Medical Photography:

CLINICAL – ULTRAVIOLET – INFRARED

By H. L. Gibson

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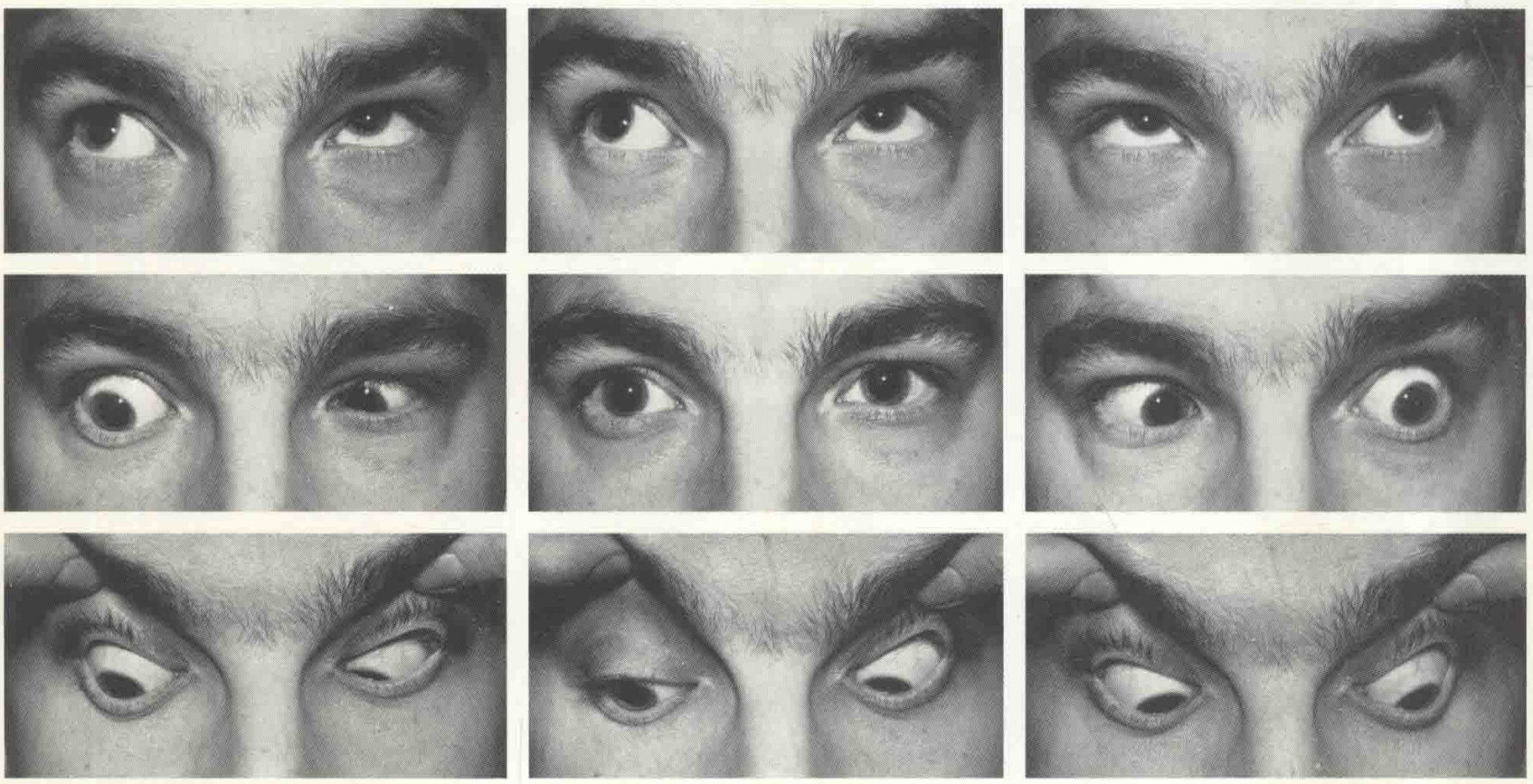
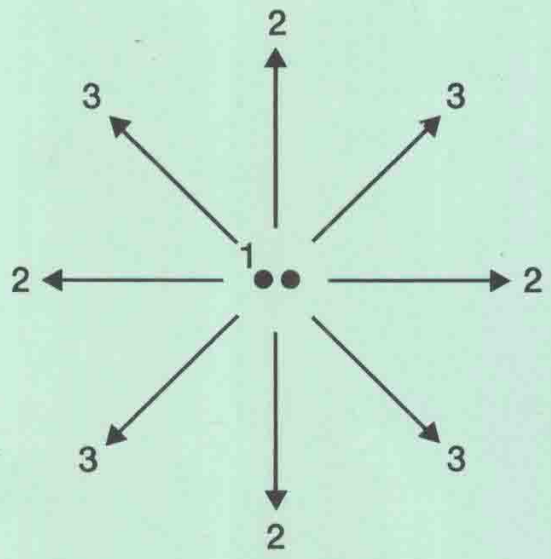
Clinical
PHOTOGRAPHY



