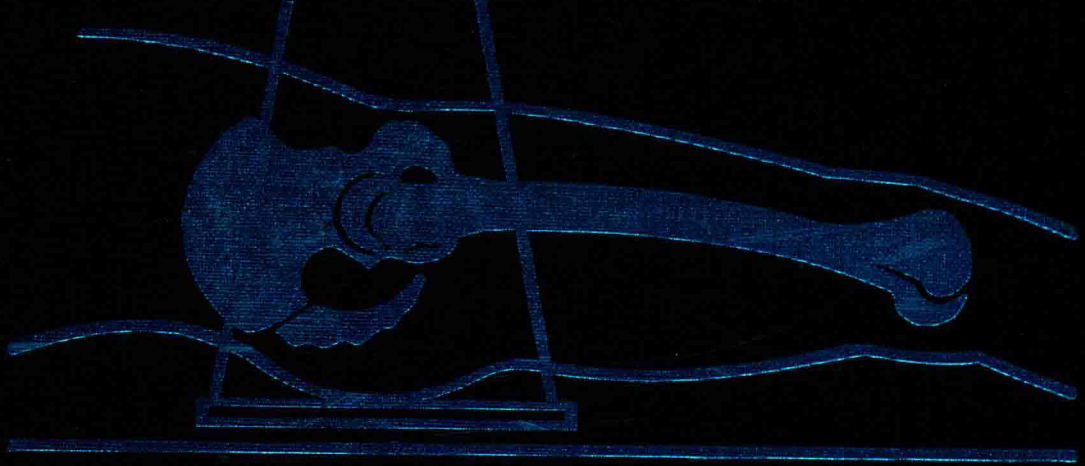
VOLUME ONE

MERRILL'S ATLAS OF RADIOGRAPHIC POSITIONS and RADIOLOGIC PROCEDURES



Philip W. Ballinger

SEVENTH EDITION

VOLUME ONE

MERRILL'S ATLAS OF RADIOGRAPHIC POSITIONS and RADIOLOGIC PROCEDURES

PHILIP W. BALLINGER, M.S., R.T.(R)

Director and Assistant Professor, Radiologic Technology Division
School of Allied Medical Professions
The Ohio State University
Columbus, Ohio

Seventh Edition

with **2987** illustrations, including **9** in full color

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PREFACE

Hardly is the ink dry on one edition when new knowledge, different procedures, and technological advancements dictate that the revision process begin. Such was the case with this edition of *Merrill's Atlas of Radiographic Positions and Radiologic Procedures*.

One of the more noticeable changes can be attributed to the Twelfth International Congress of Anatomists, which met in London in 1985. Substantial alterations of nomenclature were adopted; these results were published in the 1989 sixth edition of *Nomina Anatomica,* the third edition of *Nomina Histologica,* and the third edition of *Nomina Embryologica*. Because the terminology authorized by the International Congress is the standard terminology for anatomy, this seventh edition of *Merrill's Atlas* reflects these nomenclature changes.

To make the transition to the new anatomic terminology easier, the decision was made to list the new term first and the older term parenthetically. An example of the change is that of the carpal navicular; the accepted name is the scaphoid, so it is printed in the text as *scaphoid (navicular)*. Some reviewers of the early manuscript did not like all of the terminology changes, but we as health care professionals must adopt the terminology used in anatomy textbooks and taught to radiography students, medical students, and residents in radiology. I personally prefer *odontoid process* to the term *dens,* and *extremity* to *limb,* but in the new edition these examples are printed as *dens (odontoid process),* and *limb (extremity)*. To assist the reader of *Merrill's Atlas* in identifying which anatomic terms have changed since the sixth edition, a summary listing the new and old terms is printed on the inside cover.

Other changes were designed to make using the text easier. The phase of patient respiration has been consistently placed in this edition. *Respiration* instructions have been included just before the central ray for those procedures involving the head and torso. For all chapters involving radiography of the head, *italics* were added to the primary positioning landmarks to help the user to quickly identify the positioning lines and points needed to accurately position the patient. The terms *position* and *projection* have been changed to reflect the terminology adopted by The American Registry of Radiologic Technologists. Descriptions of all positioning terms are included in Chapter 3 on p. 43 to 50, including summary Table 3-2 on p. 45. The entrance and exit points for the central ray were expanded and clarified to more precisely identify the centering points when positioning the patient. Similarly, some centering points were slightly changed to reflect the anatomical centering points of the body part, which are required when using positive beam limitation equipment. Other changes include placing the running heads on the edges of the pages. This makes locating a chapter or a specific position much easier.

