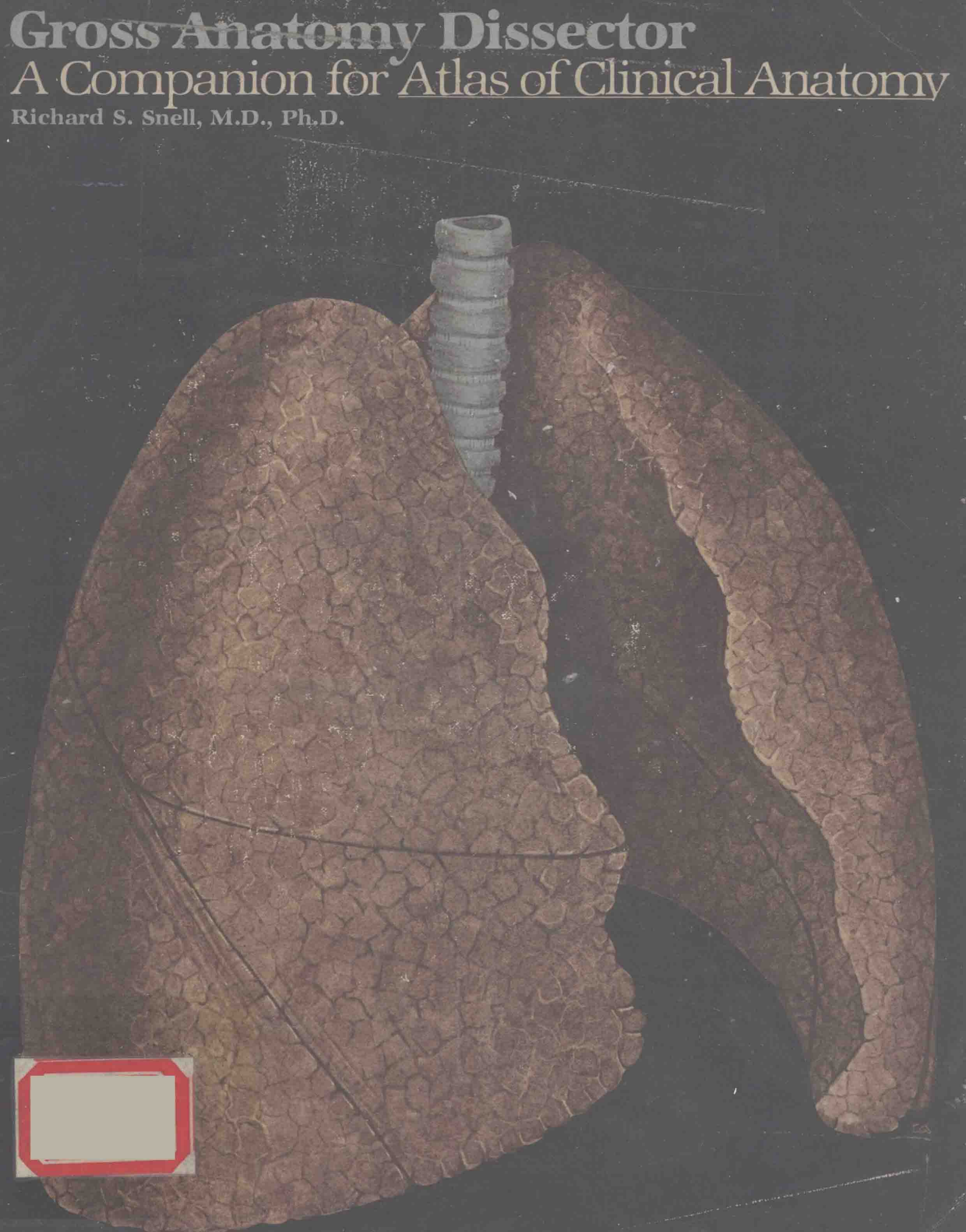
Gross Anatomy Dissector

A Companion for Atlas of Clinical Anatomy

Richard S. Snell, M.D., Ph.D.



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To My Students—

Past, Present, and Future

Gross Anatomy Dissector

A Companion for Atlas of Clinical Anatomy

By the same author

Atlas of Clinical Anatomy, 1978
Clinical Anatomy for Medical Students, 1973
Clinical Embryology for Medical Students, Second Edition, 1975
An Atlas of Normal Radiographic Anatomy (with Alvin C. Wyman, M.D.), 1976

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Preface

No one can deny that the only way really to learn gross anatomy is by dissection of the cadaver. Unfortunately, a modern medical curriculum does not allow sufficient time for a student to carry out a worthwhile dissection of the entire human body. Many schools compromise by asking the students to dissect carefully those areas of the body that are commonly diseased, and the remainder of the information is learned from a cursory dissection, or, at best, from prosected parts.