Positions of gaze: 1—primary, 2—secondary, 3—tertiary



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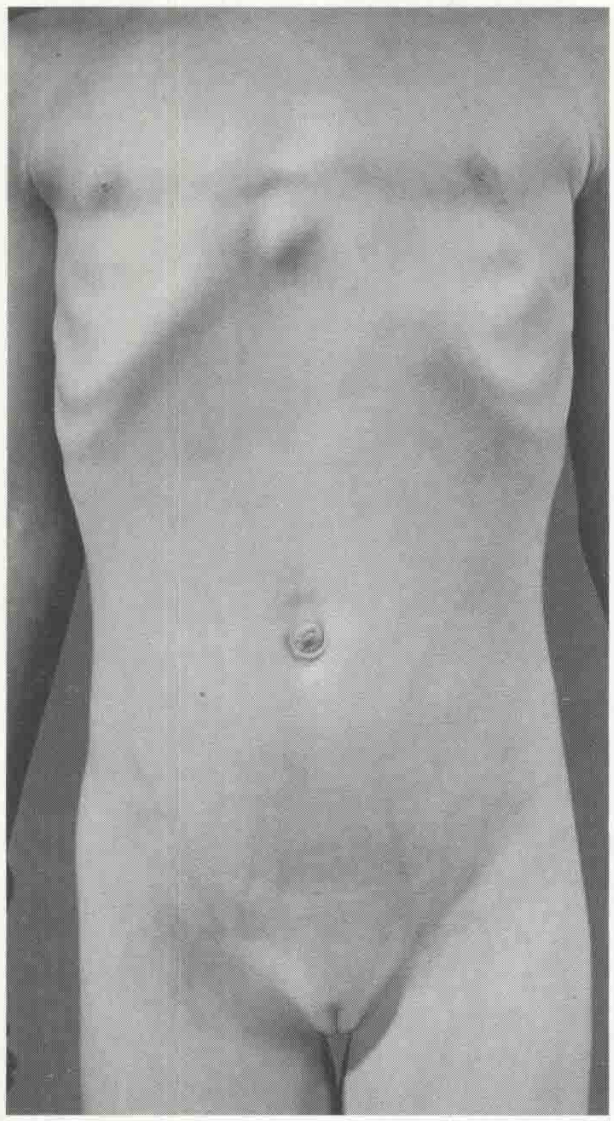
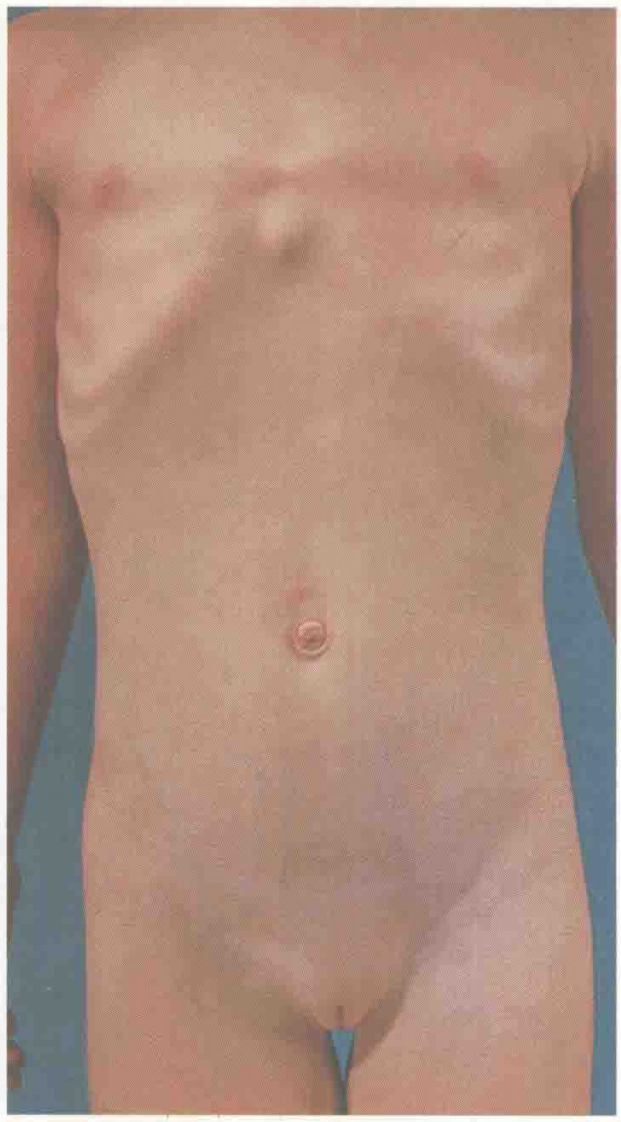
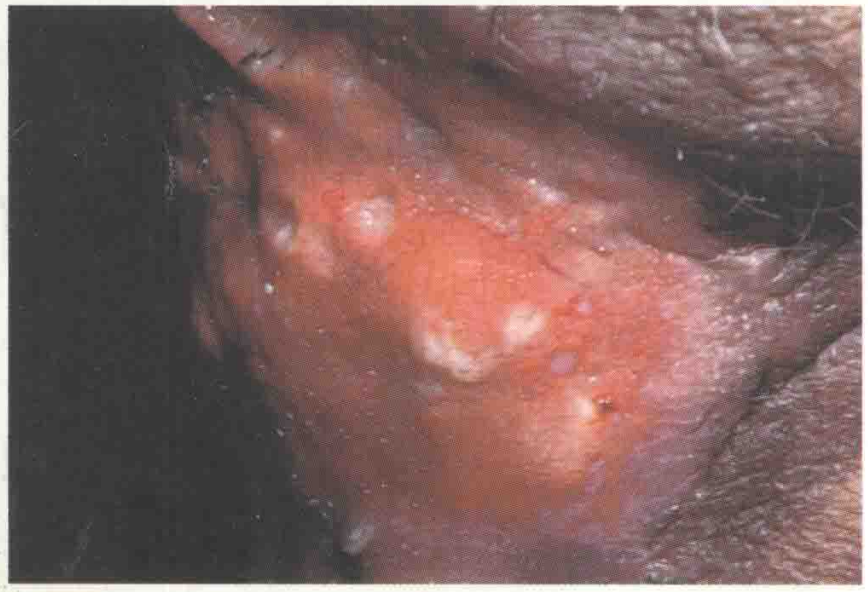




Color photography is simple and informative. It is practical and desirable for most slides. But printing in publications necessitates efficient use of the limited amount of color illustration practical. It is not needed for the morphological studies of the girl here. Black-and-white dermatologic illustrations are meaningful to practitioners but obscure to students because whites and yellows record to about the same tone and so do dark reds and blacks. Subtle colors are missed in monochrome. Depicting the golden glow exhibited by the baby, who had ingested ant poison, demanded the use of color.



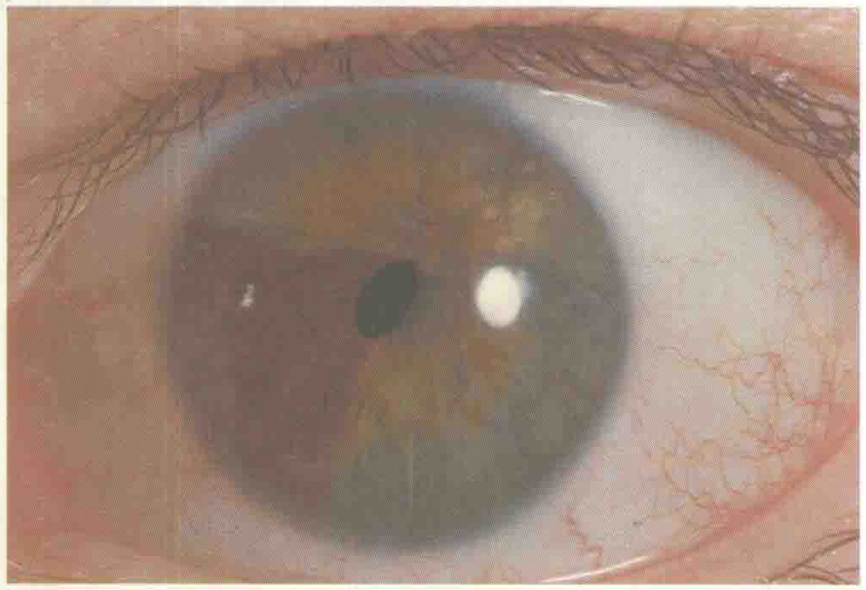


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*Figure references within each section refer only to illustrations within that section.

