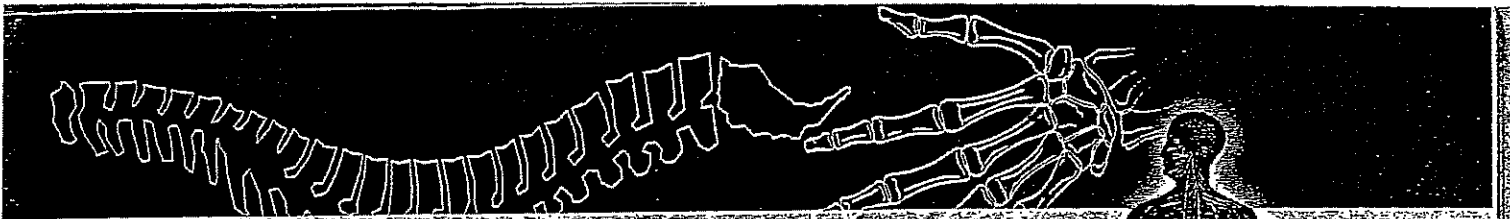


Honors Human Anatomy and Physiology-Summer Assignment

1. Read Chapter 1. This chapter is learning about a lot of the terminology that we will be using constantly throughout the year. When the school year starts, within the first two weeks, we will be having quizzes on the Chapter.
2. Vocabulary Assignment: All of the vocabulary words you need are found in the margins on the pages and defined. You are to handwrite the vocabulary words and define each term using the definitions in the margins. Make sure to number the words and underline the vocabulary terms.
3. Concept Check Assignment: Throughout the chapter, there are concept check questions. You are to do them all. Write the page number, write each question, and underneath each question, in complete sentences, answer the question.
4. Complete the workbook questions in the packet for pages 1 and 6-8 (practical application questions).

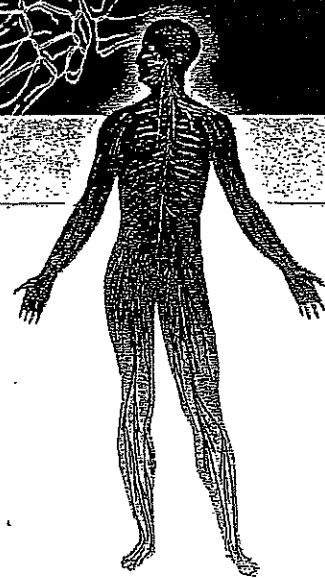
Summer Assignment is due by the start of class of the second day of school.



CHAPTER

1

OVERVIEW OF THE BODY



Completion

Complete the following sentences by filling in each blank with a key term from the text.

1. Anatomical study can be divided into areas of _____ anatomy and _____ anatomy.
2. The anatomical and physiological study of human disease is called _____.
3. The terms that describe the way a body can be divided into parts by imaginary cuts for viewing are known as _____.
4. The terms medial, superior, and distal are examples of terms of _____.
5. A movement term that describes the opposing movement of another part is said to be _____.
6. Body region terms can be divided into three categories known as _____, _____, and _____.
7. The terms superficial and deep belong to the above category (in No. 6) of _____.
8. The term umbilical is the name of one of the _____.
9. The two major anterior body cavities are the _____ and _____, and the two posterior are the _____ and _____.
10. The thoracic cavity can be further divided into the _____ and _____ cavities.



INTRODUCTION

Key Terms: anatomy, developmental anatomy, embryology, fine (microscopic) anatomy, gross anatomy, morphology, pathology, physiology

The field of medicine is filled with loads of seemingly incomprehensible and almost unpronounceable technical terms. These terms are not meant to confuse people. Actually, they were developed to help medical practitioners and scientists to better communicate information about the body. Your friends may not understand you after telling them that their feet are inferior to their head. They may think this means the head is more valuable than the feet. However, a physician or scientist would without a doubt know that you meant that the feet are positioned below the head. People working in the health and medical fields must be able to communicate consistently, using the accepted terminology to be effective on the job.

It is first important to know and understand the terms **anatomy** and **physiology** found in the title of this book. These terms distinguish body structure from body function. Anatomy is best defined as the structural make-up of an organism such as a human. Viewing the body with your eyes or with special instruments that magnify or see into body parts is the major means of investigating anatomy. The term anatomy comes from the Greek word *anatome* or *ana-temnein*, meaning to cut (*temnein*) apart (*ana*). Anatomy in ancient times was studied by cutting up a body. The term **morphology** is commonly used in medical reports in place of the term anatomy. Morphology refers to the differences and similarities in the anatomy of individuals. It also takes into account how body structures form from birth or take on different appearances in response to damage or disease.

Anatomy The structural make-up of an organism

Physiology The functions of an organism

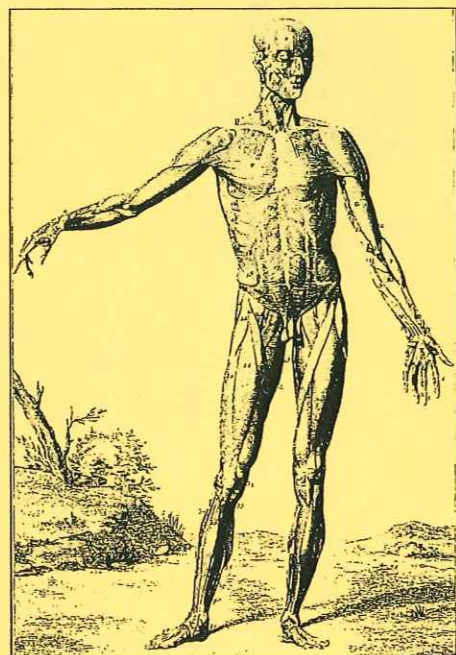
Morphology The structural make-up of an organism, referring to differences and similarities in anatomy

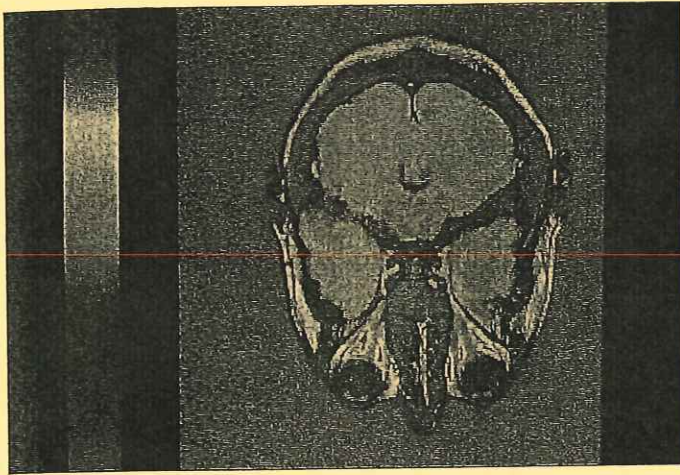
Fine (Microscopic) Anatomy The study of anatomy concerned with microscopic features of the body

Gross Anatomy The study of anatomy concerned with the features of the body visible to the naked eye

ROOTS OF ANATOMY

Modern anatomical studies involve the use of powerful microscopes and specialized imaging machines to produce detailed information about body structures. However, all of this technology is simply a follow-up of anatomical investigations carried out by the Greek scientists Alcmaeon and Empodocles in the 5th century BC. They produced detailed drawings of the human body. Hippocrates, another Greek scientist who lived from 460 to 377 BC, used anatomical studies to better explain medical conditions and treatments. However, all of their work was constrained by the fact that they were not allowed to cut open the human body. So, in the 3rd century BC, the philosopher Aristotle studied the internal structures of animals to better understand humans. It was not until 300 BC that Herophilus and Erasistratus performed the first internal studies on humans. In effect, they were truly the originators of anatomy because they cut (*temnein*) apart (*ana*) the body. Society changed its ideas

