

Chapter 1

Entering the World of Clinical Anatomy

In This Chapter

- ▶ Looking at different types of anatomy
 - ▶ Arranging anatomy by systems and regions
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You're reading this book, so you're probably embarking on a career in medicine and healthcare. That means you need to know how the human body works, and you also need to know how to find and examine the parts of the body. This chapter introduces you to the concept of clinical anatomy and how it compares with other ways to look at anatomy.

Studying the Body in Different Ways

Anatomy is the study of the tissues, organs, and other structures of the body, and it's often combined with *physiology*, which describes how the body parts function. We present the info in this book from a clinical perspective, but the following sections describe multiple ways that people in medical fields study and discuss the body.

Looking under the microscope or with your eyes

Bodies are made up of cells — lots and lots of little cells that have different shapes and functions. For example, skin cells provide a protective barrier for the tender parts inside, red blood cells carry oxygen, and brain cells let you think about things (including anatomy).

Histology, or microanatomy, is the study of the anatomy of tissues and the cells of which they're comprised. Because cells are ridiculously small, you can't look at them with unaided eyes, but a microscope gives you a close-up view of the cells. Understanding the anatomy of cells is important, especially in the laboratory, but you really can't examine patients under a microscope.

Gross anatomy, or macroscopic anatomy, is the study of the parts of the body you can see with your eyes. These parts include big structures like the pancreas, liver, bones, and muscles and smaller parts like little blood vessels and nerves. Of course, sometimes you need to use invasive methods to understand gross anatomy, which is fine when you're working with a cadaver. However, gross anatomy isn't always so helpful with a living, breathing patient.

Speaking clinically: Terms used in clinical anatomy

Anatomy has a lexicon of words that you'll need to know. Most of them help you locate structures or understand how those structures relate to other parts of the body. The terms also help you describe the locations of things you find during a physical examination. For example, if you see a contusion (bruise) on a patient's back, you'll need to be able to explain exactly where it is in words that other healthcare providers will understand.

Certain anatomical words describe how the body (or parts) of the body move. Don't worry, you don't need to learn a whole new language — we cover the basic terminology in Chapter 2.

Dividing the Body into Systems and Regions

Medical practitioners rarely look at only one organ or body part at a time. In clinical anatomy, body parts can be grouped together by the system they belong to or by the area or region where they're located. We describe both types of organization in the following sections.

Organizing the body by systems

Body parts don't work alone; they work in concert with other body parts and tissues in systems to perform certain functions. You can group the organs and other structures of the body by these interactions.

The integumentary, musculoskeletal, and nervous systems

The main organ of the *integumentary system* is the skin, which is also called the *integument*. This system also includes the various structures that accompany the skin, like hair, eyelashes, and nails. The integumentary system works together to protect the vital tissues underneath, which includes almost everything.

The *musculoskeletal system* includes the muscles and bones and the tendons and ligaments that connect them all together. The main purposes of the musculoskeletal system are to provide the main structural frame of the body and to produce movement, ranging from walking with long strides to making delicate maneuvers with your fingers.

The *nervous system* includes the brain, spinal cord, and the nerves that run throughout the body. The nervous system serves as a control center that interprets sensory information and sends back instructions so your various body parts know what to do next.

We take a closer look at all three systems in Chapter 3.

The cardiovascular and respiratory systems

The *cardiovascular system* includes the heart and blood vessels that convey blood throughout the body. The blood carries oxygen and nutrients to the cells of the body and carries away waste products.

The *respiratory system* includes the airways and lungs. *Ventilation*, or breathing, is the act of taking air into and out of the lungs so that *respiration*, or gas exchange, between the air and blood can occur. Along with the vocal cords and other structures, it also helps you speak.

These two systems are covered in Chapter 4.