The organization of the book remains essentially unchanged; Volumes 1 and 2 contain the radiologic procedural examinations, and Volume 3 contains descriptions of the radiology specialties. This organization was planned so, as an option, a student radiographer might purchase Volume 1 for the first term in the educational program, Volume 2 for the second educational term, and Volume 3 during the second year of professional radiography education.

Two entirely new chapters were added to Volume 3: Digital Subtraction Angiography and Computed Radiography. In addition, all chapters received substantive revisions with the addition of new illustrations and text.

Before, during, and after revising the textbook, many reviewers made significant contributions by offering suggestions for clarifying the information for the reader. Grateful appreciation is extended to three radiologists, Javier Beltran, M.D., Jerome J. Cunningham, M.D., and James Jerele, D.O., who reviewed selected chapters and offered suggestions for improvement. Several technologists devoted extensive time and effort in reviewing new chapters and new material and, in general, offering suggestions for improvement. Thanks and my true appreciation are extended to Michael W. Drafke, M.S., R.T. (R), from the College of DuPage in Glen Ellyn, Illinois; Eugene D. Frank, B.S., R.T. (R), FASRT, from the Mayo Clinic and Foundation in Rochester, Minnesota; Michael L. Fugate, M.Ed., R.T. (R) from Southwest Virginia Community College in Richlands, Virginia; Bruce W. Long, M.S., R.T.(R) from the Indiana University School of Medicine in Indianapolis, Indiana; Kenneth Roszel, B.S., R.T., from Geisinger Medical Center in Danville, Pennsylvania; Jeffrey L. Rowe, M.S., R.T.(R), from Muskingum Area Technical College in Zanesville, Ohio; Dennis Spragg, M.S.Ed., R.T.(R), from Lima Technical College in Lima, Ohio; and Anton R. Zembrod, M.Ed., R.T.(R) of Wichita Falls, Texas. I also want to thank Professor Spragg for his evaluation of the material from *Merrill's Atlas* that was published in the first edition of the *Pocket Guide to Radiography* published by Mosby-Year Book, Inc. in 1989. Mark Smith, R.T. and Debra Saunders, R.T., colleagues and graduate students at The Ohio State University, assisted me by critiquing manuscript, reviewing new material, assisting in obtaining new radiographs, proofreading manuscript, and responding to multiple requests for assistance. Your work was appreciated, and I gained a great deal of respect for each of you. I'm sure your futures will be bright.

Literally thousands of journal articles must be searched for and reviewed in revising each edition. Terry Kempton, R.T. devoted extensive time and effort to search for, locate, and review thousands of journal articles. As a result, over 1300 articles written by over 2800 authors were reviewed and added to this edition in the bibliographic sections of all three volumes. The task was extremely demanding and would not have been possible without Ms. Kempton's help.

Two anatomists at The Ohio State University assisted greatly in revising this edition. Margaret Hines, Ph.D re-

viewed the anatomy sections following the publication of the 1989 editon of *Nomina Anatomica*. Dr. Hines' comments were extremely valuable and timely in making the changes in terminology possible. Her continual support and assistance are truly appreciated. Professor John Chidley also reviewed the anatomy sections and offered suggestions for changes.

Eva James, R.T., reviewed the comments of the anatomists and those received from users, synthesized them, compared them with *Nomina Anatomica*, and organized the anatomy sections of the chapters for consistency and clarity. In addition, Ms. James reviewed the final manuscript and prepared a summary of the anatomic terms that have changed from the previous edition.

Sincere thanks are extended to Julie Gilhousen, R.T.(R)(N) from Picker International, Inc. for her cooperation in arranging for the use of the radiographic equipment needed to produce new photographic illustrations. Picker International, Inc. has demonstrated strong support for this *Atlas* through all seven editions and that support is truly appreciated.

Although every effort has been made to ensure accuracy and consistency of information, an occasional mistake escapes. When such occurs, you can assist me by marking the error on a photocopy of the page and mailing it directly to me. Suggestions for improvement are also welcome, for it is only with the assistance of concerned professionals that the text is strengthened.