Clinical Photography

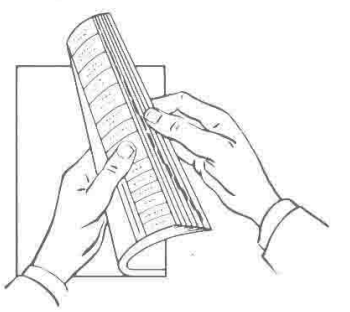
This book presents a cross section of the kinds of photography carried out in various clinical surroundings. It will be helpful in orienting those contemplating medical photography as a career; specifically, the clinical phase of the service, which deals almost exclusively with the photography of patients. Also, it offers those who are already studying in this field of para-medical activity, the basic aspects of photographic technique, personal attitudes, and institutional decorum and safety.

For the practicing medical photographer, the book will be particularly useful in planning and conducting a training program for his or her assistants. It will guide him in his instruction courses as well as provide his students with technical information. It is not too vain to believe that even the experienced photographer will be able to obtain new ideas from many of the more advanced presentations. The illustrations will be helpful in discussing projects with both the medical and the para-medical staffs.

Medical students can gain from the book an appreciation of what a photographic department can offer for helping them in their studies and note-keeping. Certain simplified procedures are given that will enable the intern to make many photographs himself with a minimum of photographic experience, equipment, time, and expenditure. By gaining an appreciation of the benefits and requirements of photography in this way, he will be well prepared to utilize photographic services later on, when he is in a position to order such services. These same simple procedures will also be valuable to a physician in his office or private clinic.

General techniques are fully covered. But, of course, the scope of this book does not make it practical to go into the details of highly specialized applications. Nevertheless, the techniques are outlined, and further medical and photographic reading is listed.

A working knowledge of cameras and sensitized materials is assumed. The technical emphasis in this book is on lighting and positioning (posing) the patients. The illustrative factors for making clear and informative records are included.



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The Clinical Photographer

Patients are people—people with problems. They are often in pain and usually apprehensive. To them, the medical photographer is someone who, once more, submits them to an institutional routine. He takes their pictures, with part or all of their clothing removed, to show what is usually an embarrassing condition or deformity. Again, indispensable as photography is in the teaching and advancing of medicine, it does not present to the patient the same direct benefit as a radiograph or a blood test.

The clinical photographer, then, has to put the patients at ease as much as possible and quietly impress them with the importance of clinical photography. The best way to do this is to really feel a genuine empathy toward the patients. The right personal attitude for the photographer will then come automatically.

The photographer should be understanding, but not openly over-sympathetic because that may seem to indicate an undue seriousness in the condition. He must be patient but firm, particularly with hesitant older people and rebellious children. Forced cheerfulness and cold indifference are both out of place. He should feel and act as though photography were an important part of each individual treatment, which indirectly it is. The value of the photographic procedure will then be felt by the patients.

The clinical photographer will not find his subjects glamorous. He should not be embarrassed at nudity nor squeamish about the grimness of advanced conditions, for patients are quick to sense such feelings and intensify them in their own attitudes. The photographer must remain impersonal to nudity and not be callous toward affliction. Familiarity is prohibited; false modesty, superfluous; and calmness, obligatory.

It goes without saying that the clinical photographer must be efficient. He can then speed up the sessions for the comfort of the patients as well as provide the medical staff with informative photographs. He needs to have a humane temperament and he has to be proficient in camera work. Although both of these qualities are partially inherent, they can be learned and developed by practical experience. Apprenticeship in the photographic department of a hospital, university, or research institution provides the best means for gaining a faculty for working with patients.

But first the photography must be learned. Training in general photographic technique can be obtained in many schools; courses in biomedical photography are available; and some curricula incorporate both phases.* General information on films, papers, and darkroom techniques is offered in the Kodak publications listed on page 118. Basic chapters on these technical phases as they apply specifically to clinical photography are given in Gibson (1960).

In the early stages of training or apprenticeship, it is undesirable "to practice on sick people." How then can the beginner learn to photograph the human body in the factual style required for a clear, clinical record?

One way is to employ professional models to serve as the subjects for practice. Experiments in lighting, filter, infrared, and posing techniques can then be worked out with someone accustomed to standing in front of the camera for long periods. In some institutional situations, patients will consent to a few extra shots for refining a photographic experiment "under working conditions" or for making an exacting teaching illustration. This is particularly true of children who are not debilitated. They welcome some diversion from the tedium of the ward, especially when they are made to feel important. Obviously, the consent of the attending physician and parents should be obtained. (See Figure 1.)

In the normal routine of photographing many of the patients, several photographs will be needed for obtaining the clearest view. Making and studying such records helps the student to achieve discrimination. With the simple system to be described further on in this book, extra photographs can be taken quickly and easily.

Apart from knowing the technical aspects of the job, the clinical photographer must learn hospital procedures. Also it is necessary to become familiar with a certain amount of medical and anatomical terminology. This and other aspects of medical photography become easy when the photographer is motivated by an interest in medicine rather than by the art of photography alone.

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*The Executive Secretary of the Biological Photographic Association can supply the latest information on schools and courses for medical photography. Currently, he is: Mr. Stan McComb, Executive Secretary, Biological Photographic Association, Rochester, Minnesota 55901.

