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How To Do It

Make a video tape

PETER CULL

Video recordings have become a popular and accepted tool of record, analysis, and communication in medicine and they vary from the relatively simple, unedited demonstration of the clinical examination of a patient—which to make may need just one camera and single operator—to a full scale teaching production involving many staff, studio and location work, multiple cameras, complex editing with insertion of graphics, film and animation sequences, overdubbed narration, and music. At each point in this spectrum, the technical and creative requirements are very different and so in this short article it is possible only to consider some general points. For those who, having read it and pondered the implications, wish to proceed further there are some excellent reference works available and these are listed below.

Improvements in video technology have taken place at a remarkable pace in recent years, and while quality and versatility have risen costs have come down. Furthermore, cameras and recorders are now so simple to operate that no amateurs need be deterred from using this excellent medium, providing, that is, that they recognise their own creative limitations and that of their equipment, and are prepared to invest the necessary time and effort.

The technical, production, and creative elements of video production are inseparable so I shall discuss them together.

Video formats

There are several video recording formats currently in use; the two most popular in the amateur/professional range are VHS and U-Matic, though others are fast developing. Both of these are cassette tape systems; VHS, using 1/2" recording tape, is the cheaper whereas U-Matic, which uses 3/4" tape, is mainly used by professionals. Generally speaking the wider the tape the higher the quality of recording and this is particularly important when tapes need to be edited or copied as each rerecording results in a loss of quality.

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From *How To Do It: 2*, a new collection of useful advice on topics that doctors need to know about but won't find in the medical textbooks. Just published, price £6.95, this is a companion volume to the popular *How To Do It: 1*, also published by the BMJ.

It is perhaps worth mentioning here that in addition to various formats there are also three different television broadcast standards in the world. In Britain and most European countries PAL standard is used but both France and the USA among others use different standards. As a result a video tape made in Britain cannot be replayed in a country operating on a different standard unless the relevant equipment is available or the tape is copied in the appropriate standard.

Recorders

Irrespective of the format employed, the video recorder is the key element in the equipment, and it is worth spending a bit more to gain reliability and obtain the best results. It is advisable to choose a professional or industrial recorder with an "Edit" facility which ensures that recordings begin with a clean cut picture rather than a broken image that takes time to settle down (the use of editing in compiling a programme will be discussed later). Battery driven portable recorders with built in playback facilities are available in both formats and some recorders are now actually incorporated in the camera body itself—the so called Cam-corders. Portable equipment is particularly useful for a one man operation and in locations remote from a power source, or where trailing power, camera, and sound cables are a nuisance or dangerous. It is worth bearing in mind that when making recordings in sensitive situations—for example, clinical interviews and examinations, performance evaluation, role play, etc—the less obtrusive the equipment the less alarming or distracting it is for the participant, and a better, less selfconscious performance will be obtained.

Cameras

Any video camera will work with any recording format and your choice will depend largely on the available finance which in turn dictates quality and the degree of versatility. Colour cameras based on cathode ray tubes can be divided into two basic types: single tube, where the colour information in the three primary colours is separated by means of filters on a single cathode ray tube; and three tube cameras in which a separate tube is devoted to each of the primary colours. A three tube camera is usually larger, heavier, and more expensive, but produces pictures of a much higher quality. Another type of microchip camera now in process of evolution operates without tubes—the CCD camera. This has many potential advantages and is a development worth following for semi-professional users.

There are other factors to consider when choosing a camera: an automatic focusing facility can be useful for the one man operation, but there are disadvantages such as the fact that the point of focus must always remain in the centre of the frame, thus severely restricting picture composition; the zoom facility allowing a smooth transition from wide angle to close up view is an essential, and an automatic aperture control which adjusts the quantity of light entering the lens is extremely useful; high sensitivity will permit the camera to be used with the minimum of additional lighting and the so called low light cameras will operate with reasonable efficiency in a well lit room. This is particularly valuable in a medical environment, where banks of television lights can be both distracting and uncomfortable for patients and inconvenient for the operator to install on location in wards, etc. The facility for synchronisation with other cameras may be useful and this is considered in the subsequent section.

Small, lightweight cameras can be hand held which is sometimes an advantage, but every vibration is magnified in the picture and this can be a severe distraction. Whenever possible, therefore, the camera should be mounted on a firm tripod.

ONE OR MORE CAMERAS?

Pictures captured from a single, unchanging camera viewpoint usually lack interest. The judicious use of the zoom facility and panning between two participants, for example, can improve the presentation; even so, too many repetitive movements of this kind can be disturbing and it is often impossible to establish a viewpoint from which every action and detail can be adequately observed. In such circumstances you need to consider the use of additional cameras covering the scene from different viewpoints and cutting between them.