This *Atlas* requires extensive visual support and without the professional staff of the medical illustrators, medical photographers, and the concerned staff of the Biomedical Communications Division in the School of Allied Medical Professions and The Ohio State University, the illustrations printed in this textbook would not be of such high quality. Particular thanks are extended to chief photographer Robert Jones for his patience and cooperation in shooting, printing, and reprinting the illustrations to show just what is desired. Thanks also to Mr. Harry Condry and Mr. Matthew Eppley for their responding to my many, sometimes impossible, requests.

Sincere thanks are extended to scores of individuals (R.T.s, students, and physicians) who assisted by locating radiographs for this edition. As is the custom, whenever a radiograph is printed in the *Atlas*, the name of the individual supplying the original radiograph is printed adjacent to the image. Unfortunately there were a few radiographs I was not able to print because they were duplicates. Thanks again to all who assisted by supplying illustrations of excellent quality for this edition.

Sincere thanks are extended to Eileen Buckholz who has served as secretary to the Radiologic Technology Division at The Ohio State University (and manager of my schedule) for several years. Her ability to assist the faculty and students, get me to classes with students, attend university meetings, respond to phone calls, and many other tasks while keeping track of me is truly appreciated. Thanks again, Eileen, for all your help.

To David Culverwell, Peggy Fagen, Christi Mangold, Cecilia Reilly, Elaine Steinborn, Mary Stueck, and the entire professional staff of Mosby-Year Book, Inc., I enjoyed working with you in our mutual quest to produce a quality textbook. Although some of the deadlines were a little tight, we generally made them.

Without the total support of my family this project would not have been possible. To my father-in-law, L. Neil Hathaway, thanks for your understanding and encouragement. I also thank my parents, D.W. and Mildred Ballinger, for their love and encouragement demonstrated throughout my career and their continuing support and assistance. They are always there when they are needed and I apologize for taking that for granted. To my wife, Nancy, loving appreciation is extended for her understanding and assistance. In addition to being an understanding wife (well, most of the time), my multiple requests for her help have generally been answered. Many times the family schedule has been revised or something rescheduled because I was out of town or "just had to work." Thanks for your love and support over the years. My son, Eric, and daughter, Monica, are relatively understanding of the neverending revision process. I apologize for the many times I should have been doing things to assist and support them, but was instead working on the book or attending a professional meeting. Over the years Eric and Monica have learned to stop asking, "Is the book done yet?" because they know that as soon as it is complete, it and other projects will compete for my attention. Eric and Monica, I love you and appreciate your patience. I only wish that sometimes when you see my travel schedule posted on the refrigerator door, instead of asking, "Now where are you going?" you'd ask, "When will you be back?"