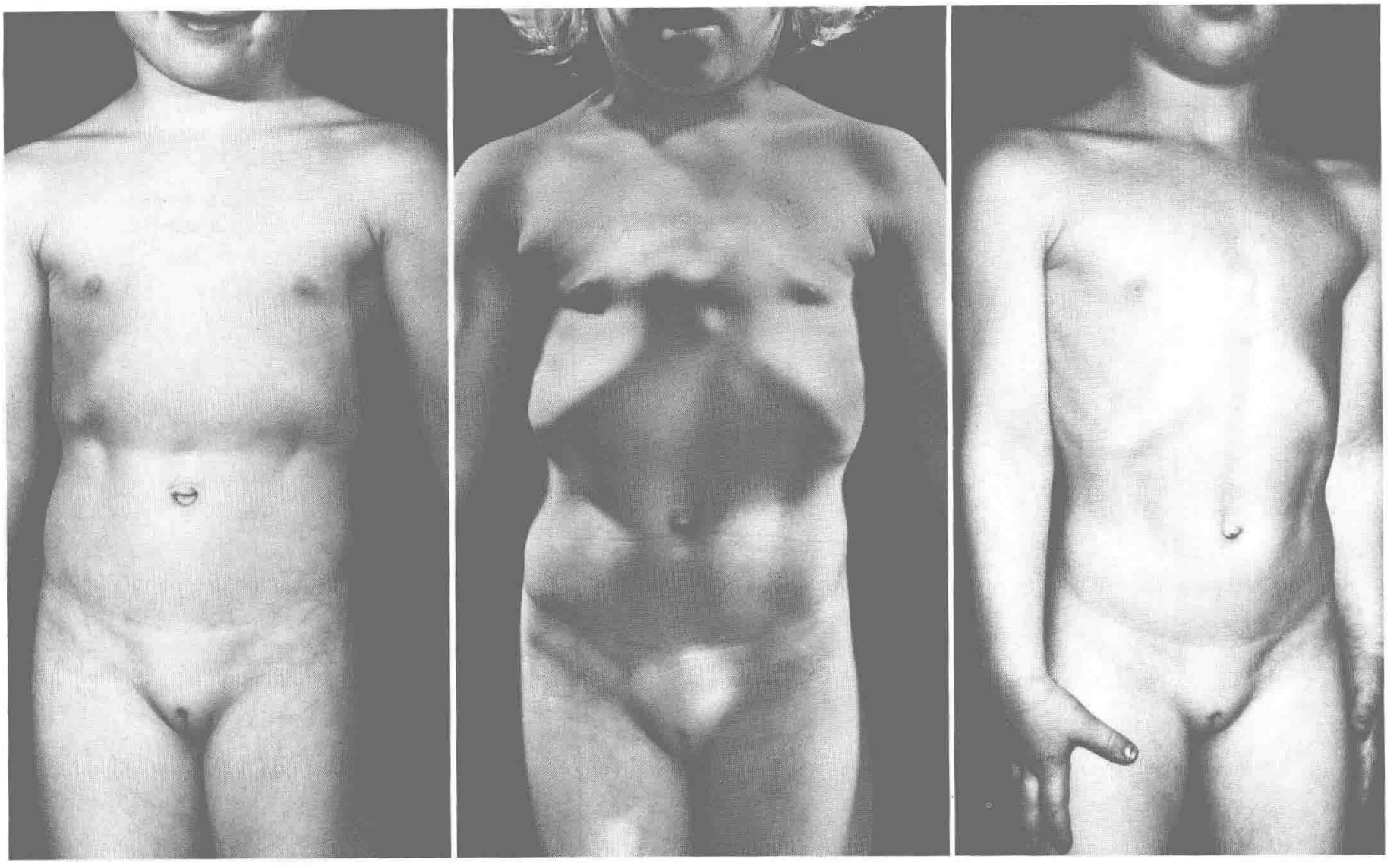


Figure 1—*Clinical photographs made with the help of a willing patient who was not debilitated by her mild chest condition.* **Left:** *A demonstration of flat, or even, lighting in a "standardized" setup. Such an arrangement can be used by inexperienced personnel. It would be suitable for many dermatological records of lesions extending over the trunk, but it is not effective in showing the deformation of the chest here.* **Center:** *"Optimum" lighting reveals the morphological condition of the chest and hips quite clearly. This is the best, and the specific lighting for this patient and establishing it required the skill of an experienced photographer.* **Right:** *A record quickly made by the "simple system" for inexperienced photographers. It shows enough of the condition to serve as a notation for a physician familiar with the patient, but it is not adequate for a morphologic illustration in a lecture or textbook, nor is the pose suitable for showing the hips. (These lightings and techniques are treated fully further on in this book.)*

Medical photography is a rewarding occupation for those who experience a personal satisfaction from a dedication to the welfare of people. The field also offers ample challenges in techniques and communications to make it an interesting and creative career. This opportunity to function as both an illustrator and a communicator adds continual variety to the field of medical photography.

As an illustrator, the photographer must know what his viewers have previously seen so that he can extend their visual comprehension by illustrating what they have not seen. He must know what relationships the viewers can recognize before he can successfully give them new relationships to correlate.

As a good communicator, he will come to realize that there are two phases to visual learning. The first comes from our seeing-experiences in the real world—guided by teachers and others. We discover how to form impressions of naturalness and know how to search for information by interpreting actual visual relationships. The second is gained from exposure to educational pictorial representations. These have been stylized for the purpose of depicting the natural in a visual form. Psychologically we have learned how to allow for the differences between a real object and an image of it. Nevertheless, the photographic image should depart from the object as little as possible and the departures should be along the well-known lines of graphic illustration. For example, photographers should study and follow the "grammatical" rules of design and allow for the impact of style, in order to produce an effective teaching illustration.

Types and Purposes

Clinical photography to most laymen means producing "before-and-after" photographs—records of afflicted areas and the same areas when they are healed. It is true that recording the progress of a patient undergoing treatment is one aspect of clinical photography. However, this is only a small part of the scope of the field. A progress record has many more purposes than just showing that the treatment was successful. For one thing, the "after" picture is unnecessary from most medical standpoints. It is merely necessary to state that the morbid condition cleared up.

Photographs are not intended as proof. Photographic manipulation could be employed to distort the facts. The medical photographer has to record facts as faithfully as possible. The photographs then enable the physician or research worker to present his findings more readily and clearly. Actually, it is the integrity of such men, not the photographs, that supplies the "proof."

KINDS OF PHOTOGRAPHS

Figure 2 is a "before" picture. It depicts a dermatological allergy condition as it appeared when first seen by the physician. This type of photograph is a common one and is made whenever the case is distinctive enough to merit study or inclusion in the patient's history folder. It is the basic record. The number and the nature of follow-up pictures that are made depend upon the specific needs arising for following the progress of treatment or for supplying illustrations for lecturing and publication.

Progress Records

Figure 3 is a progress record of a lip cancer. The series illustrates several factors. It shows the location and extent of the involvement before treatment and the slight residual scarring after cure. When accompanied by dates, the rate of remission is indicated.

In addition to the general purposes for medical photographs discussed further on in the section on applications, the progress record has specific uses. Often, the remission of a condition is slow and sometimes retrograde. It would be too much to expect the busy physician to remember the exact appearance of every patient on previous visits. Serial photographs can chart slow changes. They enable the physician to decide whether to continue, modify, stop, or change the treatment. He

Figure 2—*This is a record of an allergic eczema from contact with shoe dye as it appeared when the patient was first seen by the dermatologist. Such initial records serve as a basis for demonstration, study, and possible further photography.*

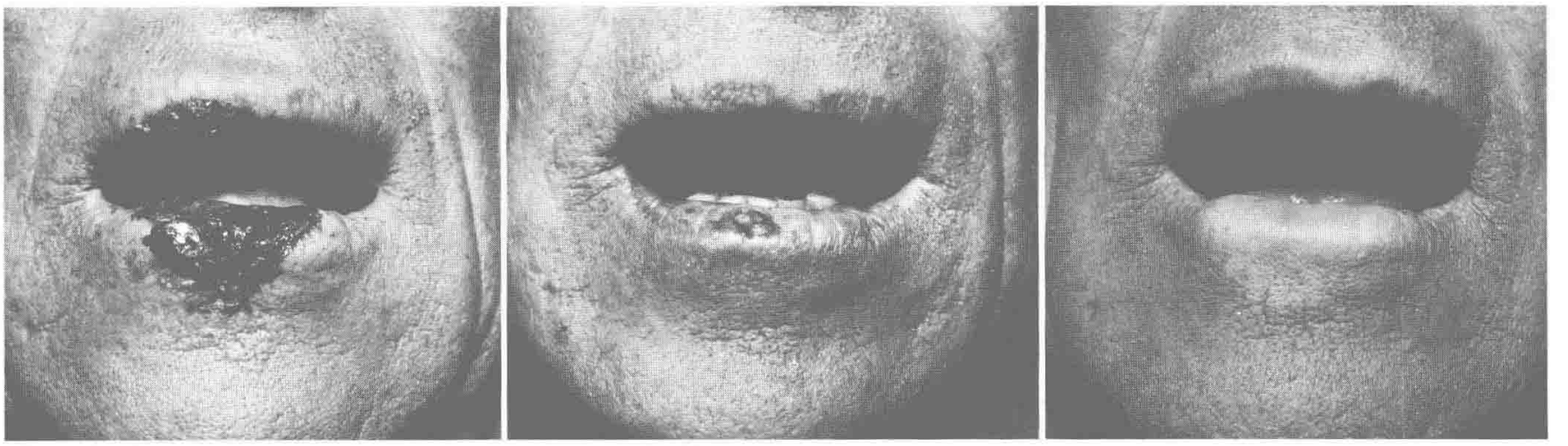


Figure 3—*Progress records showing the response to treatment for a lip cancer.*

can convincingly discuss the difficult case with the patient. He may even elect to show the photographs to the patient in order to justify and to encourage continuation of the treatment.