The purpose of this dissector is to guide the student through the dissection of the body, placing emphasis on the clinically important areas. The instructions are concise, and simple illustrations are used in difficult areas. Wherever possible, references are made to the illustrations in my *Atlas of Clinical Anatomy*,* which has been written so that the different regions may be dissected in any sequence. Detailed instruction for dissection of the brain is not within the scope of this book. Blank pages have been left at the end of each chapter so that the student may insert notes or additional instructions from his mentor.

*Richard S. Snell, *Atlas of Clinical Anatomy* (Boston: Little, Brown and Company), 1978.

A medical student should regard the opportunity to dissect the human body as a rare privilege. It is a unique opportunity to study in detail structures that throughout the greater part of his professional life he will be examining by inspecting the overlying skin, by percussion, and by auscultation. For this reason he should try to relate deep structures to important landmarks seen on the surface.

I extend sincere thanks to Terry Dolan, Myra Feldman, and Virginia Childs, my artists, for their careful interpretation of rough sketches for the illustrations and for their diligence in executing the final artwork. Special thanks go to Mrs. Amy Pursel for her skill and patience in typing the manuscript.

Finally, to the staff of Little, Brown and Company, I wish to express my gratitude and thanks, once again, for their assistance throughout the preparation of this book.

R. S. S.

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THE DISSECTING LABORATORY

It should be remembered that as a medical student you are specially privileged to be able to dissect the human body. A large proportion of the cadavers have been willed to the medical school in order that you may learn the structure of the body and so be able to treat the sick. These people have given of themselves so that you may learn. Please respect the material that you are dissecting at all times. It is advisable to wear long white coats to protect your clothes. Be sure to wash your hands carefully before using doorknobs, chalkboards, and audiovisual materials.

The dissecting tables should be cleaned at regular intervals, and worn-out scalpel blades should be disposed of in specially provided containers. All scraps of human anatomical material should be placed in the containers provided. Loose fatty tissue inadvertently dropped on the floor should be picked up immediately and the floor mopped.

Although most embalming fluids contain antiseptic, any cut or small injury should be attended to promptly and thoroughly washed with soap and water. First-aid kits should be available in the laboratory. An instructor should be notified of any accident.

CARE OF THE CADAVER

Students assigned to a cadaver are held responsible for its care once the dissecting program has commenced. Although the body has been preserved or embalmed, there is a great tendency for the different parts to dry out by evaporation, change color, and become hard. If a part dries out, especially the face, hands, external genitalia, and feet, it can never be restored by wetting down, and dissection is impossible. The following methods for preservation of dissected specimens have been found to be successful and should be closely followed:

1. Never expose more of the cadaver than necessary for study. Keep the remainder, especially dissected areas, covered with *moist* cheesecloth and, if possible, enclosed in a plastic bag.
2. Whenever possible, preserve the skin and superficial fascia, as these are ideal coverings for the part under dissection.
3. While dissecting, keep the part moist (but not soggy) by sprinkling with a wetting solution that will be available in the laboratory.
4. When leaving at the end of the day, make certain that all parts are properly wrapped in wet cheesecloth, and if the dissecting tables have lids, make sure that they are securely closed.
5. Periodically inspect the cadaver for fungus growth. This growth very occasionally occurs and should be reported to the curator so that measures may be taken to curb it.

Failure to look after your cadaver by neglecting to follow these simple instructions may jeopardize your work and waste important anatomical material.

DISSECTING TEAM

A group of students will be assigned a cadaver. The method of dissecting the body is a regional one. Your instructor will inform you of the region to be dissected and the date by which the dissection must be completed. It is important that the dissecting team work efficiently and well together and that each member does his share of the work. Moreover, each student must have the opportunity to follow the dissections as they proceed. As a general approach to laboratory activity, it is suggested that one member of the team should dissect and one member should read aloud the dissecting instructions, while the third member supplements the instructions with pertinent information from textbooks, atlases, etc. Responsibility for dissection should be rotated daily to assure that each student has the opportunity to dissect a portion of the body. Above all, work efficiently and do not waste time. A sound knowledge of