Philip W. Ballinger

Columbus, Ohio

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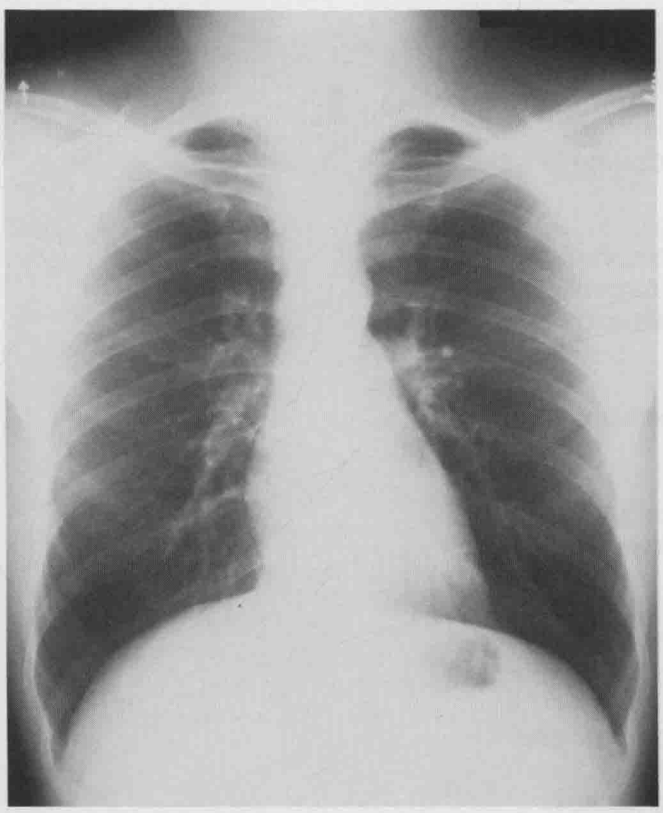
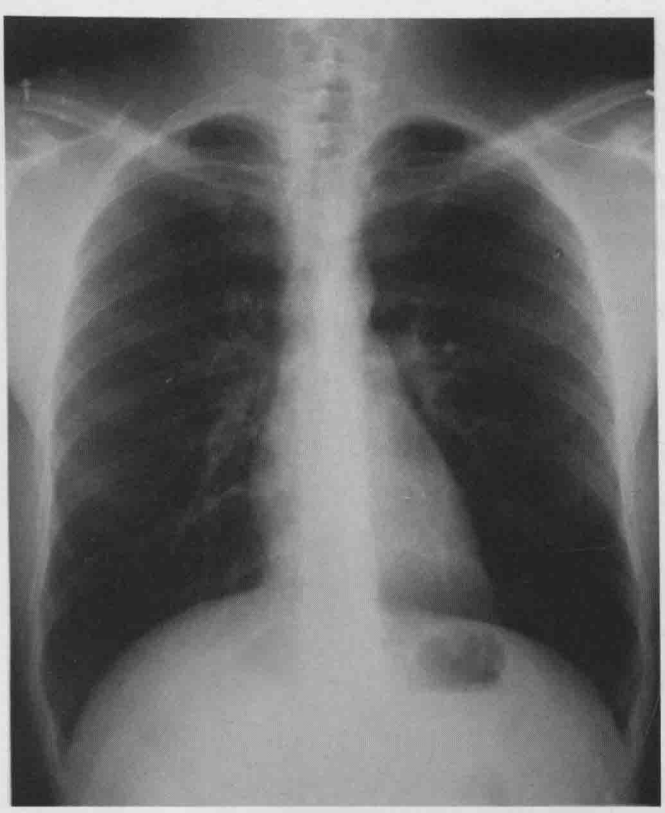
Fig. 1-1. Sufficient radiographic density is needed to make a diagnosis. **A,** Insufficient density. **B,** Proper density. **C,** Too dense.

(Courtesy Frank J. Brewster, R.T.)



A



B

C

Radiograph

A radiograph is the end result of an exacting technical procedure. Each phase of this procedure must be carried out with care to obtain the greatest possible information concerning the anatomic details of the structures for the purpose of demonstrating the absence of, or the presence and extent of, traumatic or pathologic changes. There is no examination in radiology in which accuracy and attention to detail are not essential.

The technologist should be thoroughly familiar with the radiographic shadows cast by normal structures. To develop the ability to properly analyze radiographs and to correct or prevent errors in technique, the technologist should study radiographs from the following standpoints:

1. The relationship of the structural shadows as to size, shape, position, and angulation must be reviewed.
2. Each anatomic structure must be compared with that of adjacent structures, such as the head of the humerus compared with the glenoid fossa and acromion process.

Fig. 1-2. Different scales of contrast. **A,** Long scale (low contrast). **B,** Moderate contrast. **C,** Short scale (high contrast).

(Courtesy John Syring, R.T.)

A

3. The *density* of the radiograph must be within the useful density range. If a radiograph is too light or too dark, an accurate diagnosis becomes difficult or impossible. Fig. 1-1 illustrates radiographs of proper and improper densities. If a change in technique is necessary, the factors that primarily control density are milliampere-seconds (mAs) and source-to-image receptor distance (SID).
4. The *contrast* of the radiograph must be sufficient to allow radiographic distinction of adjacent structures with different tissue densities. Fig. 1-2 shows three different scales of contrast. The primary controlling factor of radiographic contrast is peak kilovoltage (kVp).

