis described in the future affecting the keen lecturer.) The absolute beginner should also practise drawing and writing on the blackboard and inspect his work critically from the back of the lecture-room. A device used by a very diffident lecturer comes to my memory; he previously drew the faint outlines of his diagrams with a crayon on the blackboard at his leisure, and simply overdraw on these with chalk in the course of his lecture, impressing his audience (who could not see the prepared lines) with the dexterity and speed of his drawings.

To impress and amaze is, however, the last thing blackboard drawings should do. On the contrary, they should be as simple and primitive as possible. A drawing like Fig. 6 (left) is not a masterpiece but is recognizable as a hand. With slight alterations (Fig. 6—right) it can be made to point out anatomical facts—namely, that the middle finger is the longest one of the four and that the thumb is in a slightly different plane from the others. It is a very common mistake to overload a drawing with information. Only two or three facts can be represented in a diagram without making it confusing. It is preferable to make serial drawings of the same subject, say the inguinal canal, rather than to try to cram too much information into one drawing.

FIG. 7.

In subjects like anatomy or surgery three-dimensional effects are sometimes sought, and the well-known method of architects can be used. To illustrate special relationships engineers and architects do not use shading, perspective, and other weapons of the artist, but different views of the same object. In blackboard drawings, also, this is the simplest and least ambiguous way of illustrating special relations: the muscles of the pelvic floor, for instance (Fig. 7).

It is important, of course, with simple blackboard drawings to explain exactly what one is about to draw. With the drawing of different views of the pelvic musculature (Fig. 7), one should hold up a bony pelvis and show exactly from what viewpoint the diagram to follow will be drawn, or what cross-section is going to be used. The lecturer should also give some preliminary warning of the eventual size and number of drawings in order that the students can plan ahead on their notepaper. Labelling one or two important landmarks with clearly written legends is also necessary.

A real master-stroke is that, after explaining what he is about to draw, the lecturer poses a question before turning to the

blackboard to draw. The ensuing few seconds' silence (one should not talk with one's back to the audience) is well utilized by the audience busily thinking about the answer and at the same time copying the diagram.

In this short article on blackboard drawing I have deliberately avoided the description of fancy new tools in the use of blackboard drawing, such as the chalk that is fluorescent and can be used in semi-darkness, or the overhead projectors which in certain centres have replaced the blackboard, because I feel it is all too easy to become fascinated by a new interesting piece of equipment before, by practice and patience, one has mastered the old, well-established and everywhere easily applicable ones. I would like to point out, however, in closing, that a light greyish-green-coloured ground-glass "black" board is a much better board to use for chalk drawings. The range of colour that is easily seen from a distance is greater (and incidentally similar to that which the students can use on their own notepaper), and this type of board is much easier to wipe and keep clean.

Summary

It is claimed in this article that blackboard drawing still remains the most useful of visual aids in medical education in the course of formal lectures. Also, the lecturer who uses it regularly acquires a skill of simple diagrammatic illustration which can be put to use in the everyday bedside teaching. The use of good diagrams is well within the ability of the average lecturer. A few practical suggestions on the technique of blackboard drawing are given.

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REFERENCE

Ollerenshaw, R., and Hansell, P. (1950). *Brit. med. J.*, 2, 488.