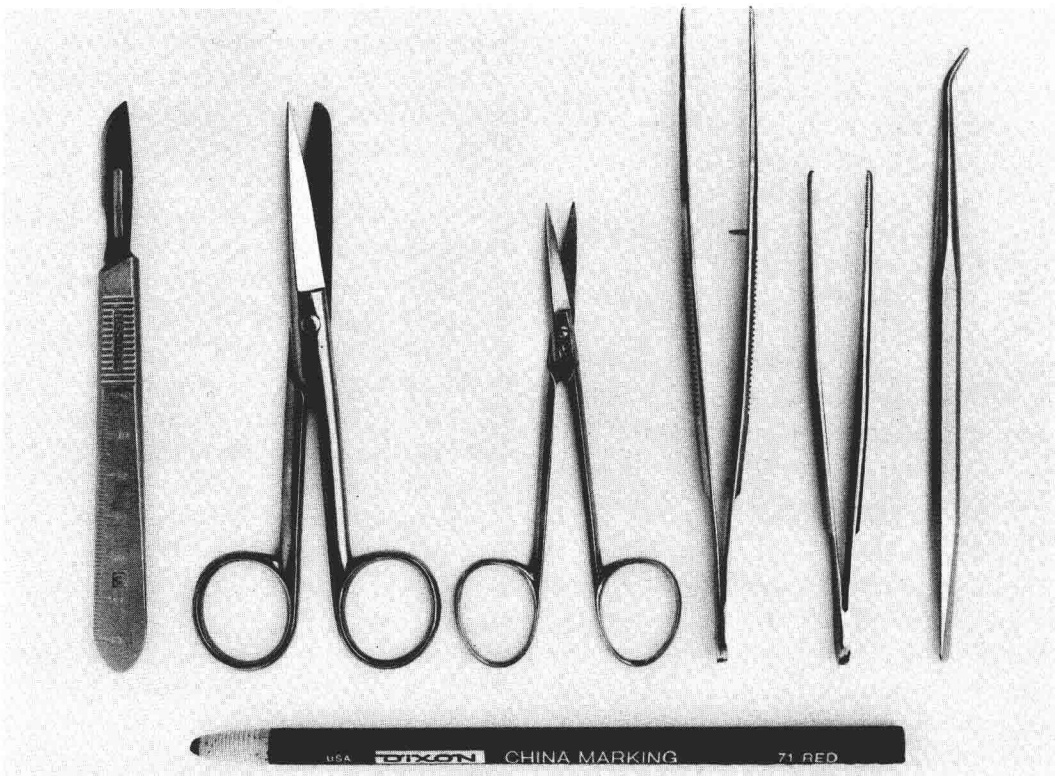

Fig. 1
Suitable dissecting instruments and grease pencil.

anatomy cannot be obtained by rushing through the dissection just before an examination.

DISSECTING EQUIPMENT

The dissector should have the following instruments (Fig. 1):

1. One scalpel handle with detachable knife blades. The blades should be medium-sized and of the rounded type. The blade must be sharp. You cannot do a good dissection with a blunt knife.
2. One pair of large dissecting scissors with one blade having a rounded end.
3. One pair of small, fine scissors with sharp ends.
4. One pair of large forceps with blunt ends and ridged gripping surfaces.
5. One pair of fine forceps with blunt ends and ridged gripping surfaces.
6. One metal probe with a blunt bent tip.
7. One grease pencil for skin marking.

SUGGESTIONS FOR DISSECTION

A motorist or hiker traveling across country with which he is not familiar will invariably study a map of the area beforehand. He does this for two reasons: so that he will not get lost, and so that he will be able to observe places of interest on the way. For the same reasons, a medical student should never start to dissect a region of the body without first thoroughly reading about the area in a textbook and then studying it in a good atlas of gross anatomy. After all, the purpose of dissection is to enable you to obtain a three-dimensional approach to the structures of the body, and blindly blundering through an area of the body with a sharp scalpel is not going to enable you to achieve this. Your finished dissection should clearly show the important structures present. The nerves, arteries, muscles, etc. should have been cleaned and all fat and loose connective tissue and small veins removed. Only by having the size, extent, and relations of the various structures clearly defined will you, the fu-

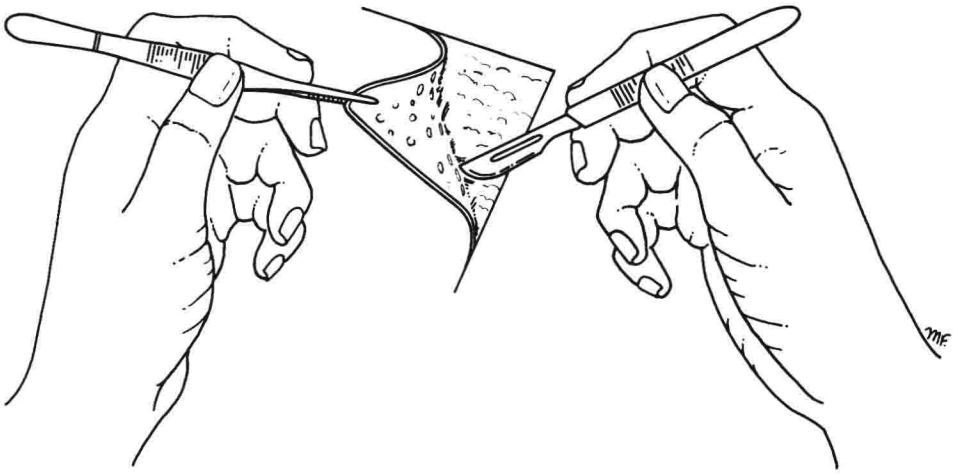

Fig. 2
Technique for removing the skin.

ture physician, be able to recall the information on a later occasion in a clinical setting.