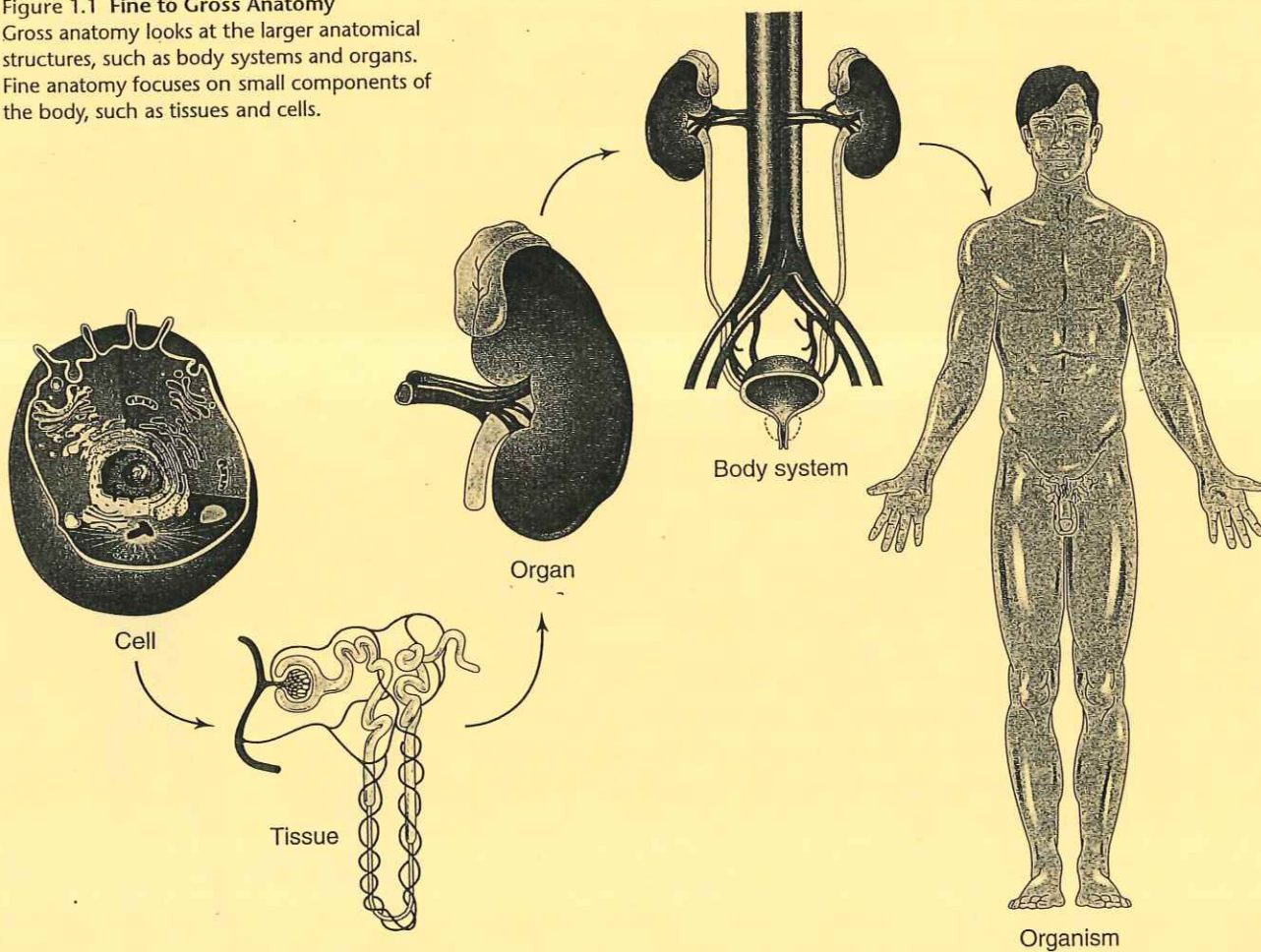




about the sacredness of the human body, giving Herophilus and Erasistratus the opportunity to do their work. It was not until the 13th century that a bulk of fine anatomy and physiology work was conducted by scientists throughout Europe. They were helped by Islamic scholars who were able to interpret ancient Greek anatomy documents that made their way to the Middle East.

Many medical practitioners and scientists divide the study of anatomy into **fine anatomy** and **gross anatomy** (Figure 1.1). Fine anatomy examines microscopic features of the body. This is usually performed with laboratory

Figure 1.1 Fine to Gross Anatomy
Gross anatomy looks at the larger anatomical structures, such as body systems and organs. Fine anatomy focuses on small components of the body, such as tissues and cells.



Civic Responsibility

HELPING OTHERS WITH YOUR KNOWLEDGE

It is valuable to use what you have learned about anatomy and physiology terms to help others better understand the world around them. It is very important to check your facts and seek further information about certain topics before discussing health and science issues. Here are some suggestions to foster a better public awareness of anatomy and physiology terminology:

1. Assist people who are not native English speakers with anatomy and physiology terms.
2. Work with sports clubs to educate players about body terminology associated with sports injuries.
3. Help elderly persons to better understand the terms used by nurses, therapists, and physicians.
4. Volunteer at a school health day to teach children body-part terms.

Embryology The study of the anatomical changes that occur during the growth of an embryo

Developmental Anatomy The study of anatomical changes that occur during the growth of a human being

Pathology The study of human diseases

instruments, such as microscopes and imaging machines (Figure 1.2). The fine anatomy of body structures is often used to investigate the cause of disease and bodily injury. Gross anatomy deals with larger parts of the body that are easily viewed with naked eye. Imaging equipment can also be used to study gross anatomy features inside the body. Gross anatomy studies provide the first indication that something may be wrong with the body. The term **embryology**, or **developmental anatomy**, is also commonly encountered in health professions. It is the investigation of the anatomical changes that take place during human growth, first as an embryo (embryology), and then after birth (developmental anatomy).

The term physiology refers to the function and role of anatomical features. It investigates the chemical reactions that make the body function. Physiology comes from the Greek words *physis* and *logos*. *Physis* means the nature of something, whereas *logos* means to study or investigate. So, physiology literally means looking at the characteristics of how body parts carry out their jobs. Physiology can be studied on fine or gross anatomical parts. Gross physiology studies, like gross anatomy, provide the first clues for the causes of disease. Likewise, fine physiology investigations reveal detailed information about the body parts affected by disease. Physiology can be investigated by observing changes to the fine and gross anatomical features. However, this method is not always accurate and does not provide many of the details needed to fully understand the body. So, specialized chemical investigations carried out in laboratory tests were developed to better understand physiology. A related term, **pathology**, is used to describe anatomical and physiological studies of human disease. Pathology comes from the Greek term *pathos*, meaning pain or suffering.



Figure 1.2 Microscope
Microscopes are the basic instruments for studying fine anatomy.



✓ Concept Check

1. Define the term anatomy.
2. What is the difference between the study of fine anatomy and gross anatomy?
3. What is the difference between the terms embryology and morphology?
4. Distinguish the difference between the terms physiology and pathology.

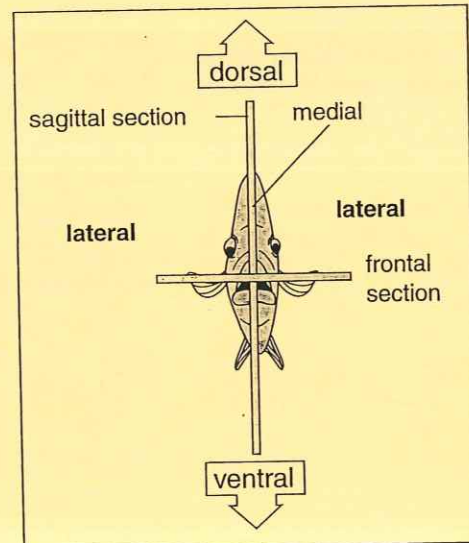
DISCOVERY SCENE PLEASE ENTER DISCOVERY SCENE PLEASE ENTER



What terms covered so far may help you solve the CSI? Do you see a need for any of the terms in explaining the body damage and problems associated with the injury?

CONFUSING POINTS OF REFERENCE

Veterinarians, or doctors of veterinary medicine, are skilled in the care of animals and have to learn orientation terms unique to animals. Most of the terms are similar to those used to explain human physical orientation. However, these terms do not necessarily have the same meaning when referring to animals as they do when viewing the human body. Compare the illustration of the fish shown here to the human diagram in Figure 1.4. In fish and four-legged animals, an anterior view of the animal means you are looking mostly at the face. The belly, or ventral view, cannot fully be seen. Note that in humans the anterior view shows the complete ventral view of the person as well as the face. In the same fashion, the posterior view of the fish shows only the tail, while in humans, it includes the "tail end" and the entire back, or dorsal, region. Veterinarians have to be very specific when describing the physical orientation of the animals they care for. Professionals working with people are free to interchange the term anterior with ventral, and posterior with dorsal.



HUMAN BODY ORIENTATION

If a doctor asked you to "please lie down facing up," it is obvious what he or she is asking. However, if she says, "please get in a supine position," you might be confused. Body orientation and positioning, as well as anatomical parts, have a specialized terminology that communicates precise information in the health and medical fields. People carrying out a variety of tasks related to healthcare and medical practices need to understand the different ways patients are positioned for various medical procedures and therapeutic practices. These terms are commonly seen in instructions for client or patient care as well as in reports describing medical conditions.