B

C

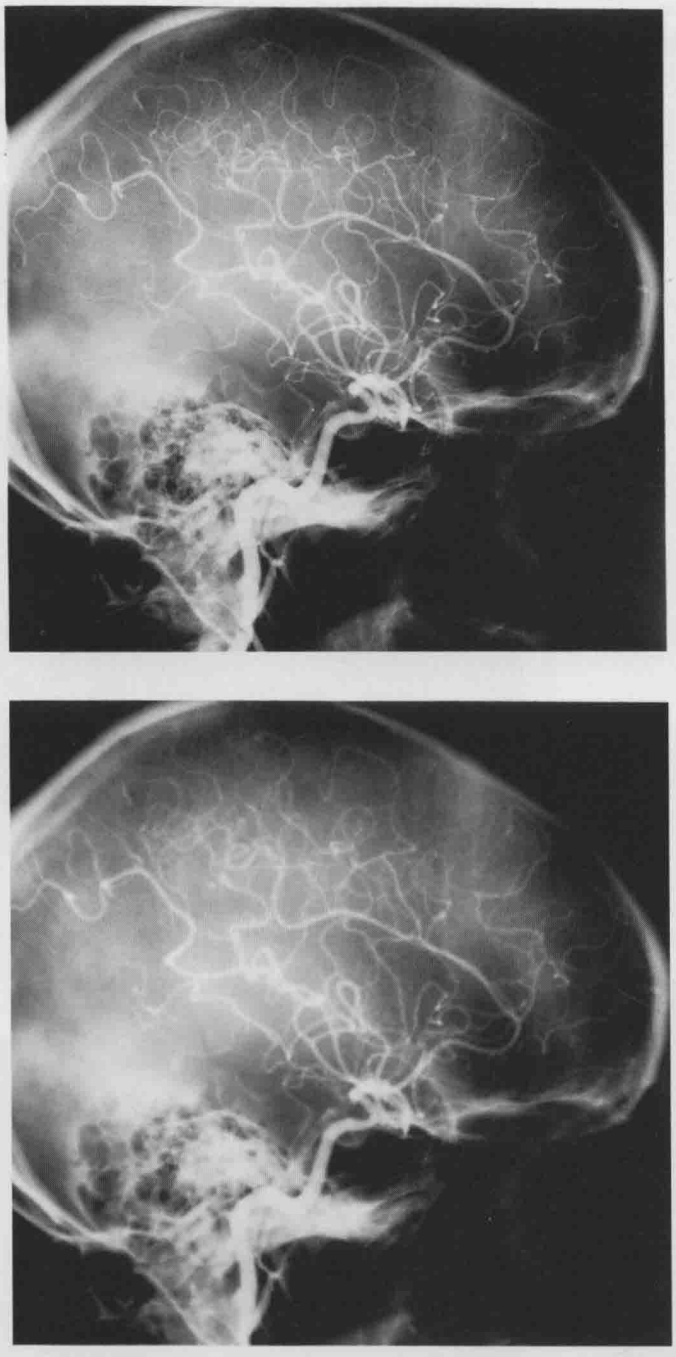


Fig. 1-3. Different levels of sharpness of details. **A,** Sharp image. **B,** Unsharp image.

(Courtesy Joyce Tarzewski, R.T.)

5. The sharpness of detail must be sufficient to clearly demonstrate the desired anatomic part. Sharpness of detail is controlled by several factors, which can be categorized as geometric factors, motion, and material. The importance of sharpness of detail is illustrated in Fig. 1-3.
6. The magnification in size of the body part must be evaluated and the controlling factors of object-film distance and SID considered. All radiographs yield some degree of magnification, because all body parts are three dimensional.
7. The shape distortion of the body part must be analyzed, and the controlling factors of direction of the central ray, central ray–film alignment, and part-film alignment must be studied. Shape distortion is often used to an advantage in radiography. An example of shape distortion is the axial projection of the cranium to demonstrate the occipital bone.

A sound knowledge of anatomy and the ability to analyze radiographs correctly are of particular importance to technologists who work where the radiologist is not in constant attendance. Under this condition the radiologist must be able to depend on the technologist to perform the technical phase of the examinations without aid.

Clinical History Needed by Technologist

The technologist is responsible for performing radiographic examinations according to the standard procedure, except when contraindicated because of the patient's condition. As the demands for radiologists' time increase, less time is available to devote to the technical phase of radiology. This makes the radiologist more dependent on the technologist to carry out this phase of patient care. This additional responsibility makes it necessary that the technologist know (1) normal anatomy and normal anatomic variations so that the patient can be accurately positioned, and (2) the radiographic characteristics of numerous pathologic conditions, that is, their effect on the normal radiopacity of structures, so that the exposure factors can be selected accordingly. Although the technologist is not responsible for explaining the cause, diagnosis, or treatment of disease, it is the technologist's responsibility to demonstrate the conditions radiographically.