METHOD OF DISSECTION

The technique of human dissection requires patience and a certain degree of skill. Beginning students are, not surprisingly, hesitant, but they soon learn to work quickly and efficiently. Most instructors start the class on dissections in which fine, easily destroyed structures are absent. By the time the head and neck region is reached, most students are competent dissectors, and this skill will prove invaluable later when performing minor surgery.

Read the dissecting instructions carefully and identify the surface landmarks specified. Mark out on the skin the line of the incision to be made, either by scratching the skin with the back of the scalpel or by using a skin pencil. Incisions should be made with great care. Insufficient depth in making incisions is misleading, time-consuming, and frustrating, while too great a depth destroys underlying structures.

Immediately beneath the skin is the superficial fascia or subcutaneous fatty tissue. In this lie the cutaneous nerves and blood vessels, and therefore it should be left behind. Having made the incision through the skin, grip the edge of the skin with large forceps and apply strong traction to it (Fig. 2). Now carefully peel back the skin flap, directing the cutting edge of the knife against it. In this manner the bundles of collagen connecting the dermis of the skin to deeper structures are severed, thus freeing up the skin. The main trunks of the nerves and blood vessels, especially the veins, should now be identified in the flap of subcutaneous tissue. This is best accomplished by pressing the edge of the scalpel handle or the edge of the forceps into the fat and firmly stroking it in the direction of the long axis of the structures

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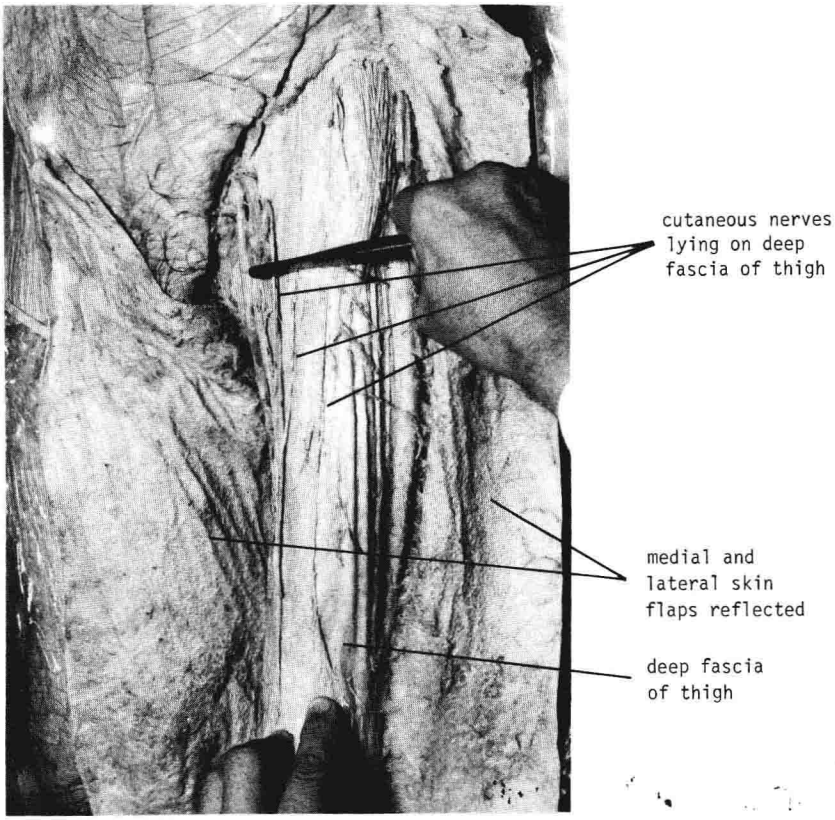

Fig. 3
The cutaneous nerves are best displayed by pressing the edge of the handle of the forceps into the fat of the superficial fascia and pushing the semiliquid fat to the sides, leaving the cutaneous nerves lying on the deep fascia.

that you are looking for. By this means the semiliquid fat is pushed to one side and discarded, leaving the superficial nerves and blood vessels lying on the deep fascia (Fig. 3).

When looking for structures enmeshed in connective tissue fat or fascia, use your forceps or the handle of the scalpel (Fig. 4). The cutting edge of the blade of the scalpel is rarely necessary. Structures can often be separated from one another by gently inserting the ends of the scissor blades between the structures and forcing the blades apart (Fig. 5).

Having identified all the main structures in the region that you are dissecting, clean each structure thoroughly. The fat and connective tissue must be picked away or carefully cut away in order to see and appreciate the structure you are studying. A clean dissection in which the structures are properly identified will be remembered; a poor dissection in which numerous structures have been cut or pulled out of position or one that is still obscured by connective tissue is useless as a learning exercise. In fact, it may cloud the theoretical knowledge that you have already acquired from the textbooks.