Direction

Key Terms: coronal plane, cephalic, cranial, caudal, directional planes, directional orientation, distal, frontal plane, inferior, lateral, medial, midsagittal plane, proximal, sagittal plane, superior, transverse plane

Body direction is divided into two sets of terms referring to **directional orientation** and **directional planes**. Directional orientation refers to the particular view you see of a person, for example, the face or the back of the head. Directional planes include a series of terms that describe the way a body can be divided into parts for viewing surface features or internal structures.

Directional Orientation Refers to the view one has of a person

Directional Planes A series of terms that describe the way a body can be viewed and divided

Medial Nearest to the midline of the body

Lateral Furthest from the midline of the body

Superior Nearest to the head

Cephalic Pertaining to the head

Cranial Pertaining to the head

Inferior A body part that is below another

Caudal Meaning near the tail

Distal A body part located far from an attachment point

Proximal A body part located near an attachment point

Anterior Meaning toward the front

Ventral In humans, toward the front. In other animals, refers to the belly

Posterior Toward the back

Dorsal Toward the back

Directional Orientation Figure 1.3a shows a front view of a person standing in the customary anatomical position. Note how his arms are placed with his palms forward. From this view, the midline of the body can be seen. It is an imaginary line that runs up and down through the center of the body. Body parts closest to the body's midline are said to have a **medial** orientation. Thus, by looking at this figure, it can be said that the nose is medial in location to the ears. Likewise, the pinky finger is medial to the thumb. **Lateral** refers to structures away from the midline. Thus, the ears are lateral to the nose, and the thumb is lateral to the little finger.

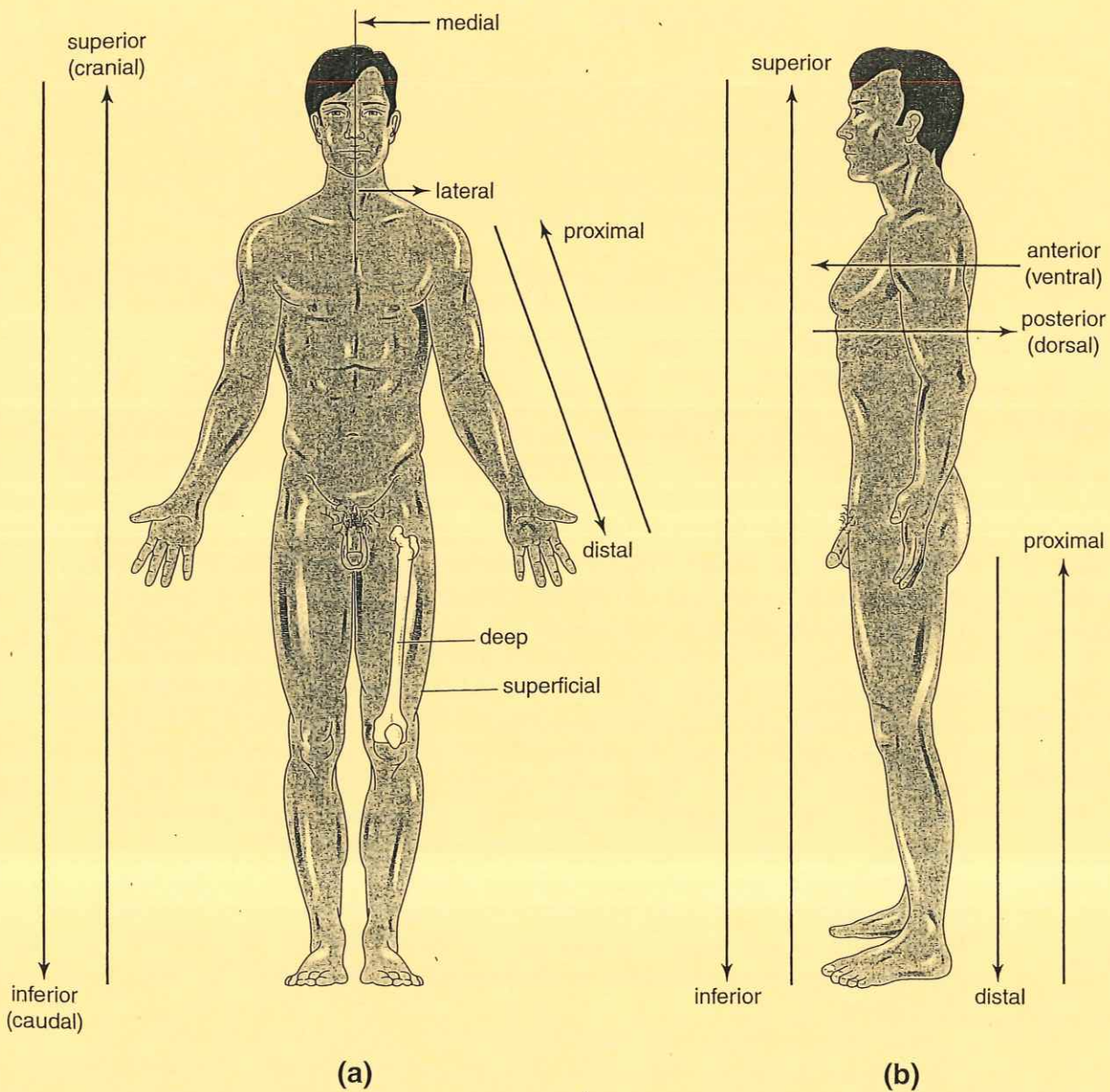
Superior is a term referring to any structure that is located above another or closer to the head. The eyes are superior to the nose as is evident in Figure 1.3a. Sometimes the term **cephalic** or **cranial** is used in place of superior. The term "superior" literally means nearest to the head. The terms cephalic and cranial mean, "pertaining to the head." In contrast, the term **inferior** refers to a body part that is below another. The nose is inferior to the eyes. The term **caudal** is regularly used in place of inferior. It means near the tail end. Caudal is the scientific term for "pertaining to the tail." Superior and inferior are often confused with the next two directional orientation terms **distal** and **proximal**. Distal specifically means any body part located far from an attachment point. By looking at the arm in Figure 1.3a, you can see that the hand is distal to the shoulder. Proximal has the opposite meaning of distal. Body parts closest to an attachment point are considered proximal. The shoulder is proximal to the hand. Similarly, the wrist is proximal to the fingers.

Now, note in Figure 1.3b that there are still four more terms to learn. When looking directly at a person's face, you are viewing his or her **anterior**. Anterior comes from the root word *ante* meaning "up front" or "coming before." The nose is anterior to the ears because it is closer to the front of the body. In human anatomy, the term **ventral** can be used in place of anterior. This holds true only for humans. Normally, the term ventral refers to the belly. Ventral comes from the term *venter* or "underside." **Posterior** refers to structures closer to the backside of the body. The term literally means, "to come after." The ears are posterior in location to the nose because they are closer to the back of the head. **Dorsal** is commonly used in place of posterior. In actuality, dorsal refers to the back, while posterior refers to the buttocks. However, in human anatomy, the terms are used interchangeably (see Confusing Points of Reference Box, page 7).



Figure 1.3 Anatomical Position

This diagram represents the major human anatomy directional orientations commonly used in healthcare communication.



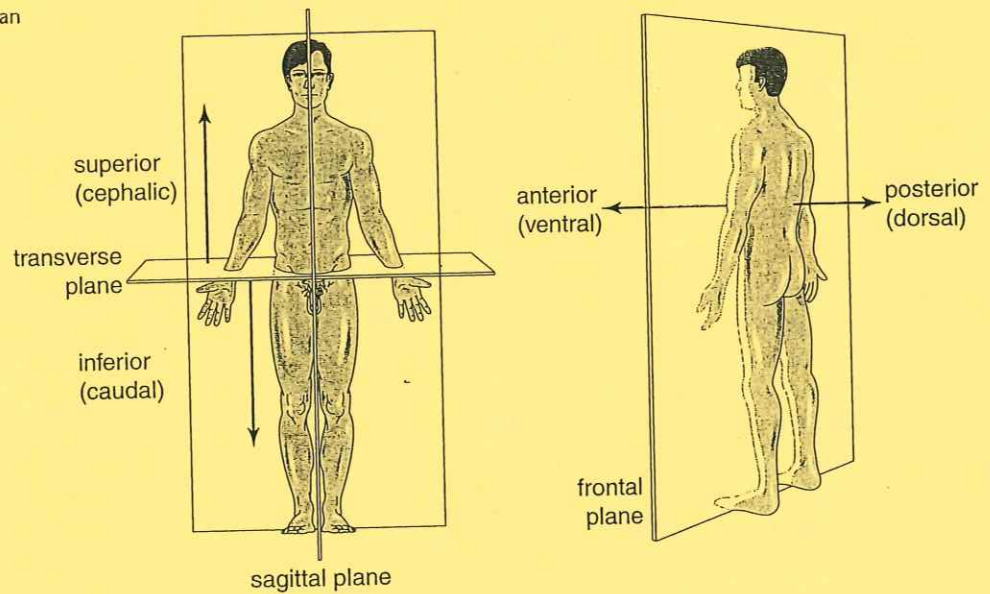
✓ *Concept Check*

1. Distinguish between the terms lateral and medial.
2. What is the difference between the terms inferior and distal?
3. What are alternate terms for anterior and posterior?