This not only raises the financial considerations of additional equipment but also the implications of additional personnel needed to operate it—the minimum number of operators required in a two camera production is three. All the cameras used must be capable of being electronically synchronised with each other and the images from each fed to individual monitors for the purposes of selection by the producer/recordist. The images from the monitors are fed into a mixing unit which permits the operator to cut, dissolve, or wipe between the selected views. The chosen image is relayed to the recorder where the final picture is viewed on the production monitor.

Sound

The soundtrack is as important as the picture in a video recording and should be accorded just as much care and attention in achieving quality and choosing equipment.

Microphones having different characteristics are chosen to suit a specific task. Omnidirectional microphones accept sound from all directions; cardioid accept sound in a broad beam from one direction and unidirectional in a narrow beam; bidirectional microphones operate like a pair of cardioids back to back, and so on.

Generally speaking, and where feasible, each sound source should be microphoned or monitored separately and sound fed back to the video recorder through a sound mixing unit on which the individual volume levels can be adjusted and controlled. Assessing the quality and level of sound should always be done through earphones plugged into the recorder where, in terms of the recording, true values can be judged. Microphones need to be positioned so that they cause the least intrusion into the picture and this can be achieved, for example, by slinging them on poles, or by using tiny lapel or tie clip units for individual participants.

Lighting

The quantity and quality of light affects the quality of the picture in a number of ways. Poor light lowers the brilliance of the picture, it dulls and alters the colours, and, most importantly, it reduces the depth of field—that is, the distance between the nearest and most distant points at which all subjects can be brought into sharp focus. Having sufficient light on the scene, or using a camera of very high sensitivity, is vital for obtaining sharp, brilliant pictures.

Lighting arrangement is a skill requiring practice and experiment and it is worth spending time on it. Professionals often use the basic three point method which uses a key, a fill, and a back light. The key light should be the brightest as it provides most of the illumination and should be placed in front of the subject, slightly to one side (usually the left), and fairly high (20-45 degrees). As by itself the key light tends to create hard shadows on the subject a less intense light placed on the opposite side will fill these dark areas. Finally, another light, again softer than the key, is directed towards the back of the subject and from above (so called rim lighting) in order to make the subject stand out and separate it from the background.

Editing

Editing is the process by which a video programme is compiled. It includes the removal of unwanted material and the assembling of various shots, titles, graphics, etc, in their correct sequence. With cinematograph film this task is relatively simple as it is done by physically cutting up the film and joining the selected pieces together with film cement. It is also precise because each complete picture, representing one twenty fourth of a second of action, is visible on the film. With video recording the invisible electronic picture signals are laid down in a diagonal pattern on the tape and unless this pattern of lines can be precisely maintained when editing from one shot to another the subsequent picture disintegrates. Video tape editing is therefore an electronic process and entails the use of two linked recorders; one, the master, on which all the prerecorded material is played; the other, the slave—which must have an inbuilt edit facility—on which the selected material is compiled and recorded in sequence. Editing equipment can be as simple as this, and somewhat imprecise, or it can be highly complex and accurate with the ability to accept inputs from video recordings, cameras, film, sound recordings, microphones, etc; able to fade, dissolve, and superimpose images; and with an electronic controller that permits the editor to rehearse the edits and make cuts at precise points.

Planning

Today's technology has made video production deceptively simple; so simple in fact that there is a tendency to ignore the most important task in creating an effective videotape—planning. Even the most basic production needs planning and some form of rehearsal if disaster is to be avoided. For example, at a point in the recording of a clinical consultation the cameraman is concentrating on a close up view of the patient's face while he describes his symptoms. Through the viewfinder the patient's face is all that the

cameraman can see. Then, without any verbal cue, the doctor begins to examine the patient's hands, while the patient continues his verbal report. Seconds later the cameraman realises that the point of interest has changed and makes a desperate attempt to retrain and refocus his camera, by which time the doctor has turned his attention to the patient's eyes. The action, perhaps very important to the story, has been lost and the camera chase continues. Preplanning and rehearsal of the action, camera position and angles, etc, is therefore vital even in a simple, unscripted, one man, unedited production.

More complex productions require much greater and more precise planning, and a storyboard is essential especially if editing is to be done. A proper storyboard or production script will consist of the following information, usually laid out in columns with across the page reference. The "sequence," which is identified by a number, relates to a particular portion of the script and this may be broken down into a number of different preplanned "shots" each having its own identifying number. Any shot may require several attempts or "takes" to get it right and the usable one is identified by number and its position on the tape is noted from the tape counter number on the recorder. "Pix" are brief descriptions and camera instructions for the picture elements in each shot—for example, "zoom in to CU (close up) of patient's face, tilt down to CU of hands, tilt up to CU of patient's eyes, pull back to reveal doctor and patient." The "sound" column includes the script of the actual words to be spoken and identifies the live elements recorded on the spot and "voice over" (VO) or narration which is added on afterwards. The "FX" columns—and there may be several—contain details of any sound effects (background noise, etc) and where they fade in, up, down, or out. Finally, the music; this is identified separately and in detail and usually added at the editing stage.