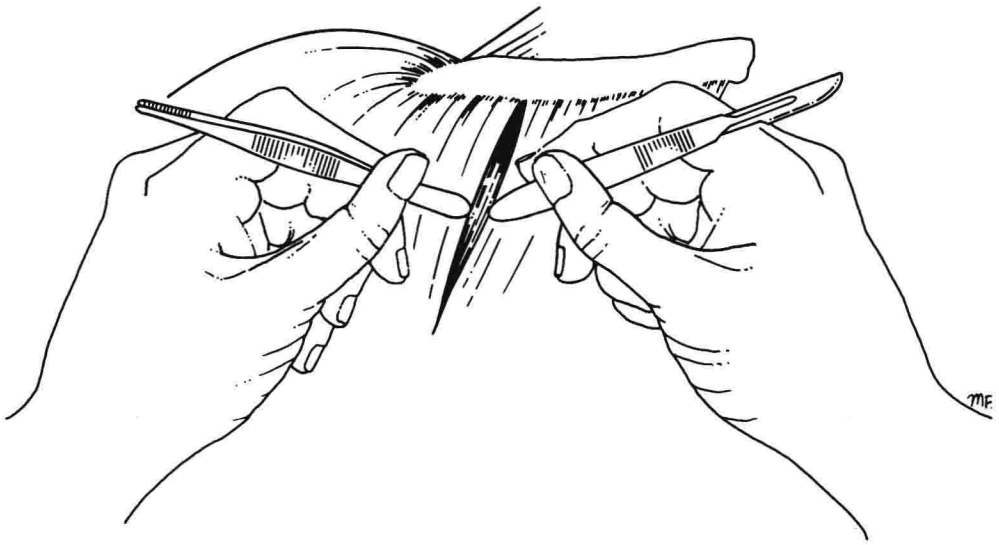

Fig. 4
When looking for structures enmeshed in connective tissue, fat, or fascia, use your forceps or handle of the scalpel to separate tissues rather than using the blade of the scalpel.

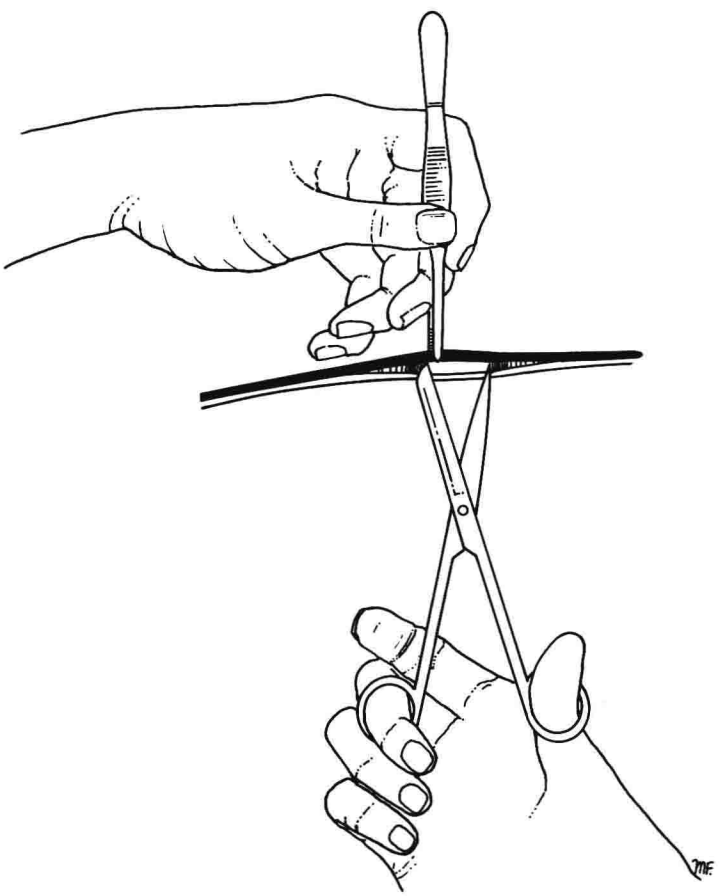

Fig. 5
Structures can often be separated from one another by gently inserting the ends of the scissor blades between the structures and forcing the blades apart.