Figure 1.4 Body Planes

This diagram represents the major human anatomy directional planes commonly used in healthcare communication.



Sagittal Lengthwise planes dividing the body into right and left sections

Midsagittal The lengthwise plane that divides the body into equal halves

Frontal The plane dividing the body vertically into anterior and posterior sections

Coronal The plane dividing the body vertically into anterior and posterior sections; referring to the crown of the head

Transverse The plane dividing the body horizontally into upper and lower sections

Directional Planes The human figures shown in Figure 1.4 illustrate a person sliced three ways. These slices produce what are called directional planes for viewing the human body. Directional planes are used to describe the location of parts when imaginary or real cuts are sliced through the body. A sagittal plane cuts the body lengthwise into left and right sections. Sagittal sections can be cut into any body part. However, it is only the midsagittal plane that cuts the body into equal halves. Perpendicular to the sagittal plane is the frontal plane. The frontal plane slices the body vertically into anterior and posterior sections. Sometimes the term coronal plane is used in place of the frontal plane. Coronal refers to the fact that the section cuts through the body parallel to the crown of the head. There is no exact midsection cut for the frontal plane. A transverse plane cuts the body along a horizontal plane. It divides the body into lower and upper sections. The bottom section of the transverse plane is inferior or caudal. In contrast, the top section of the transverse plane is superior. Again, the terms cephalic or cranial can be used in place of superior.

✓ Concept Check

1. What is the difference between a sagittal plane and midsagittal plane?
2. Define the term frontal plane.
3. What does transverse plane mean?

Positions

Key Terms: dorsal recumbent position, Fowler's position, knee-chest position, left lateral position, lithotomy position, modified Trendelenburg position, prone position, Sim's position, sitting position, supine position, Trendelenburg's position



Many medical procedures and therapies require that a patient be placed into a certain position on a chair or special table. Special terms are used to describe the specific ways a patient can be situated. Since each health and medical practice has a number of terms unique to the procedures carried out in those fields, only the major positions common to many healthcare and medical practices will be mentioned. The names of these positions have a variety of origins. Some are standard names used by many scientists, while others are named after a medical procedure or the physician who developed the position.

There are many ways to place a client or patient in a sitting position. The most common is the **sitting position** shown in Figure 1.5. As expected, it is the standard way people would sit in a chair or at the edge of a table. Another way to sit a person is in **Fowler's position**, demonstrated in Figure 1.6. The legs are held straight out and the back is supported by the back of a chair, a partition, or a wall. These positions are often modified so that the arms or legs are held in various ways.

The most commonly used positions require that a client or patient lie down on a table. However, there are many ways to lie on a table. The **supine position** places a person flat on his back facing up, as shown in Figure 1.7. Opposite to the supine position is the **prone position** in which the person is lying face down on the table, as shown in Figure 1.8. It is not unusual for a person to be placed in the **Trendelenburg's position**, in which the patient is supine with the body tilted so that the head is lower than the legs, shown in Figure 1.9. Trendelenburg's position can be adjusted into the **modified Trendelenburg's position**, demonstrated in Figure 1.10. The supine position can also be modified by special adjustments of the legs.

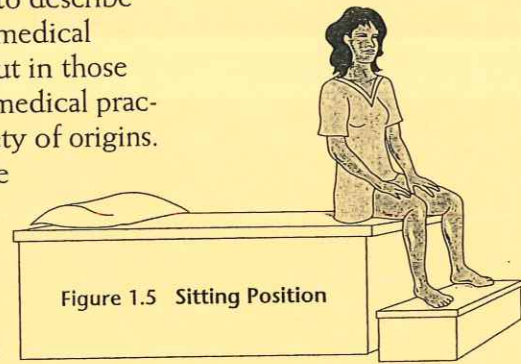


Figure 1.5 Sitting Position

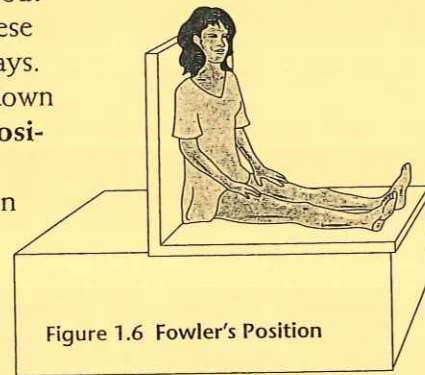


Figure 1.6 Fowler's Position

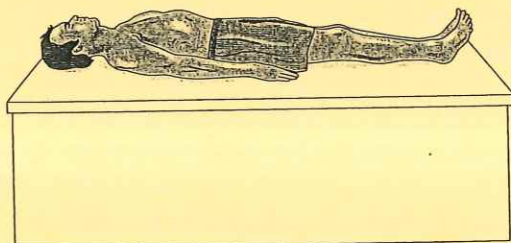


Figure 1.7 Supine Position

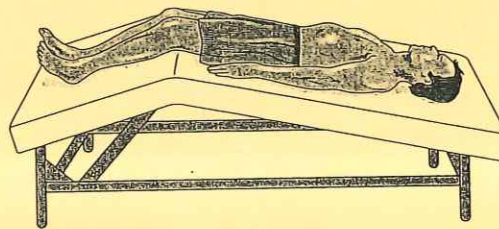


Figure 1.9 Trendelenburg's Position

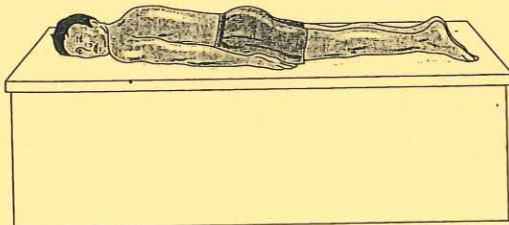


Figure 1.8 Prone Position

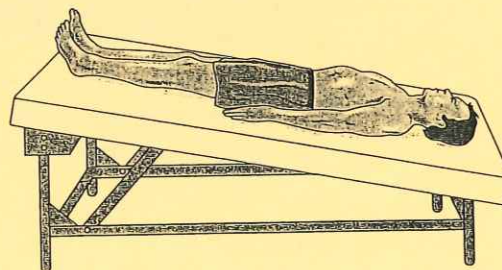


Figure 1.10 Modified Trendelenburg's Position



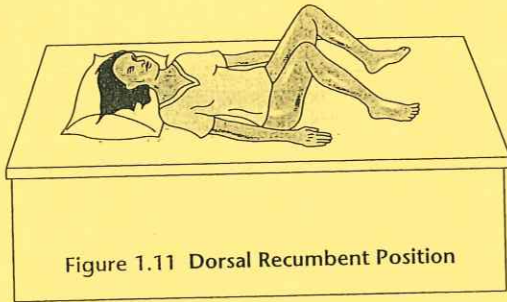


Figure 1.11 Dorsal Recumbent Position

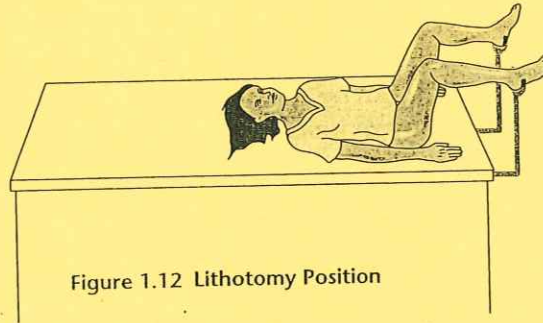


Figure 1.12 Lithotomy Position

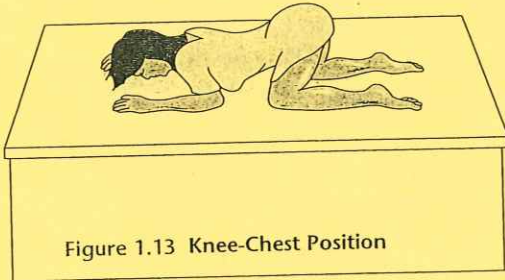


Figure 1.13 Knee-Chest Position

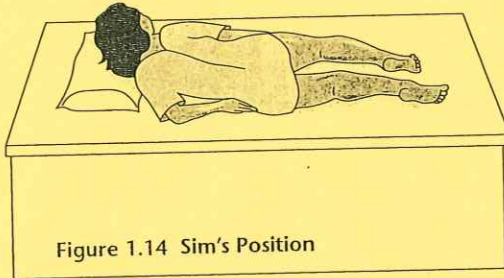


Figure 1.14 Sim's Position

A **dorsal recumbent** position places the patient supine with his or her knees bent up, as shown in Figure 1.11. A similar position, illustrated in Figure 1.12, is the **lithotomy position** in which the person's legs are placed on supports that hold the ankles and spread out the legs.