Apparatus Demonstrations

The clinical photographer does not solely photograph people. He is often called upon to record appliances, such as braces, casts, splints, exercisers, and prostheses. His duty is to show how they are worn by the patient and their function in modifying posture and mobility. Figure 4 is an example. Picturing the construction of such appliances themselves is done in the medical departmental workshops.

Most photographs of equipment alone are made in the photographic laboratory. But recording scenes of technicians manipulating equipment is within the purview of the clinical photographer. Such scenes may be either staged in the studio, or photographed on location. An example is a close-up of hands preparing microscope slides.

The simple system to be described further on permits illustrating many steps in a manual procedure by means of hand-held photographic equipment. This can be done quickly on location, and accomplished without staging or interrupting the steps in the technique photographed.

Patients undergoing therapy in special baths and other appliances in the department of physical medicine would be photographed on location by the clinical photographer. Hence, he must learn the rudiments of lighting an indoor scene.

Photo-Diagrams

A challenging phase of clinical photography is the production of photo-diagrams. Photographic prints form the basis of such illustrations. The photographer can draw pertinent coordinates, angles, fiducial marks, and

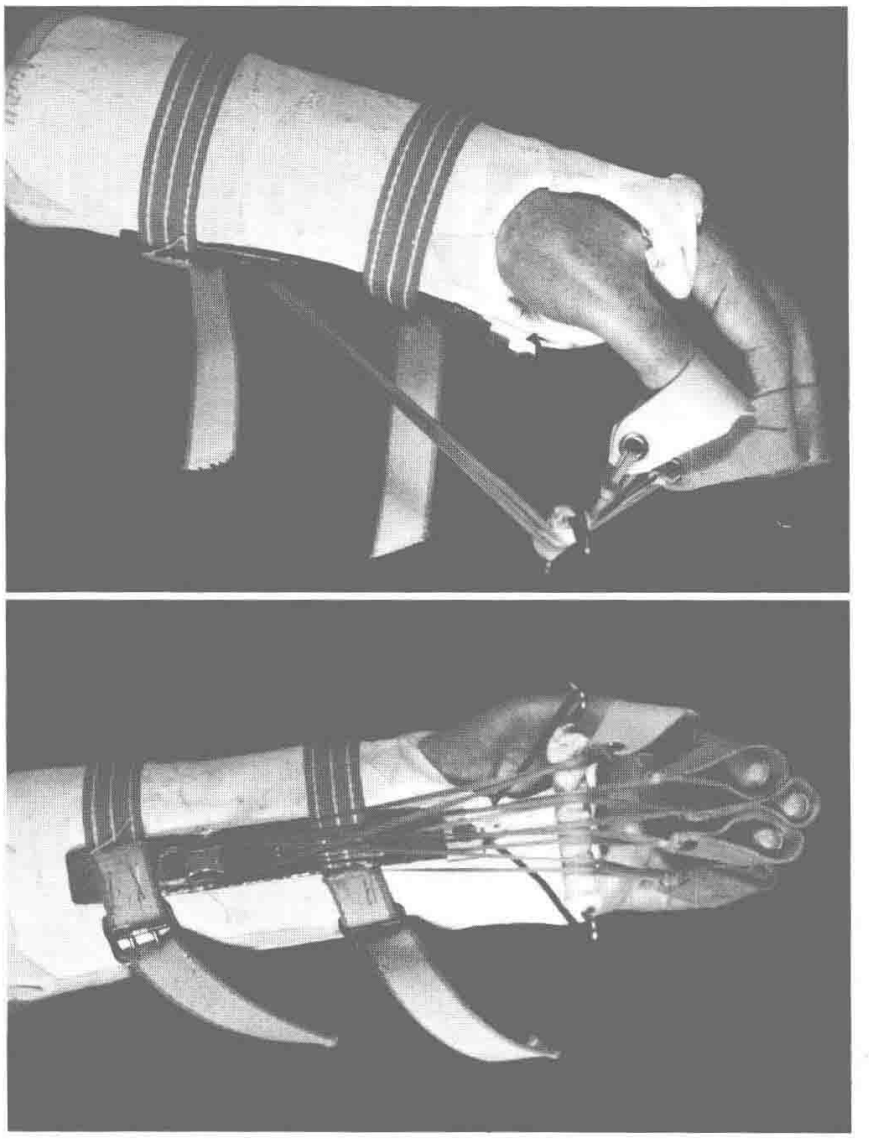


Figure 4—*Appliances such as this one for rehabilitating the hand after a serious herpes complication are common subjects for the clinical photographer.*