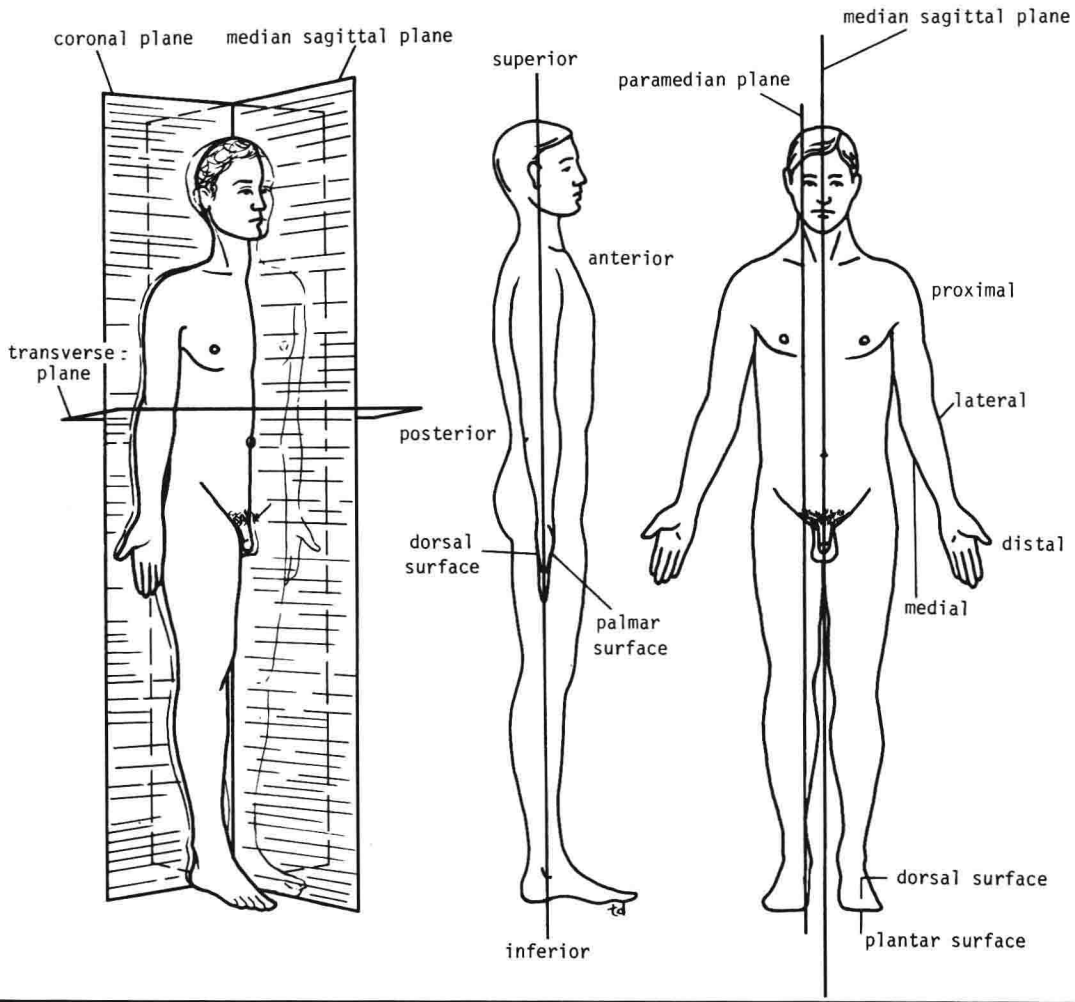

Fig. 6
Anatomical terms used in relation to position. Note that subjects are standing in anatomical position. (From Snell's *Clinical Anatomy*.)

VARIATIONS OF THE NORMAL

Descriptive gross anatomy tends to concentrate on a fixed descriptive form. A physician must always remember that there are sexual and racial differences and that the body structure changes as it grows and ages. This dissecting manual describes the most usual arrangement found in a normal adult. Variations in the arrangement of veins are common, arteries may arise from trunks other than those described, organs may have a different size or shape or, as the result of a congenital defect, they may be absent or found in an abnormal position. Muscles may be absent or have extra heads of origin. Moreover, the cause of death or previous disease may have changed the normal anatomy. Clearly, a student studying human anatomy for the first time cannot be expected to learn in the allotted time all the known variations of the normal. Once the dissection of a particular region in his cadaver is completed, however, it would benefit him greatly to examine the same regions in other dissected cadavers in the dissecting laboratory. He will then remember the usual arrangement found in the normal adult but will be aware of some of the variations. This information will be invaluable in clinical practice.

DESCRIPTIVE ANATOMICAL TERMS

Terms Related to Position. All descriptions of the human body are based on the assumption that the person is standing erect, with the arms by the sides and the face and palms of the hands directed forward (Fig. 6). This is the so-called

anatomical position. The various parts of the body are then described in relation to certain imaginary planes.

The *median sagittal plane* is a vertical plane passing through the center of the body, dividing it into equal right and left halves (Fig. 6). Planes situated to one or the other side of the median plane and parallel to it are termed *paramedian*. A structure situated nearer to the median plane of the body than another is said to be *medial* to the other. Similarly, a structure that lies farther away from the median plane than another is said to be *lateral* to the other.

Coronal planes are imaginary vertical planes at right angles to the median plane (Fig. 6). *Horizontal or transverse planes* are at right angles to both the median and coronal planes (Fig. 6).

The terms *anterior* and *posterior* are used to indicate the front or back of the body, respectively (Fig. 6), so that when describing the relationship of two structures, one is said to be anterior or posterior to the other insofar as it is closer to the anterior or posterior body surface.

In describing the hand, the terms *palmar* and *dorsal surfaces* are used in place of anterior and posterior; and in describing the foot, the terms *plantar* and *dorsal surfaces* are used instead of lower and upper surfaces (Fig. 6). The terms *proximal* and *distal* describe the relative distances from the roots of the limbs; for example, the arm is proximal to the forearm and the hand is distal to the forearm.