There are also two commonly modified prone positions. In the **knee-chest position**, the patient is facing down with his or her legs bent and the buttocks pushed up, as shown in Figure 1.13. In the **Sim's position**, the person lies face down on his or her left side with the left arm behind the back and the left knee bent, as demonstrated in Figure 1.14. This is also called the left lateral position.

Good Choice Bad Choice



Friends of yours enjoy bungee jumping. They are so excited about it that they want to do at least two jumps every weekend. Studies show that bungee jumping can place stress on the body that exceeds three times the force of gravity. In addition, the end of the jump involves a high-speed bounce that jolts the body up and down. What advice can you give your friends about the possible hazards of bungee

jumping? What impact could bungee jumping have on the body cavities? What anatomical regions of the body would be most affected by the bouncing effect? How does the increased force of gravity affect the body? Are the risks associated with bungee jumping so great that your friends should reduce the amount of time they spend doing it?

✓ Concept Check

1. Distinguish between the supine position and the prone position.
2. What are three variations of the supine position?
3. Describe two modifications of the prone position.



AGING AND BODY STRUCTURE

The human body undergoes many anatomical and physiological changes as it ages. Some of these changes are part of the normal aging process, while others are due to pathology. The most obvious gross signs of aging occur in the body cavities mentioned in this chapter. It is not unusual to find fluid build-up in the thoracic and abdominopelvic cavities as a person ages. Long-term infections to the lungs or heart can cause fluid to build up in the thoracic cavity. Irritation or injury to the stomach or intestines may produce fluids in the abdominopelvic cavity. Cancer can also cause fluids to build up in these cavities. Another problem associated with aging is the effect that gravity has on the internal structures of the abdominopelvic cavity. The stomach and liver settle on top of the intestines, which causes them to compress, sag, and twist. This sometimes interferes with the functioning of the intestines. The continuous pressure of gravity also weakens the lower wall of the abdominopelvic cavity. This may produce hernias, which are protrusions of the internal structures through the cavity walls. Last, one serious problem is that the stomach may sometimes protrude into the thoracic cavity, affecting breathing and causing severe chest pain.

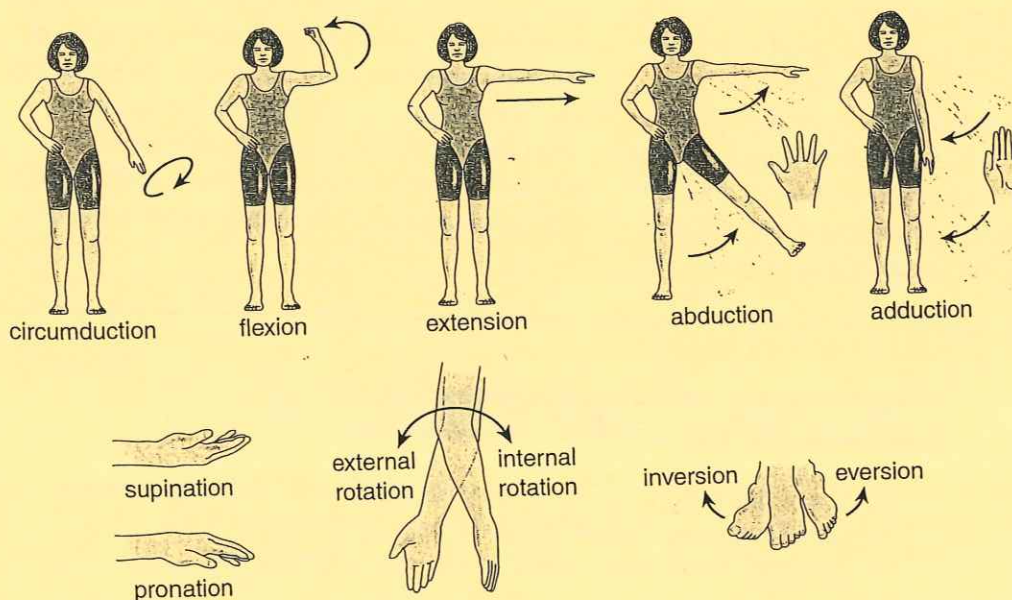
Movement

Key Terms: abduction, adduction, antagonistic, eversion, extension, flexion, inversion

Movement terms are critical in describing the way the arms and legs are moved in relation to the body. Note that each movement has an opposite movement, which is determined by how the part is attached to the body. The term **antagonistic** movement is regularly used to describe an opposing movement. Refer to Figure 1.15 to see illustrations of the movements as they are described. The term **flexion** means to bend a joint. This brings the distal end of the arm or leg close to the body. Bending the elbow or the knee are two

Antagonistic Opposing movements
Flexion To bend a joint

Figure 1.15 Directional Terms



Extension To straighten a joint

Abduction Movement of the arm or leg away from the midline of the body

Adduction Movement of the arm or leg toward the midline of the body

Eversion Movement of the hand or foot so that the thumb or great toe moves away from the midline of the body

Inversion Movement of the hand or foot so that the thumb or great toe moves toward the midline of the body

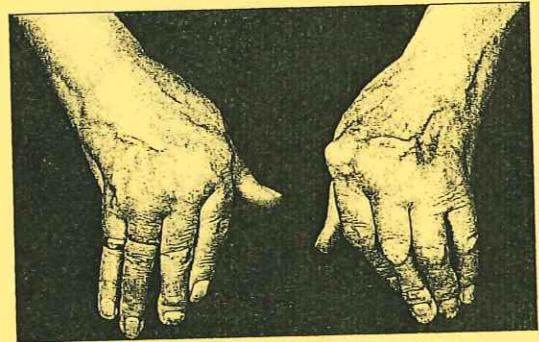
common flexion movements. **Extension** is the opposite of flexion. It is a movement that straightens out a joint. Straightening the elbow or the knee are two common extension movements. **Abduction** means moving the whole arm or leg away from the midline of the body. The antagonistic movement is **adduction**, which means that the whole arm or leg is placed flat against the body. **Eversion** is a movement that rotates the hand or foot so that the thumb or great toe moves away from the body's midline. Its antagonistic movement is **inversion**, which turns the hand or foot inward toward the body.

✓ Concept Check

1. Define the term antagonistic in relation to body movement.
2. Distinguish between the terms flexion and extension.
3. Name and describe the antagonistic movements for flexion, abduction, and eversion.

MOVEMENT ISSUES

Under normal conditions, the joints are designed to permit a full range of motion for the body movements described in this chapter. However, aging and diseases of the joints produce a variety of conditions that reduce movement. One condition, called arthritis, or "irritation of the joints," can distort the joint so that it is not capable of its intended motions. Arthritis can cause a joint to stiffen so that the person can only make a partial movement or no movement at all. Motion can be limited because of extreme pain associated with moving the joint or because the stiffness restricts the joint surfaces. Some forms of arthritis will twist the joint into a position where it is no longer capable of its normal motion.



DISCOVERY SCENE PLEASE ENTER DISCOVERY SCENE PLEASE ENTER



Break

Do the terms referring to body directions provide any help in communicating information about the patient with the knife wound? How would you explain where the wound is located using the terms described at this point in the chapter?

BODY REGIONS

Body region terms describe the body as if viewing a map. They describe the specific locations of body parts or regions on the surface or inside the body. These terms are universally used so that anyone hearing or reading these terms can envision the exact location on or within the body.