This may seem overelaborate but without a detailed plan known

by everyone concerned on the production chaos will inevitably ensue, time be wasted, and tempers fray.

Legal responsibilities

It is important to understand that in compiling a video programme the use of any copyright material, whether it be a diagram from a textbook, a film extract, a still photograph, or a piece of music (live or recorded), it is unlawful without the express permission of the copyright owner.

The Video Recording Act 1984 and the Child Protection Act 1978 place restrictions on the recording of certain subjects, and on the distribution and showing of video recordings that contain material which under the acts is considered to be indecent or displaying gross violence. Producers and users of medical and scientific video recordings are advised to take extreme care in this matter and they may well be surprised by the nature of material classified under these headings. Equally important in medical recordings is the matter of confidentiality of illustrative clinical recordings of patients, and both these subjects are covered in the North East Thames Regional Health Authority's code of practice listed below.

Useful reading

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 Watts H. *On camera: how to produce film and video*. London: BBC Publications, 1982.
Basic video guide (£1) and *Code of practice on the confidentiality of illustrative clinical records* (£5). North East Thames Regional Health Authority Audio Visual Advisory Committee, Robin Brook Centre, St Bartholomew's Hospital, West Smithfield, London EC1A 7BE.

Schoolchildren are routinely tested for colour vision defects with the Ishihara colour plates. Those found to have a defect of their colour vision have this information recorded in their school records and are then given relevant careers information at the appropriate age. Should these children be seen by an ophthalmologist to exclude macular or neurological lesions?

The Ishihara colour vision plates are a sensitive test of red/green colour vision and most people who have abnormalities shown on the test are not handicapped except by virtue of their being unable to carry out specialised occupational tasks. If a child has a defect on the Ishihara plates without symptoms with normal acuities in both eyes then no further action need be taken. If there is an associated defect in vision or symptoms they should be seen by an ophthalmologist.—DAVID TAYLOR, consultant ophthalmologist, London.

If acid is the primary route of attack in caries does the use of antacids cause a reduction in tooth decay?

I know of no evidence that this is so. The cause of dental caries is simple: micro-organisms in dental plaque metabolise dietary sugars to acids (mainly lactate), which dissolve the apatite structure of enamel. The pH at the plaque-enamel interface, some distance from saliva, is important. The plaque pH falls quickly after exposure to sugar, reaching a minimum within five minutes. To be effective buffers have to diffuse through plaque and be present when the production of acid is greatest. This means that buffers either have to remain in plaque for some time or have to be taken within a few minutes of consumption of sugar. Many antacids are insoluble and will not diffuse easily through plaque. Bicarbonate antacids may do better but will not remain for long. Bicarbonate is saliva's main buffer, and as eating stimulates salivary flow salivary bicarbonate is most abundant when the need is greatest, at meal times.

The idea of neutralising plaque acids by mouthwashes, tablets, or toothpastes is not new. Two substances that have received the most attention are dibasic ammonium phosphate and urea, and 11 clinical trials of these substances were reported between 1944 and 1957. Amm-i-dent toothpaste contains 13% carbamide. Some results were encouraging but they were so

variable that these products were never endorsed by the American Dental Association.

In conclusion, though antacids may possibly contribute to prevention of caries, this is improbable as their effect is likely to be too late and too transitory.—A J RUGG-GUNN, reader in preventive dentistry and honorary consultant, Newcastle upon Tyne.

What is the frequency of toxæmia of pregnancy and has it declined in recent years?

Toxæmia of pregnancy—also known as pre-eclampsia, pregnancy induced hypertension, pregnancy associated hypertension, or gestosis¹—is difficult to define and has been reported to affect anywhere from 0.5% to 35% of pregnant women.² Its incidence is affected by factors such as the age, parity, and social class of the woman, her smoking habits, the sex of her fetus, and the country—and indeed the region—in which she lives.^{1,2} The epidemiology of pre-eclampsia has been studied in Aberdeen for many years: in the early 1950s the incidence of severe pre-eclampsia in single first pregnancies was 5.8% and in second pregnancies only 0.38%.³ The incidence of mild pre-eclampsia then was 22.1% in primiparas and 8.6% in multiparas.⁴ Both mild and severe pre-eclampsia declined slightly among primiparas until 1965, after which they increased again: in primigravidas in 1976-80 the incidence of albuminuric pre-eclampsia was 7.5% and of mild pre-eclampsia 35.9%.⁴ The perinatal mortality rate associated with pre-eclampsia has, however, fallen.³ The incidence of eclampsia in first pregnancies in Aberdeen has remained about 1.7 per 1000 for 30 years but eclampsia now seems to be occurring at an earlier gestation, and an increasing proportion of albuminuric hypertensive women are presenting without a prodromal period of hypertension.⁴—JAMES OWEN DRIFE, senior lecturer in obstetrics and gynaecology, Leicester.

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