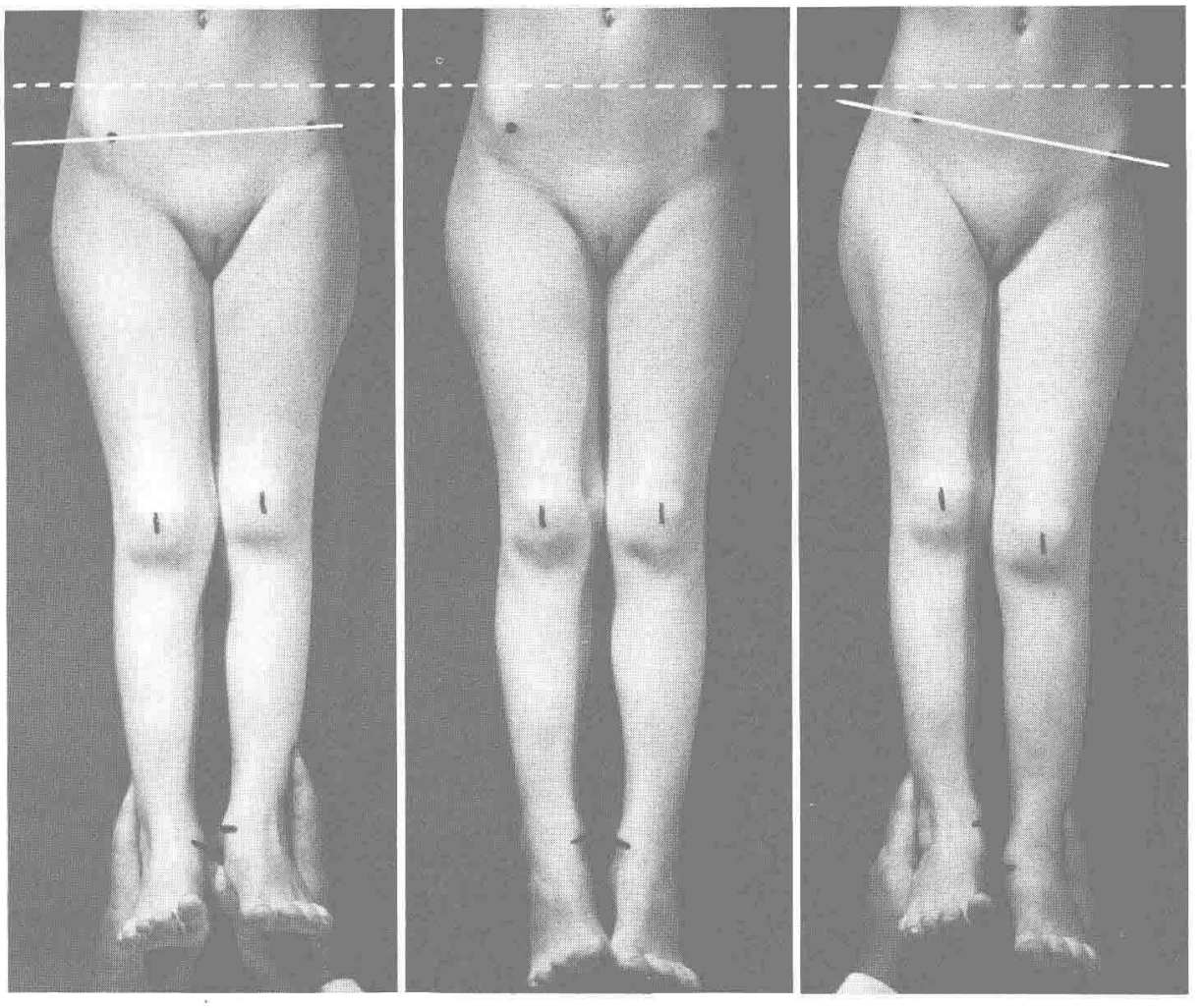
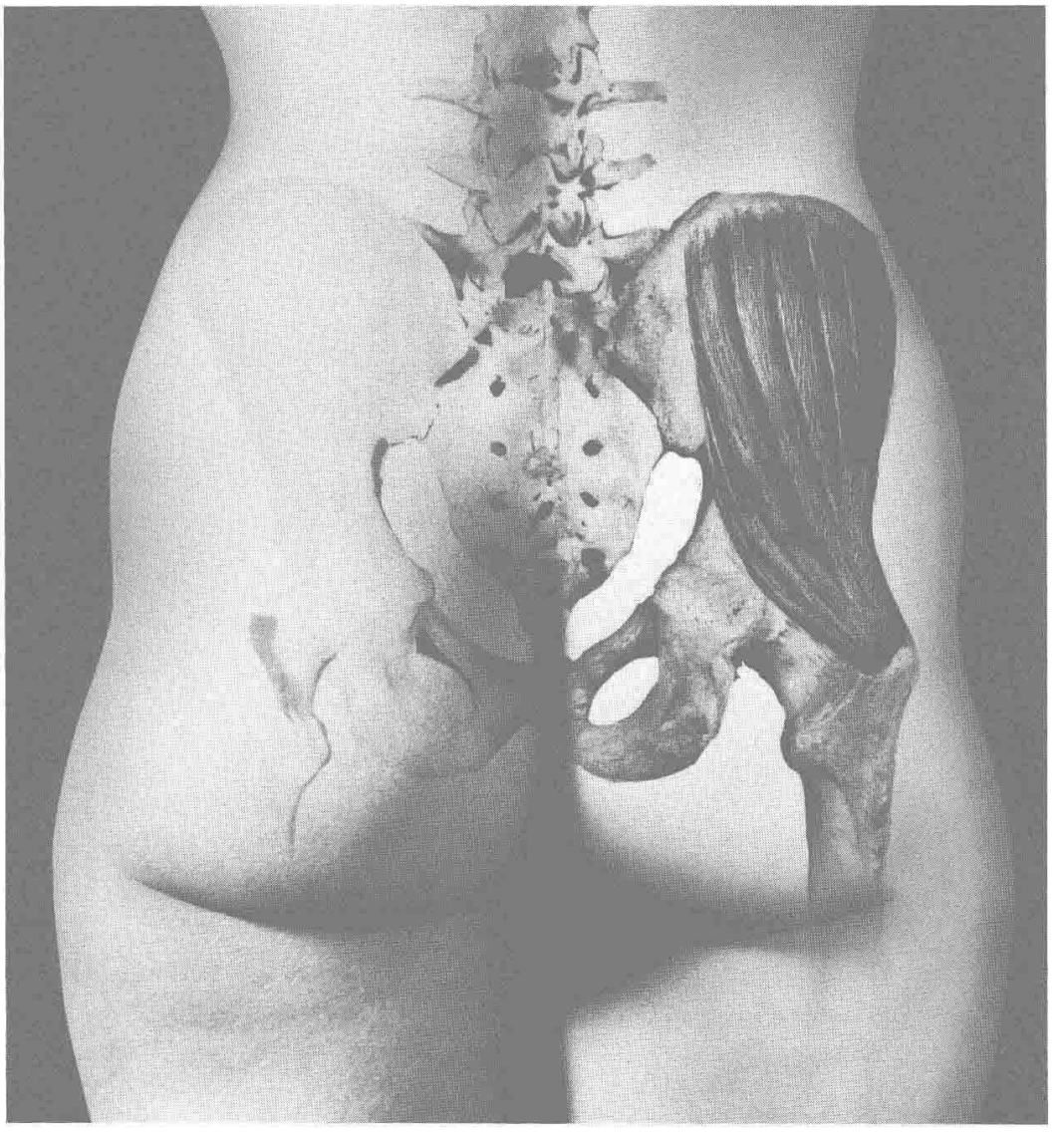
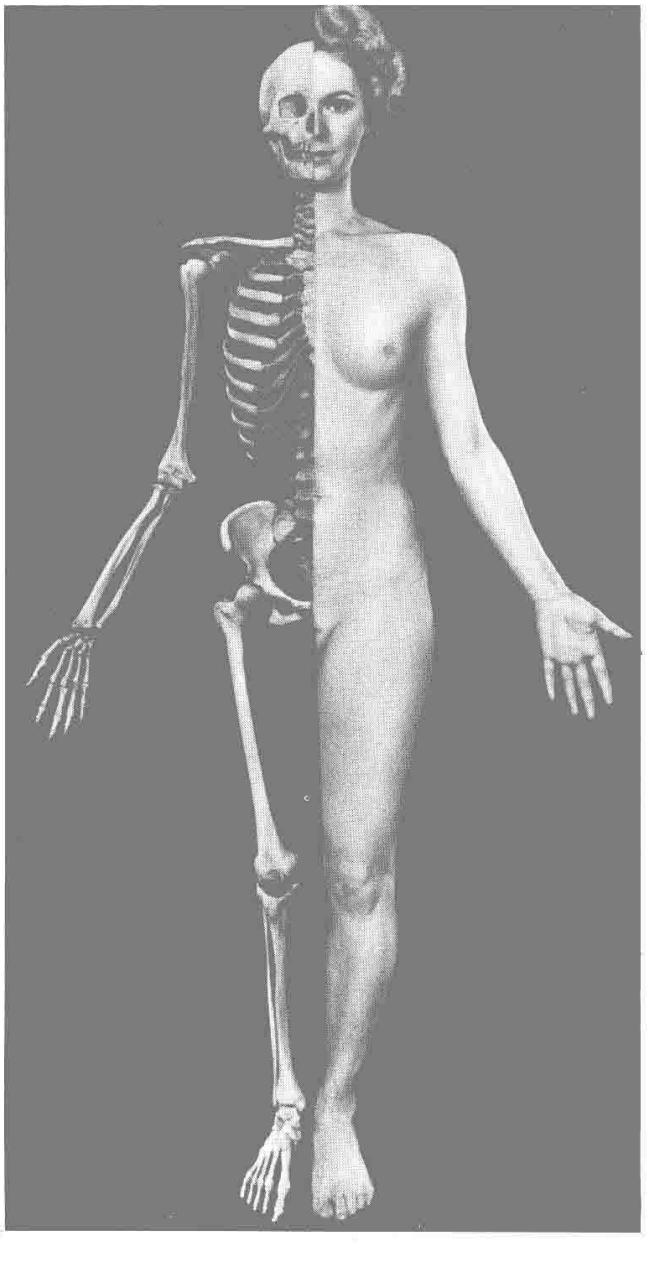