General Locations

Key Terms: abdominal, acromial, bilateral, brachial, carpal, cervical, clavicular, cubital, deep, geniculate, ocular, palmar, parietal, pedal, pelvic, plantar, pubic, superficial, thoracic, unilateral, visceral

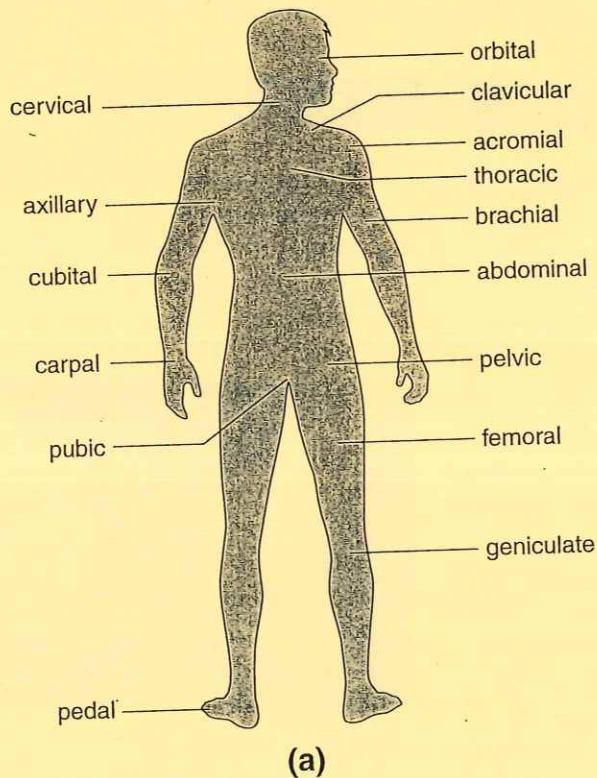


Figure 1.16a Surface Feature Coverage

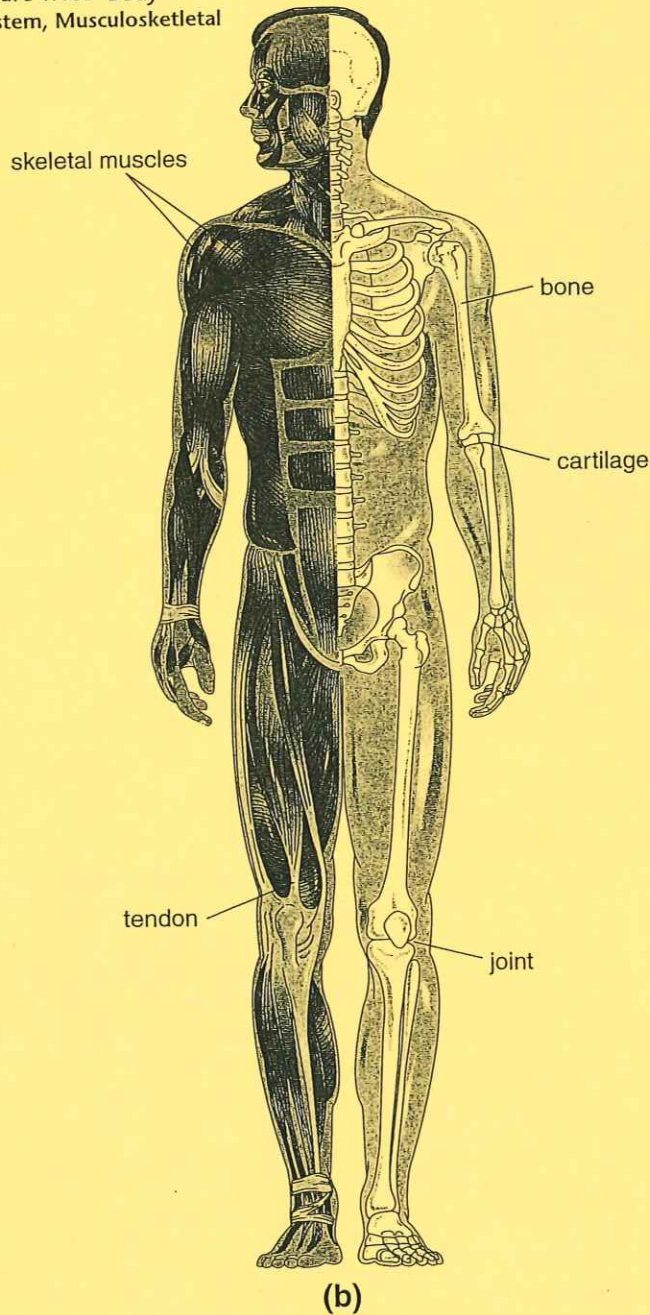
Anatomical terminology is essential to pinpoint particular regions of the body that may need attention or that show signs of injury. The terms related to the body features shown in Figure 1.16a are equivalent to street signs. They provide a universal way to communicate major surface features and are used with other medical terms to further clarify surface locations. For example, **cervical** is specific to the neck region. **Ocular** means located near the eyes. The term **clavicular** refers to the region around the collar bone, while **acromial** refers to the shoulder. The term axillary is used in place of armpit. Even the common words arm (**brachial**), elbow (**cubital**), and wrist (**carpal**) are replaced with anatomical terms. The stomach region is called **abdominal**, and the chest region is called **thoracic**. **Pelvic** is used to refer to the hip bone region, while the term **pubic** designates the groin. The knee is called the **geniculate** area, and **pedal** is the appropriate term for foot.

The terms described here are used in the same way that a person would describe the location of objects or rooms in a house. For example, you may say that there is an attic storage space above the living room or a furnace in

- Cervical** Refers to the neck region
- Ocular** Refers to the eyes
- Clavicular** Refers to the region around the collar bone
- Acromial** Refers to the shoulder region
- Brachial** Refers to the arm
- Cubital** Refers to the elbow
- Carpal** Refers to the wrist
- Abdominal** Refers to the stomach region
- Thoracic** Refers to the chest region
- Pelvic** Refers to the region around the hip bone
- Pubic** Refers to the groin region
- Geniculate** Refers to the knee region
- Pedal** Refers to the region around the foot
- Superficial** Refers to any body part or region close to the skin
- Deep** Refers to any structure or region located away from the body's surface and toward the inside
- Bilateral** Refers to body structures located laterally on both sides of the body
- Unilateral** Refers to a single body part found in a lateral location
- Parietal** Refers to the outer wall of a hollow body part, such as the stomach. It also refers to the thin linings covering body cavities



Figure 1.16b Body System, Musculoskeletal



the basement below the kitchen. In this way, the terms presented here help you locate a specific area of the body. The term **superficial** describes any part or region close to the skin or outer surface of the body. In Figure 1.16b, the muscles would be superficial because they are found just beneath the skin. A **deep** structure is one that is found away from the body surface toward the inside of the body. The thigh bone is a deep structure lying beneath the muscles. **Bilateral** describes body structures that are located laterally on both sides of the body. The eyes and ears are bilateral structures. The term **unilateral** is used for a single body part found in a lateral location. For example, the heart's location is unilateral because it lies slightly left of the body's midline. The stomach is also unilateral because it is only on the left side of the body.

Certain terms that describe location can be somewhat confusing at first. This is true of the terms **parietal** and **visceral**. Parietal has two meanings: First, it can refer to the outer wall of a hollow body part. The parietal wall of the stomach refers to the outer layer of the stomach surface. Second, it also refers to the thin linings that cover whole body cavities. Parietal structures are, in effect, superficial coverings. The term visceral describes the inner wall of a body organ. It also refers to a covering found directly on a body part. Visceral structures are located deep in the body compared with parietal structures. Some location terms are specific to a particular body part. For example, the term **palmar** pertains to the palm of the hand. Similarly, **plantar** describes the sole, or lower surface, of the foot.