When the radiologist cannot see the patient, the technologist is responsible for obtaining the necessary history and observing any apparent abnormality that might affect the radiographic result, such as jaundice in gallbladder examinations and surface masses that might cast shadows that could be mistaken for internal changes. When the technologist assumes this responsibility, the radiologist should give specific instructions as to the information desired.

The requisition received by the technologist should state the exact region to be radiographed and the suspected or existing patient diagnosis. The patient must be positioned and the exposure factors selected according to the region involved and the radiographic characteristics of the existent abnormality. The technologist must understand the rationale behind the examination; otherwise he or she cannot produce radiographs of the greatest possible diagnostic value. Having the information in advance saves the delay and expense of reexamination, not to mention the inconvenience and, much more important, the unnecessary radiation exposure to the patient.

Initial Examination

The projections taken for the initial examination of each body part are based on the anatomy and/or function of the part and the nature of the abnormality indicated by the clinical history. The projections used for the initial examination are usually held to the minimum required to detect any demonstrable abnormality in the region. Supplemental studies for further investigation are then made as indicated. This method or routine of performing each examination saves time, eliminates unnecessary radiographs, and reduces radiation exposure to the patient.

Diagnosis and the Technologist

It is quite natural for patients to be anxious about the result of their examinations and to ask questions. The technologist should tactfully advise the patient that the physician will receive the report as soon as the radiologist has interpreted the radiographs. Referring physicians are also prone to asking questions of the technologist, and it is recommended that the physician be referred to the radiologist.

Ethics in Radiologic Technology

Ethics is the term applied to the science of duty and right conduct toward others. The nature of the work in the medical profession requires that the rules of conduct be strict. The physician, being responsible for the welfare of the patient, must be able to depend on the absolute honesty of all health professionals in carrying out orders and in reporting any mistakes.

The "Code of Ethics" initially developed and adopted by The American Society of Radiologic Technologists identified ten ethical principles[1]. The Society's "Code of Ethics" in its present form follows[2]:

[1]"Code of Ethics," Radiol Technol 54:48, 1982.
[2]Radiol Technol 59(4):369, 1988.

Principle 1

The Radiologic Technologist functions efficiently and effectively, demonstrating conduct and attitudes reflecting the profession.

1.1 Responds to patient needs.
1.2 Performs tasks competently.
1.3 Supports colleagues and associates in providing quality patient care.

Principle 2

The Radiologic Technologist acts to advance the principle objective of the profession to provide services to humanity with full respect for the dignity of mankind.

2.1 Participates in and actively supports the professional organizations for radiologic technology.
2.2 Acts as a representative for the profession and the tenets for which it stands.
2.3 Serves as an advocate of professional policy and procedure to colleagues and associates in the health care delivery system.

Principle 3

The Radiologic Technologist provides service to patients without discrimination.

3.1 Exhibits no prejudice for sex, race, creed, religion.
3.2 Provides service without regard to social or economic status.
3.3 Delivers care unrestricted by concerns for personal attributes, nature of the disease or illness.

Principle 4

The Radiologic Technologist practices technology founded on scientific basis.

4.1 Applies theoretical knowledge and concepts in the performance of tasks appropriate to the practice.
4.2 Utilizes equipment and accessories consistent with the purpose for which it has been designed.
4.3 Employs procedures and techniques appropriately, efficiently and effectively.

Principle 5

The Radiologic Technologist exercises care, discretion and judgment in the practice of the profession.

5.1 Assumes responsibility for professional decisions.
5.2 Assesses situations and acts in the best interest of the patient.

Principle 6

The Radiologic Technologist provides the physician with pertinent information related to diagnosis and treatment management of the patient.

6.1 Complies with the fact that diagnosis and interpretation are outside the scope of practice for the profession.
6.2 Acts as an agent to obtain medical information through observation and communication to aid the physician in diagnosis and treatment management.

Principle 7

The Radiologic Technologist is responsible for protecting the patient, self and others from unnecessary radiation.

7.1 Performs service with competence and expertise.
7.2 Utilizes equipment and accessories to limit radiation to the affected area of the patient.
7.3 Employs techniques and procedures to minimize radiation exposure to self and other members of the health care team.

Principle 8

The Radiologic Technologist practices ethical conduct befitting the profession.

8.1 Protects the patient's right to quality radiologic technology care.
8.2 Provides the public with information related to the profession and its functions.
8.3 Supports the profession by maintaining and upgrading professional standards.