The terms *superficial* and *deep* denote the relative distances of structures from the surface of the body, and the terms *superior* and *inferior* denote levels relatively high or low with reference to the upper and lower ends of the body.

The terms *internal* and *external* are used to describe the relative distance of a structure from the center of an organ or cavity; for example, the internal carotid artery is found inside the cranial cavity and the external carotid artery is found outside the cranial cavity.

The term *ipsilateral* refers to the same side of the body; for example, the left hand and left foot are ipsilateral. *Contralateral* refers to opposite sides of the body; for example, the left biceps brachii muscle and the right rectus femoris muscle are contralateral.

The *supine position* of the body is lying on the back. The *prone position* is lying face downward.

Terms Related to Movement. The site where two or more bones come together is known as a *joint*. Some joints have no movement (sutures of skull), some have only slight movement (superior tibiofibular joint), and some are freely movable (shoulder joint).

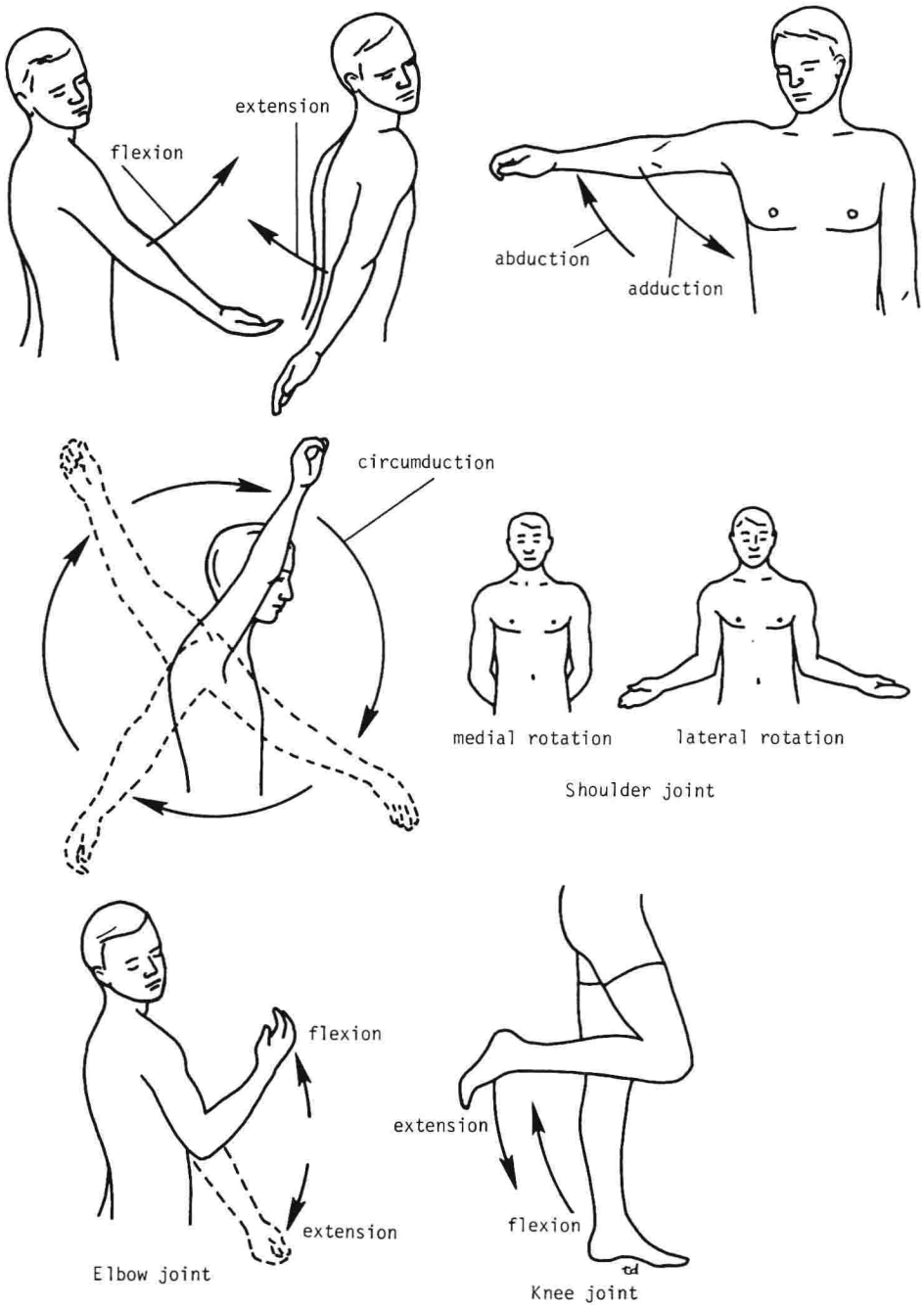

Fig. 7
Some anatomical terms used in relation to movement. Note difference between flexion of elbow and knee. (From Snell's *Clinical Anatomy*.)