Visceral Refers to the inner wall of an organ. It also refers to the coverings found directly on body parts

Palmar Pertaining to the palm of the hand

Plantar Pertaining to the sole of the foot

Abdominopelvic Regions and Quadrants

Key Terms: abdominopelvic region, epigastric, hypogastric, left hypochondriac, left inguinal, left lower quadrant (LLQ), left lumbar, left upper quadrant (LUQ), right hypochondriac, quadrant, right inguinal, right lower quadrant (RLQ), right lumbar, right upper quadrant (RUQ), umbilical



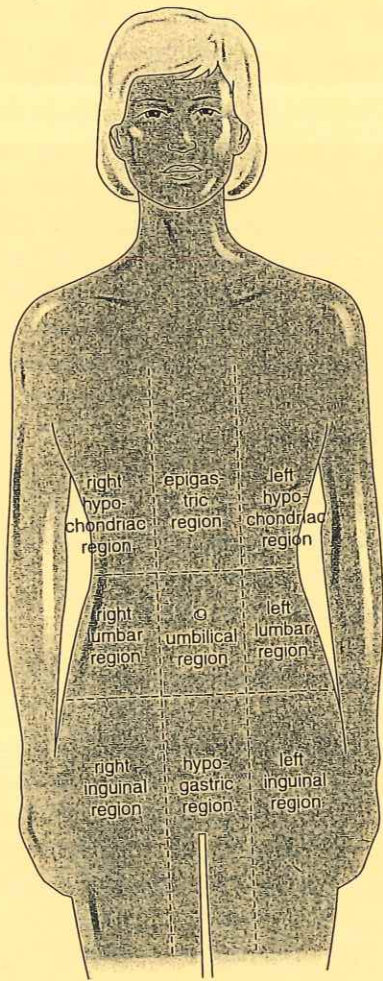


Figure 1.17 Abdominopelvic Regions

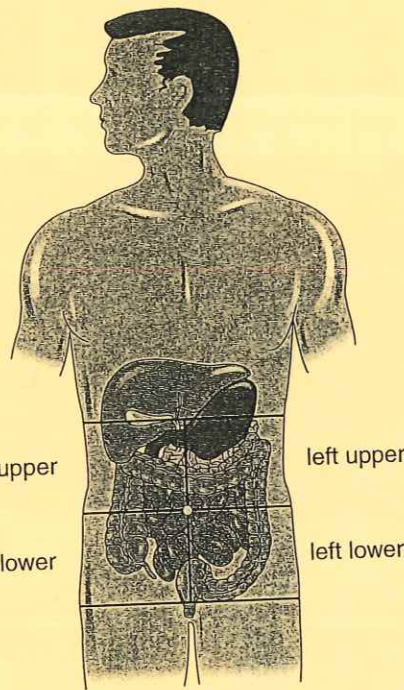


Figure 1.18 Body Quadrants

The **abdominopelvic region** describes the part of the body lying just below the breasts and just above the groin, as shown in Figure 1.17. It is a very important region of the body because it contains almost all of the major body organs. The abdominopelvic region is divided into sections using terms that describe a particular location. In the upper right corner of the abdominopelvic region lies the **right hypochondriac**. Its name comes from the fact that it sits below the ribs. The **left hypochondriac** is in the opposite position in the body. Between these two regions is the **epigastric** region. It has this name because it sits above the stomach.

Below the right hypochondriac is the **right lumbar** region. On the other side of the body is the **left lumbar**. The term lumbar means at waist level, or at the "small of the back." Medial to these two regions is the **umbilical** region. As is evident in the name, the umbilical region contains the navel.

The **right inguinal** region makes up the area of the right lower lateral part of the abdominopelvic region. On the other side is the **left inguinal** region. These regions lie directly upon the pelvis. Inguinal is the scientific term for groin. Medial to the left and right lumbar regions is the **hypogastric** region. Although it is below the navel, its name means "located below the stomach."

Abdominopelvic Region Refers to the region of the body found below the breasts and above the groin

Right Hypochondriac The upper right corner of the abdominopelvic region

Left Hypochondriac The upper left corner of the abdominopelvic region

Epigastric The upper middle of the abdominopelvic region

Right Lumbar The middle right corner of the abdominopelvic region

Left Lumbar The middle left corner of the abdominopelvic region

Umbilical The middle section between the right and left lumbar of the abdominopelvic region

Right Inguinal The lower right corner of the abdominopelvic region

Left Inguinal The lower left corner of the abdominopelvic region

Hypogastric The middle section between the right and left inguinal sections of the abdominopelvic region



Quadrant Refers to the abdominopelvic regions as divided into four sections

Right Upper Quadrant The quadrant containing the right hypochondriac, lumbar, epigastric, and umbilical regions

Left Upper Quadrant The quadrant containing the left hypochondriac, lumbar, epigastric, and umbilical regions

Right Lower Quadrant The quadrant containing the right inguinal, lumbar, hypogastric, and umbilical regions

Left Lower Quadrant The quadrant containing the left inguinal, lumbar, hypogastric, and umbilical regions

Most clinicians use a simpler way to describe the body region divisions. They use what is called the **quadrant** naming system, which divides the region into four parts. These four parts are shown in Figure 1.18. The quadrant system is simple to remember. However, it provides less detail for identifying the location of pain or injury to the abdominopelvic region. The **right upper quadrant (RUQ)** overlaps the right hypochondriac, epigastric, right lumbar, and umbilical regions. In turn, the **left upper quadrant (LUQ)** overlies the left hypochondriac, epigastric, left lumbar, and umbilical regions. The **right lower quadrant (RLQ)** overlaps the right lumbar, umbilical, right inguinal, and hypogastric regions. Overlying the left lumbar, umbilical, left inguinal, and hypogastric regions is the **left lower quadrant (LLQ)**.

✓ Concept Check

1. Define the abdominopelvic region.
2. What is the name of the center-most section of the abdominopelvic region?
3. How does the quadrant system differ from the abdominopelvic sections?

DISCOVERY SCENE PLEASE ENTER DISCOVERY SCENE PLEASE ENTER



How does an understanding of the terminology describing body regions help solve the CSI? Do you see how the terms would help in determining the type of damage to the person's body? How would you apply the terms deep and superficial in trying to gather more information about the knife wound?

BODY CAVITIES

Key Terms: abdominal cavity, abdominopelvic cavity, cervical region, coccyx region, cranial cavity, diaphragm, lumbar region, mediastinum, nasal cavity, oral cavity, pelvic cavity, pericardial cavity, pleural cavity, sacral region, sinuses, spinal cavity, spinal column regions, thoracic cavity, thoracic region

Abdominopelvic Cavity The body cavity containing the abdominal and pelvic cavities

Abdominal Cavity The body cavity containing the liver, gallbladder, intestines, kidneys, spleen, and stomach

Pelvic Cavity The body cavity containing the rectum, reproductive system, and urinary bladder

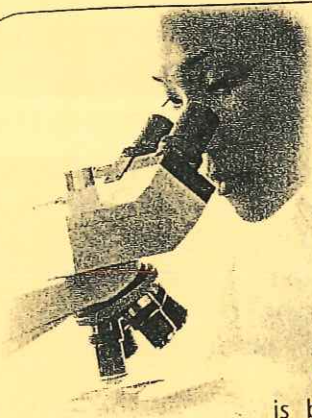
The human body is divided into distinct body cavities that contain particular body organs as shown in Figure 1.9. These cavities wall off the various organs with thin sheets of wet membrane called serosa, or flattened layers of muscle. An awareness of the terms describing these body cavities is important in understanding the arrangement of internal organs.

A large cavity called the **abdominopelvic cavity** forms a hollow space within the abdominopelvic region already described in this chapter. The abdominopelvic cavity is actually composed of two cavities: the **abdominal cavity** and the **pelvic cavity**. The abdominal cavity contains the liver, gall bladder, intestines, kidneys, spleen, and stomach. Inferior to the abdominal cavity is the pelvic cavity, which includes the rectum, reproductive system, and urinary bladder.



Cutting Edge Research

SMOKING AND THE THORACIC CAVITY



A story about the thoracic cavity is not the hot topic you would expect to see in the news. However, a condition called pneumothorax is becoming more prevalent among certain groups of people. *Pneumothorax* is a condition in which one or both lungs collapse. One form of this condition, called spontaneous pneumothorax, occurs in the absence of injury to the chest or lungs. Recent studies show that *spontaneous pneumothorax* is seven times more likely to occur in males than in females. Compared with nonsmokers, male smokers are 20 times more likely to develop spontaneous pneumothorax. Female smokers are only nine times more likely

than female nonsmokers to experience spontaneous pneumothorax. In addition, the condition mostly occurs during the fall or winter. Smoking can be avoided, warding off the chance of developing this potentially life-threatening condition. However, current studies indicate that air pollution may have the same effect as smoking. Some air pollution comes from second-hand smoke. Much of the pollution comes from automobiles and industrial operations. People living in areas with poor air quality have to be vigilant to reduce factors that further damage the lungs. This includes staying indoors during poor-air-quality days and avoiding situations of greater exposure to polluted air. That means avoiding cigarette or other tobacco smoke, gas-powered lawn equipment, fireplace smoke, and fumes from outdoor grills.