Principle 9

The Radiologic Technologist respects confidences entrusted in the course of professional practice.

9.1 Protects the patient's right to privacy.
9.2 Keeps confidential information relating to patients, colleagues and associates.
9.3 Reveals confidential information only as required by law or to protect the welfare of the individual or the community.

Principle 10

The Radiologic Technologist recognizes that continuing education is vital to maintaining and advancing the profession.

10.1 Participates as a student in learning activities appropriate to specific areas of responsibility as well as to the scope of practice.
10.2 Shares knowledge with colleagues.
10.3 Investigates new and innovative aspects of professional practice.

Care of Radiographic Examining Room

The radiographic examining room should be as scrupulously clean as any other room used for medical purposes. The mechanical parts of the x-ray machine, such as the table and tube stand, should be wiped with a clean, damp (not wet) cloth every day. The metal parts should be periodically cleaned with a disinfectant. The overhead system, x-ray tube, and other parts that conduct electricity should be cleaned with alcohol or a clean, dry cloth. Water is never used to clean electrical parts.

Cones, collimators, compression devices, gonad shields, and other accessories should be cleaned daily. The gummy residue left on cassettes and cassette stands by adhesive tape should be removed and the cassette disinfected. Cassettes should be protected from patients with bleeding, ulcerated, or other exudative lesions by use of protective covers. Stained and physically abused cassettes are inexcusable and do not represent a professional.

The radiographic room should be prepared for the examination before the patient is brought into the room. Fresh linen should be put on the table and pillow. Everything should be in place so that the room looks clean and fresh, not disarranged from the previous examination. The accessories to be used during the examination should be selected and placed nearby. These duties require only a few minutes but create a lasting impression on the patient.

Aseptic Technique

Technologists are engaged in caring for sick people and therefore should be thoroughly familiar with aseptic technique. They should know how to handle patients who are on precaution or isolation without contaminating their hands, clothing, or apparatus, and they should know how to disinfect these things when they do become contaminated. As one of the first steps in aseptic technique, the technologist's hands should be kept smooth and free from roughness or chapping by the frequent use of soothing lotions. Any abrasion should be protected by a bandage to prevent the entrance of bacteria. The hands should be washed after each patient and should be kept away from the face and head.

For the protection of the technologist's health, as well as that of the patient, the laws of asepsis and prophylaxis must be obeyed. Scrupulous cleanliness should be used in handling all patients, whether they are known to have an infectious disease or not. If the patient's head, face, or teeth are to be examined, the patient should see the technologist wash his or her hands. If this is not possible, the technologist should wash his or her hands and then enter the room drying the hands with a fresh towel. If the patient's face is to come in contact with the cassette front, he or she should see the technologist clean the front with alcohol, or it should be covered with a clean drape.

A sufficient supply of gowns and disposable gloves should be kept in the radiology department to care for infectious patients. After known or suspected infectious patients, the technologist must wash his hands in warm running water and soap-suds, rinse them, and dry them thoroughly. If the washbasin is not equipped with a knee control for the water supply, the valve of the faucet should be opened with a paper towel when the hands are contaminated. After proper hand washing, the valve of the faucet should be closed with a paper towel.

Before bringing isolation unit patients to the radiology department, the transporter should drape the stretcher or wheelchair with a clean sheet to prevent contamination of anything the patient might touch. When it is necessary to transfer these patients to the radiographic table, it should first be draped with a sheet. The edges of the sheet may then be folded back over the patient so that the technologist can position him or her through the clean side without becoming contaminated.

For the protection of cassettes when a non-Bucky technique is used, a folded sheet should be placed over the end of the stretcher or table. The cassette is then placed between the clean fold of the sheet, and, with the hands between the clean fold, the technologist can position the patient through the sheet. If the technologist must handle the patient directly, an assistant should position the tube and operate the equipment to prevent contamination.

When the examination is finished, the contaminated linen should be folded with the clean side out and returned to the unit with the patient. There it will receive the special attention given to linen used for these patients or be disposed of according to the established policy of the institution.

Disinfectants and Antiseptics

Chemical substances that kill pathogenic bacteria are classified as *germicides* or *disinfectants*. Chemical substances that inhibit the growth of, without necessarily killing, pathogenic microorganisms are called *antiseptics*. *Sterilization*, which is usually performed by means of heat, is the destruction of all microorganisms. Thus sterilization is the killing of all microorganisms, whereas disinfection is the process of killing only those which are pathogenic. The objection to many chemical disinfectants is that to be effective they must be used in solutions so strong that they damage the material being disinfected.