Flexion is a movement that takes place in a sagittal plane; it is usually an anterior movement, but it is occasionally posterior, as in the case of the knee joint (Fig. 7). *Extension* means straightening the joint, and it usually takes place in a posterior direction (Fig. 7). *Lateral flexion* is a movement of the trunk in the coronal plane (Fig. 8).

Abduction of a limb is the movement away from the midline of the body in the coronal plane (Fig. 7). *Adduction* of a limb is the movement toward the body in the coronal plane (Fig. 7). In the fingers and toes, abduction is applied to the spreading of these structures, and adduction is applied to the drawing together of these structures (Fig. 8).

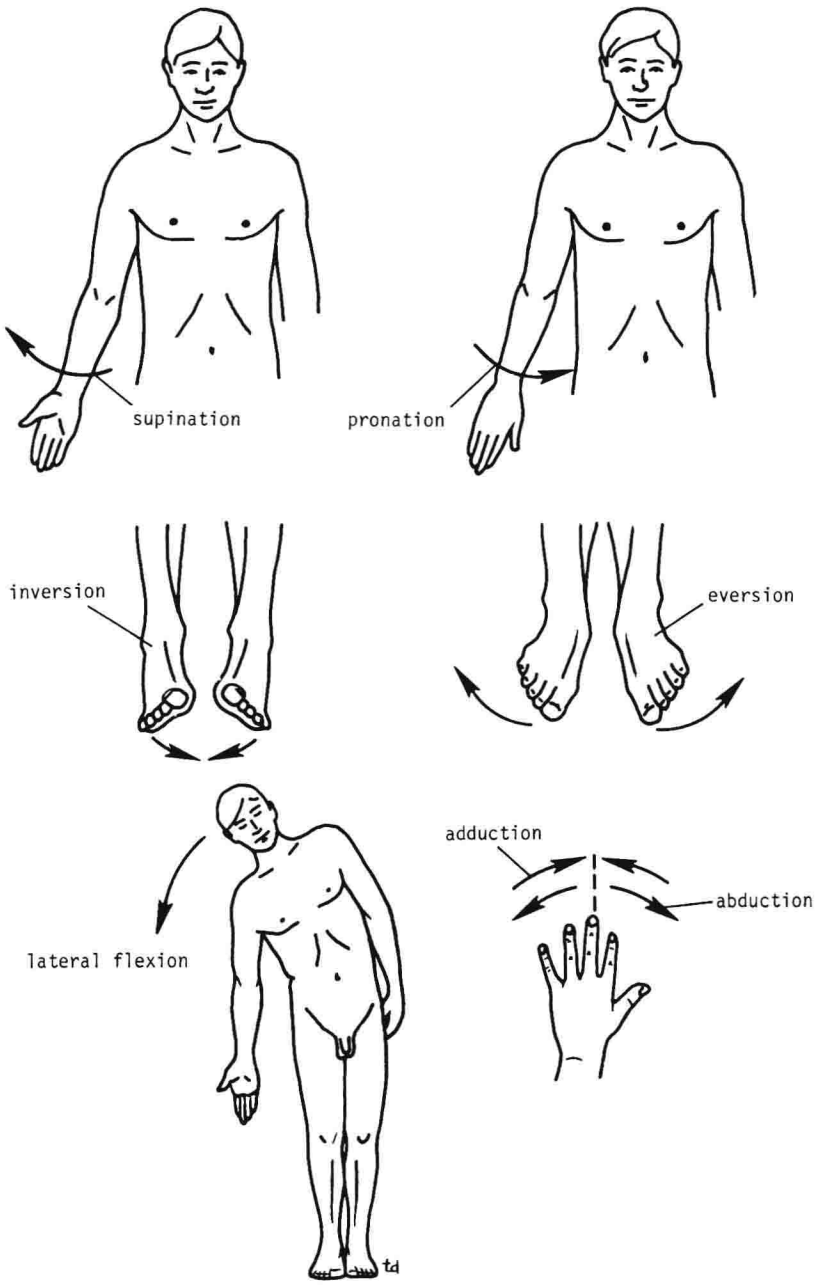

Fig. 8
Additional anatomical terms used in relation to movement. (From Snell's *Clinical Anatomy*.)

Rotation is the term applied to the movement of a part of the body around its long axis. *Pronation* of the forearm is a medial rotation of the forearm in such a manner that the palm of the hand faces posteriorly (Fig. 8). *Supination* of the forearm is a lateral rotation of the forearm from the pronated position, so that the palm of the hand comes to face anteriorly (Fig. 8).

Circumduction is the combination in sequence of the movements of flexion, extension, abduction, and adduction (Fig. 7).

Protraction is to move forward; *retraction* is to move backward (used to describe the forward and backward movement of the jaw at the temporomandibular joints).

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