

Anatomy is the setting (structure) in which the events (functions) of life occur. This book deals mainly with functional human gross anatomy—the examination of structures of the human that can be seen without a microscope. The three main approaches to studying anatomy are regional, systemic, and clinical (or applied), reflecting the body's organization and the priorities and purposes for studying it.

Regional Anatomy

Regional anatomy (topographical anatomy) considers the organization of the human body as major parts or segments (Fig. I.1): a main body, consisting of the head, neck, and trunk (subdivided into thorax, abdomen, back, and pelvis/perineum), and paired upper limbs and lower limbs. All the major parts may be further subdivided into areas and regions. Regional anatomy is the method of studying the body's structure by focusing attention on a specific part (e.g., the head), area (the face), or region (the orbital or eye region); examining the arrangement and relationships of the various systemic structures (muscles, nerves, arteries, etc.) within it; and then usually continuing to study adjacent regions in an ordered sequence. Outside of this Introduction, the regional approach is followed in this book, with each chapter addressing the anatomy of a major part of the body. This is the approach usually followed in anatomy courses that have a laboratory component involving dissection. When studying anatomy by this approach, it is important to routinely put the regional anatomy into the context of that of adjacent regions, parts, and of the body as a whole.

Regional anatomy also recognizes the body's organization by layers: skin, subcutaneous tissue, and deep fascia covering the deeper structures of muscles, skeleton, and cavities, which contain viscera (internal organs). Many of these deeper structures are partially evident beneath the body's outer covering and may be studied and examined in living individuals via surface anatomy.

Surface anatomy is an essential part of the study of regional anatomy. It is specifically addressed in this book in surface anatomy sections (orange background) that provide knowledge of what lies under the skin and what structures are perceptible to touch (palpable) in the living body at rest and in action. We can learn much by observing the external form and surface of the body and by observing or feeling the superficial aspects of structures beneath its surface. The aim of this method is to visualize (recall distinct mental images of) structures that confer contour to the surface or are palpable beneath it and, in clinical practice, to distinguish any unusual or abnormal findings. In short, surface anatomy requires a thorough understanding of the anatomy of the structures beneath the surface. In people with stab wounds, for example, a physician must be able to visualize the deep structures that may be injured. Knowledge of surface anatomy can also decrease the need to memorize facts because the body is always available to observe and palpate.

Physical examination is the clinical application of surface anatomy. Palpation is a clinical technique, used with observation and listening for examining the body. Palpation of arterial pulses, for instance, is part of a physical examination. Students of many of the health sciences will learn to use instruments to facilitate examination of the body (such as an ophthalmoscope for observation of features of the eyeballs) and to listen to functioning parts of the body (a stethoscope to auscultate the heart and lungs).

Regional study of deep structures and abnormalities in a living person is now also possible by means of radiographic

and sectional imaging and endoscopy. Radiographic and sectional imaging (radiographic anatomy) provides useful information about normal structures in living individuals, demonstrating the effect of muscle tone, body fluids and pressures, and gravity that cadaveric study does not. Diagnostic radiology reveals the effects of trauma, pathology, and aging on normal structures. In this book, most radiographic and many sectional images are integrated into the chapters where appropriate. The medical imaging sections at the end of each chapter provide an introduction to the techniques of radiographic and sectional imaging and include series of sectional images that apply to the chapter. Endoscopic tech-

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niques (using an insertable flexible fiber optic device to examine internal structures, such as the interior of the stomach)

also demonstrate living anatomy. The detailed and thorough

learning of the three-dimensional anatomy of deep structures

and their relationships is best accomplished initially by dissection. In

clinical practice, surface anatomy, radiographic

and sectional images, endoscopy, and your experience from

studying anatomy will combine to provide you with knowledge of your patient's anatomy.

The computer is a useful adjunct in teaching regional

anatomy because it facilitates learning by allowing interactivity and manipulation of two- and three-dimensional

graphic models. Prosections, carefully prepared dissections

for the demonstration of anatomical structures, are also useful. However, learning is most efficient and retention is highest when didactic study is

combined with the experience of

actual dissection—that is, learning by doing. During dissection you observe, palpate, move, and sequentially reveal parts

of the body. In 1770, Dr. William Hunter, a distinguished

Scottish anatomist and obstetrician, stated: "Dissection alone

teaches us where we may cut or inspect the living body with

freedom and dispatch."

Systemic Anatomy

Systemic anatomy is the study of the body's organ systems

that work together to carry out complex functions. The basic

systems and the field of study or treatment of each (in parentheses) are:

\ The integumentary system (dermatology) consists of the

skin (L. integumentum, a covering) and its appendages—

hair, nails, and sweat glands, for example—and the subcutaneous tissue just beneath it. The skin, an extensive sensory organ, forms the body's outer, protective covering and

container.

\ The skeletal system (osteology) consists of bones and cartilage; it provides our basic shape and support for the body and is what the muscular system acts on to produce movement. It also protects vital organs such as the heart,

lungs, and pelvic organs.

\ The articular system (arthrology) consists of joints and their associated ligaments, connecting the bony parts of the skeletal system and providing the sites at which move#ments occur.

\ The muscular system (myology) consists of skeletal mus#cles that act (contract) to move or position parts of the body (e.g., the bones that articulate at joints), or smooth and cardiac muscle that propels, expels, or controls the flow of fluids and contained substance.

\ The nervous system (neurology) consists of the central nervous system (brain and spinal cord) and the periph#eral nervous system (nerves and ganglia, together with their motor and sensory endings). The nervous system controls and coordinates the functions of the organ sys#tems, enabling the body's responses to and activities within its environment. The sense organs, including the olfac#tory organ (sense of smell), eye or visual system (ophthal#mology), ear (sense of hearing and balance#otology), and gustatory organ (sense of taste), are often considered with the nervous system in systemic anatomy.

\ The circulatory system (angiology) consists of the cardio#vascular and lymphatic systems, which function in parallel to transport the body's fluids.

\ The cardiovascular system (cardiology) consists of the heart and blood vessels that propel and conduct blood through the body, delivering oxygen, nutrients, and hor#mones to cells and removing their waste products.

\ The lymphatic system is a network of lymphatic ves#sels that withdraws excess tissue fluid (lymph) from the body's interstitial (intercellular) fluid compartment, filters it through lymph nodes, and returns it to the bloodstream.

FIGURE I.1. Major parts of the body and regions of the lower limb.

Anatomy is described relative to the anatomical position illustrated here.

Anterior view Posterior view

Key Major Parts of the Body

Head

Neck

Thorax

Back

Abdomen

Pelvis/perineum

Lower limb

Upper limb

Key Regions of Lower Limb

1 = Gluteal region

2 = Anterior thigh region

3 = Posterior thigh region

4 = Anterior knee region

5 = Posterior knee region

6 = Anterior leg region

7 = Posterior leg region

8 = Anterior talocrural (ankle) region

9 = Posterior talocrural region

10 = Foot region

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