Because alcohol is commonly used in medical facilities, it should be noted that alcohol has antiseptic but not disinfectant properties.

Isolation Unit

When doing bedside work in an isolation unit, the technologist should obtain a gown, cap, mask, and, if necessary, gloves. If more than one radiograph is to be taken, the technologist stands the additional cassettes on paper towels outside the patient's room. The machine is taken into the room and manipulated into position. Care is taken not to let the machine touch the bed. The cassette is put in a clean pillowcase (a clean case for each cassette used), and an assistant performs the contamination work of adjusting the cassette and patient. If it is not possible to have an experienced technologist assist when the position is an exacting one necessary adjustments are made on the control panel and tube, and the machine is operated through a clean cloth. Care is taken not to let the contaminated side of the cloth come in contact with the equipment.

When the exposures have been finished, the mask, cap, and gown are removed and placed in the precaution hamper. The technologist washes his or her hands before leaving the room. The cable of the x-ray machine, which has of necessity been on the floor, must be wiped with a disinfectant solution.

Operating Room

Aseptic technique is a fixed habit with nurses, but technologists who have not had extensive nursing education must exercise constant watchfulness to avoid doing anything that will contaminate sterile objects in the operating room. After putting on scrub clothing, cap, and mask the technologist should step into the operating room to survey the particular setup before taking in the x-ray equipment. By taking this precaution the technologist can make sure that sufficient room is available to do the work without danger of contaminating anything. If necessary the technologist asks the circulating nurse to move such items as the sterile-bowl stand. Because of the danger of contamination of the sterile field, sterile supplies, or persons scrubbed for the operation, the technologist should never approach the operative side of the table.

After checking the setup, the technologist should take the x-ray machine in on the free side of the operating table, that is, the side opposite the surgeon, scrub nurse, and sterile layout. The machine should be maneuvered into a position that will make the final adjustments easy when the surgeon is ready to proceed with the examination. Needless to say, the x-ray equipment should be thoroughly wiped with a damp (not wet) cloth before it is taken into the operating room. The cassette is placed in a sterile pillowcase or other sterile covering, depending on the type of examination to be performed. The surgeon or one of the assistants holds the sterile case open while the technologist gently drops the cassette into it, being careful not to touch the sterile case. The technologist may then give directions for positioning and holding the cassette for the exposure.

The technologist should make the necessary arrangements with the operating room supervisor when performing work in the operating room that requires the use of a tunnel or other special equipment. The cassette tunnel or grid should be placed on the table when it is being prepared for the patient, with the tray opening to the free side of the table. With the cooperation of the surgeons and operating room supervisor, a system can be developed whereby radiographic examinations can be performed in the operating room accurately and quickly, without moving the patient or endangering the sterile field.

Minor Surgical Procedures in Radiology Department

Many procedures that require a rigid aseptic technique, such as cystography, intravenous urography, spinal punctures, angiography, and angiocardiography, are often carried out in the radiology department (Fig. 1-4). Although the radiologist needs the assistance of a nurse in certain of these procedures, the technologist can make the necessary preparations and give sufficient assistance in others.

For procedures that do not require a nurse, the technologist should know what surgical instruments and supplies are needed and how to prepare and sterilize them. Nonnurse technologists should make arrangements with the surgical supervisor for the training necessary to carry out these procedures. Adequate training in aseptic technique and dressings can be given in a rather short time.

Procedure Book

There should be a procedure book covering each specialized examination performed in the radiology department. Under the appropriate heading, each procedure should be outlined and state the staff required and the duties of each member of the team. There should be a listing of the sterile and nonsterile items. A copy of the sterile instruments required should be given to the supervisor of the central supply room to facilitate preparation of the trays for each of the different procedures.

Bowel Preparation

Radiographic examinations involving the abdomen often require that the entire colon be cleansed before the examination to obtain diagnostic quality radiographs. The patient's colon may be cleansed by one or any combination of the following: limited diet, laxatives, and enemas. The technique used to cleanse the patient's colon is generally selected by the medical facility or physician.

Fig. 1-4. Many radiologic procedures require that strict aseptic technique be followed, as seen in this procedure involving passing a catheter into the patient's femoral artery.