Figure 5—*Types of photo-diagrams associated with patient photography. They can be made either from grouped photographs or from unferrotyped prints upon which drawings are made. (Sacrum illustration courtesy of John A. Gaughan.)*





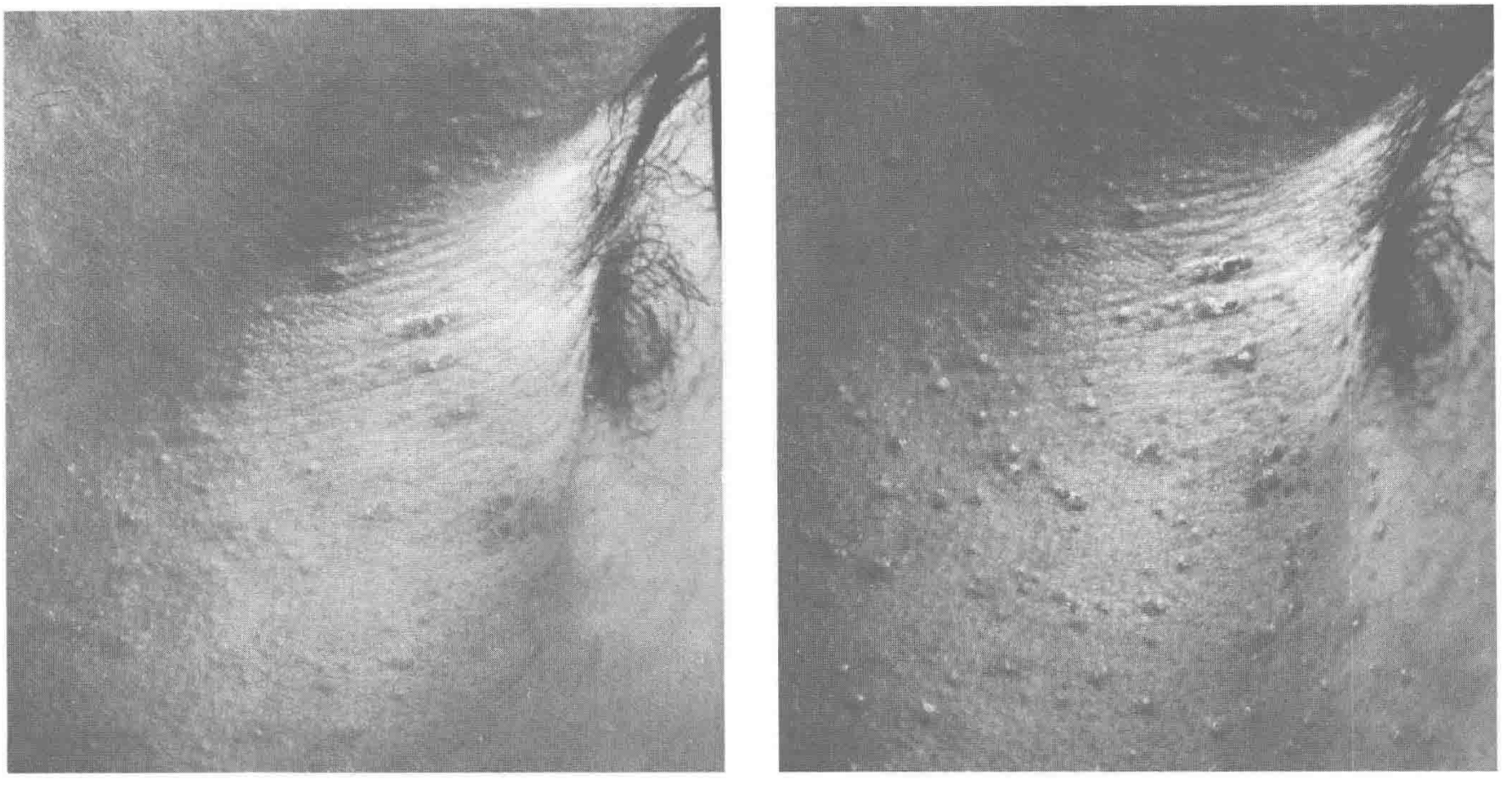


Figure 6—*It is often necessary to emphasize some feature of the subject. Here, the faint pink lesions of pityriasis rosea were darkened in effect by employing orthochromatic film.*

limits on the prints. Combinations of photography and the work of an artist are often effective as diagrams. For other applications, several photographs can be cut and mounted together. These types of illustration can easily be designed to present more concise and clearer information than could be shown by photographs alone.

Often, when serial or progress diagrams are made, the result serves as a tool. For example, the top diagram in Figure 5 indicates the angles and other relationships between key anatomical landmarks. The photographs were made before corrective measures and exercises were begun. Similar follow-up diagrams can be prepared to record and scale the patient's progress.