The lymphatic and immune systems

The *lymphatic system* includes lymphatic vessels and lymph nodes that filter fluids from tissues and return them to the bloodstream. The *immune system* is made up of white blood cells and proteins that help fight off bacteria, viruses, and other unfriendly invaders. Many white blood cells of the immune system reside in the organs of the lymphatic system to provide the surveillance that protects you from foreign invaders.

These systems are described in Chapter 5.

The digestive, urinary, and endocrine systems

The *digestive system* is composed of the digestive tract and organs including the liver and pancreas. The function of the digestive system is to break the foods you eat into individual nutrients and to absorb them into the body. It also eliminates waste products.

The *urinary system* includes the kidneys, ureters, bladder, and urethra. Its function is to filter blood and remove waste products such as urine.

The *endocrine system* includes organs called *glands*. The glands secrete hormones that target specific tissues and regulate processes such as metabolism, development, and reproduction.

These systems are described in Chapter 6.

Organizing the body by regions

Another way to study clinical anatomy (other than by systems; see the preceding section) is by looking at all the parts that reside in a certain area. To keep everyone on the same page, the body is divided into specific regions for this purpose.

The thorax

The *thorax* includes the *thoracic cage* and the *thoracic cavity*.

- ✓ The thoracic cage includes the ribs and associated structures.
- ✓ The thoracic cavity includes everything in the thorax from just below the neck down to a muscle called the *diaphragm*. Important structures in the thoracic cavity include the heart, lungs, great blood vessels, and thymus gland.

We cover the thoracic cavity along with the thoracic cage and organs in Chapters 7 and 8.

The abdomen

The *abdomen* includes the *abdominal wall* and the *abdominal cavity*.

- ✔ The abdominal wall is made up of tissues and supporting structures that cover the abdominal cavity.
- ✔ The abdominal cavity includes everything from the diaphragm down to the pelvic cavity (see the next section).

The abdomen is home to much of the digestive tract as well as the liver, gallbladder, pancreas, kidneys, and spleen. We describe the abdomen in Chapters 9 and 10.

The pelvis and the perineum

The *pelvis* is the lowest portion of the trunk, found between the hip bones. It includes the urinary bladder, urethra, internal sex organs, and distal end of the digestive tract. The *perineum* is the region between the thighs. We describe the pelvis and perineum in Chapter 11.

The head

The *head* sits at the top of everything and includes the bones that form the skull. It also includes the structures that create the face. Housed inside these structures are the brain, eyes, ears, mouth, nose, and sinuses.

We discuss the bones of the skull and the brain in Chapter 12 and the eyes, ears, nose, and mouth in Chapter 13.

The neck

The *neck* sits atop the thorax and supports the head. It may not appear to be too complicated on the outside, but inside the neck are many blood vessels, the trachea and pharynx, lymph nodes, glands, and muscles. We cover all the parts of the neck in Chapter 14.

The back

The *back* is the posterior part of your trunk, and it includes the vertebral column, the spinal cord, and lots of muscles (among other things). The back is a major structural component of the trunk that allows you to stand straight or bend and twist in several directions. We break down the structures of the back in Chapter 15.

The upper extremities

The *upper extremities* include the shoulder, arm, forearm, wrist, and hand; their corresponding bones and muscles; and the blood vessels, lymphatics, and nerves in those regions. The shoulder and elbow allow your arm and forearm to move in many directions so you can put your hands where you want them. Your fingers are able to perform fine movements like playing a piano or turning the pages of this book.

We explain the anatomy of the shoulder and arm in Chapter 16, the elbow and forearm in Chapter 17, and the parts of the wrist and hand in Chapter 18.

The lower extremities

The *lower extremities* extend from the hips to the ground. They include the bones of the thigh, knee, leg, ankle, foot, and toes along with the corresponding muscles, blood vessels, lymphatic vessels, and nerves. The lower extremities let you walk around the block, run down a hill, kick a ball, sit down, and stand up again.

We talk about the hip and thigh in Chapter 19, the knee and leg in Chapter 20, and the ankle, foot, and toes in Chapter 21.