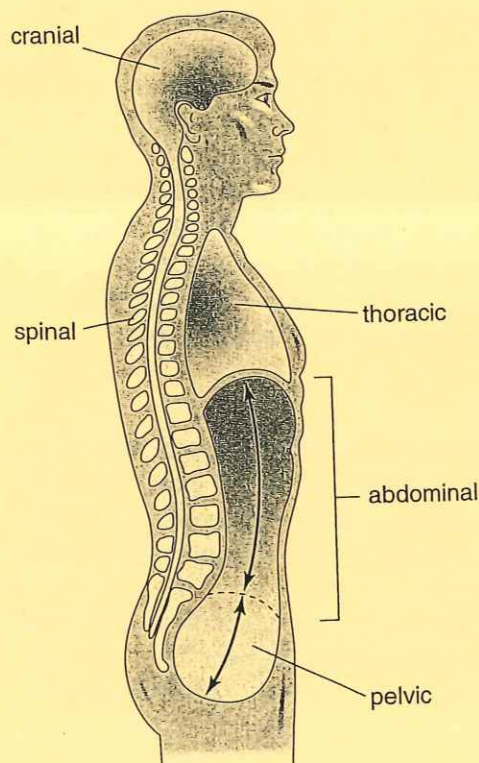


Figure 1.19 Body Cavities

Superior to the lumbar region is the **thoracic cavity**. It provides a covering that encases the esophagus, heart, lungs, and respiratory tree. Smaller partitions within the thoracic cavity separate the heart and each lung. For example, the **pericardial cavity** directly encases the heart, while the lungs are individually contained in the left and right **pleural cavities**. The **mediastinum** is a cavity region between the lungs. It contains the pericardial cavity and major structures, such as blood vessels passing through the region. Within the skull is the **cranial cavity**, which surrounds the brain. Anterior to the cranial cavity are smaller cavities called the **oral cavity**, which contains the mouth, and the **nasal cavity**, which lies behind the nose. Smaller cavities called **sinuses** are found in certain bones surrounding the cranial cavity. Connected to the cranial cavity and running along a medial dorsal

Thoracic Cavity The body cavity containing the esophagus, heart, lungs, and respiratory tree

Pericardial Cavity The body cavity containing the heart

Pleural Cavities The body cavities containing the left and right lungs

Mediastinum The body cavity between the lungs containing the pericardial cavity

Cranial Cavity The body cavity containing the brain

Oral Cavity The body cavity containing the mouth

Nasal Cavity The body cavity behind the nose

Sinuses Small cavities found in bones surrounding the cranial cavity



Spinal Cavity The body cavity containing the spinal cord

Diaphragm A large muscular partition below the thoracic cavity

Cervical Region The part of the spinal column comprising the neck

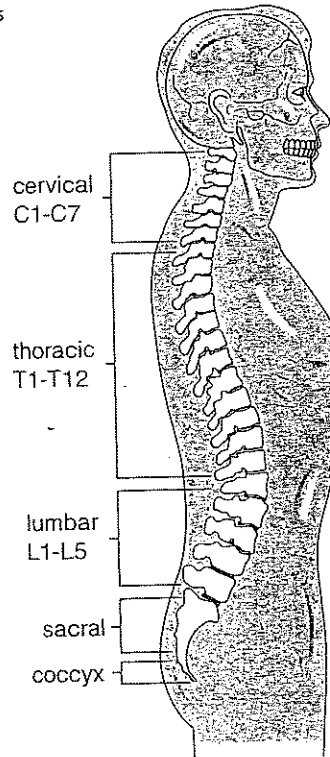
Thoracic Region The part of the spinal column comprising the thorax, or chest

Lumbar Region The part of the spinal column comprising the dorsal section of the umbilical region

Sacral Region The part of the spinal column comprising the pelvic area

Coccyx Region The part of the spinal column comprising the tail bone

Figure 1.20 Spinal Column Regions



position in the body is the **spinal cavity**. As its name implies, the spinal cavity covers the spinal cord. Below the thoracic cavity is a large muscular partition called the **diaphragm**.

The spinal cavity can be divided into spinal-column regions, as shown in Figure 1.20. The uppermost section is called the **cervical region**, which makes up the neck. Inferior to the cervical region is the **thoracic region**. It is so named because it is composed of the thorax or chest area. The lower back contains the **lumbar region** of the spinal cavity. It lies along the dorsal portion of the umbilical region. The **sacral region** makes up much of the back of the pelvic bone. Below the sacral region is a tiny area called the **coccyx region**. It is also called the "tail bone" region.

✓ Concept Check

1. What structures are found in the abdominopelvic cavity?
2. Distinguish between the thoracic cavity and the spinal cavity.
3. What are the sections of the spinal cavity?

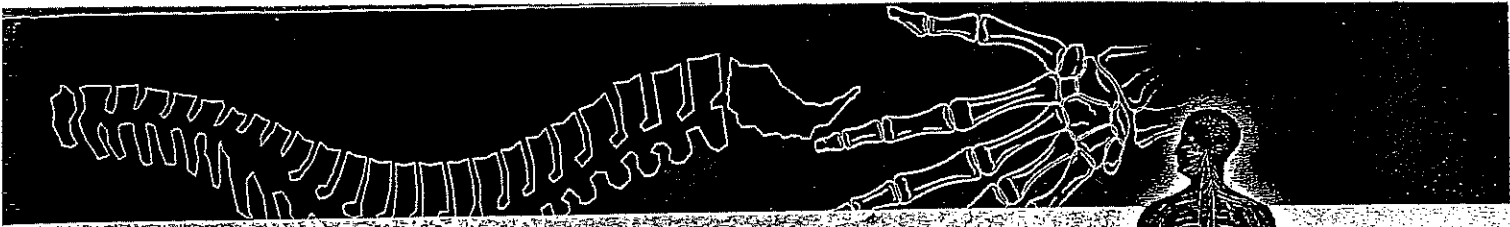
DISCOVERY SCENE PLEASE ENTER DISCOVERY SCENE PLEASE ENTER



What additional information have you gathered about the man's injuries in the CSI? How does knowledge of the body cavities help explain the problems noted by the ambulance crew?

(Hint: The knife pointed up as it entered the man's left hypochondriac region of the abdominopelvic region.)

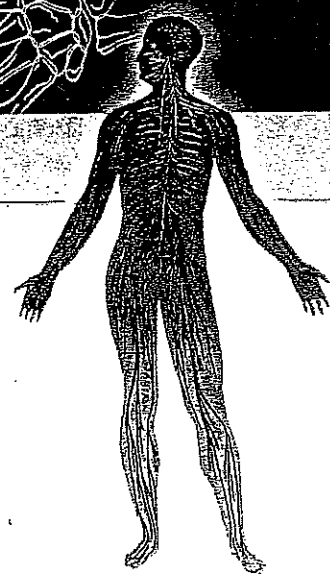




CHAPTER



OVERVIEW OF THE BODY



Completion

Complete the following sentences by filling in each blank with a key term from the text.

1. Anatomical study can be divided into areas of _____ anatomy and _____ anatomy.
2. The anatomical and physiological study of human disease is called _____.
3. The terms that describe the way a body can be divided into parts by imaginary cuts for viewing are known as _____.
4. The terms medial, superior, and distal are examples of terms of _____.
5. A movement term that describes the opposing movement of another part is said to be _____.
6. Body region terms can be divided into three categories known as _____, _____, and _____.
7. The terms superficial and deep belong to the above category (in No. 6) of _____.
8. The term umbilical is the name of one of the _____.
9. The two major anterior body cavities are the _____ and _____, and the two posterior are the _____ and _____.
10. The thoracic cavity can be further divided into the _____ and _____ cavities.



d) sawing a bed in two so that the headboard is separated from the footboard

5. Identify the body movement term involved in each of the following activities:

a) "squat" exercises

b) jumping jacks

c) "pigeon-toe" placement of the feet

6. In which abdominopelvic quadrant might a patient with cirrhosis (inflammation of the liver) experience observable swelling?

Which abdominopelvic region(s)?

7. Would it be correct to use abdominopelvic region terms to describe pain associated with the heart? Why or why not?

8. Which of the body cavities are connected? Explain.

9. In which major body cavity do you think the conditions called pleuritis and pericarditis would occur?
10. Name the spinal-column region with which each of the following items would have the most contact when worn:
- a) belt
 - b) choker necklace
 - c) strapless bikini top
 - d) hip pockets

Laboratory Activity 1

Drawing the Abdominopelvic Regions & Quadrants

Background

It is important to be able to visualize the abdominopelvic regions of the body without having to reference a book. This activity will give you practice identifying the precise locations of these regions on an illustration of the human body.

Materials

- Blank overhead transparency sheet
- Washable black marker
- Washable red marker

Procedure

Place the clear transparency sheet over the diagram provided here. First, use the black marker to draw the lines representing the abdominopelvic regions. Then, label the diagram. Next, use the red marker to draw the quadrant lines. Add the quadrant labels. Compare your drawing and labels to the information provided in this chapter.