Modified Renditions

In general, the photographer will be expected to render the skin tones and the appearance of lesions as naturally as possible. Nevertheless, emphasis of certain features is sometimes needed for "mapping" faint rashes, venous patterns, and pigment patches. A common modification of this type is shown in Figure 6. On the left, the faint pink rash of pityriasis rosea—photographed on panchromatic film with electronic flash lighting—appears very much as it looked to the eye. The lesions are exaggerated in the right-hand photograph, since it was made on orthochromatic film. One record enables the medically inexperienced person to trace the pattern of the lesions, the other shows him their visual intensity. Both photographs are needed under these circumstances.

Infrared and ultraviolet photography are techniques frequently carried out in the clinical studio for obtaining modified renditions that are more informative than visual inspection. It is beyond the scope of this book to go into them. The reader should consult *Medical Infrared Photography,* Kodak Publication No. N-1, and *Ultraviolet and Fluorescence Photography,* M-27, for full information about these specialized techniques.

Group Pictures

While some of the group photos that the clinical photographer will make will not include patients, most of them will. He should be prepared to photograph various scenes in locations such as rehabilitation centers, psychology clinics, and laboratories. Figure 7 was made in a speech-therapy class.

Another nonclinical photographic application is the preparation of simple class portraits of students to serve as reference rosters for instructors. Similar photos of hospital personnel and informal portraits of the staff members are often made by the clinical photographer.

Figure 7—*This scene in a speech training center is typical of the group photos required in many phases of medical practice.*

Action Studies

Broadly, this field covers people in motion or exhibiting reactions. It deals with making records for studying gait and body movements as these functions are affected by physical and behavioral anomalies. Figure 8 is a still photograph, and a series of such records is valuable in many applications. Many occasions call for cinematography. A section on movie techniques for this field is included in a subsequent chapter.

The photography of surgical operations records the actions of the surgeon, rather than those of the patient. This type of photography is discussed in the sections on equipment and techniques.

Graphic Features

The foregoing sections outline the subject material that the photographer will encounter. The graphic techniques he needs are, in brief, those that render morphology (shape) and texture. He must also be alert for the right moment to activate the shutter. These skills are summarized in Figure 9.

The two boys in the top photograph exhibit significant morphological differences. The condition of the sick boy includes social withdrawal. The picture was made at the moment when the comparison subject was reacting to a pleasantry from the nurse in attendance—a response not exhibited by the patient.

The grouped serial records of the other boy are typical of the morphological studies made in the study and treatment of scoliosis (lateral curvature of the spine). Careful, standardized lighting and positioning (posing) procedures are required over many sessions. The top row shows some of the views made at each session. The bottom one presents the posterior view made serially over several sessions both before and after treatment. The third picture illustrates how suitable lighting delineates both shape and texture. In this case, the texture of the lesions is the more important feature.

Cavity Photography

An endoscope is an optical instrument designed for looking inside the body, either through natural orifices like the bronchus with a bronchoscope, or through incisions, such as one made in the abdomen for examination with a laparoscope. It is beyond the purpose of this book to go into details about the highly specialized photography that can be done through these instruments. Some surgical manufacturers make camera at-

Figure 8—*This boy with a genetic anomaly demonstrates the kind of action shot that can be recorded by still photography. Several records like this are sometimes needed. Cinematography is often adopted.*

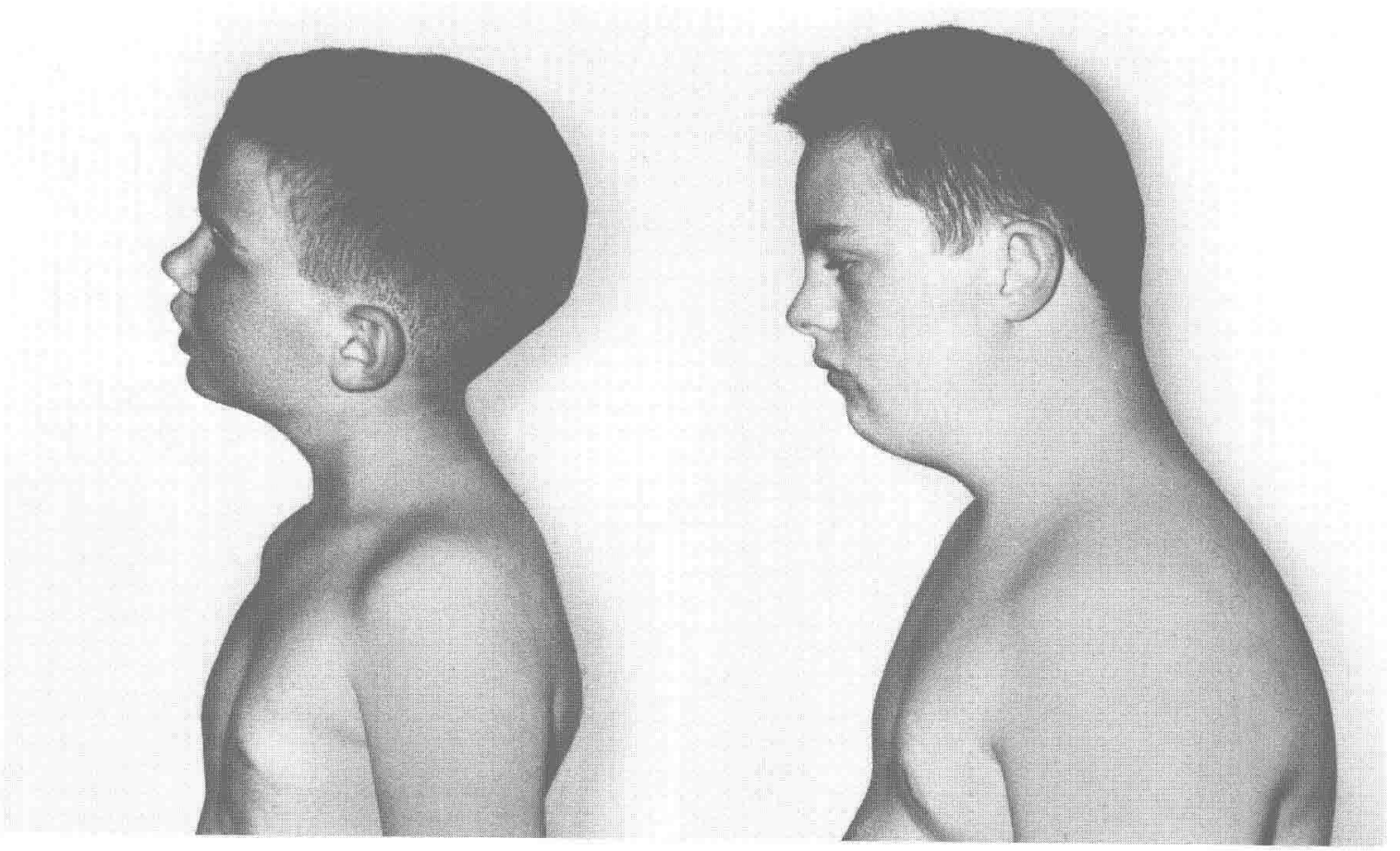


Figure 9—*Records of behavior, shape, and texture.*