CHAPTER 2

Low Back Anatomy

The anatomy of the low back consists of the bones of the spine (vertebrae); the discs between these bones; the bones of the pelvis; and muscles, ligaments, tendons, and nerves. This chapter provides a general overview of essential aspects of low back anatomy.

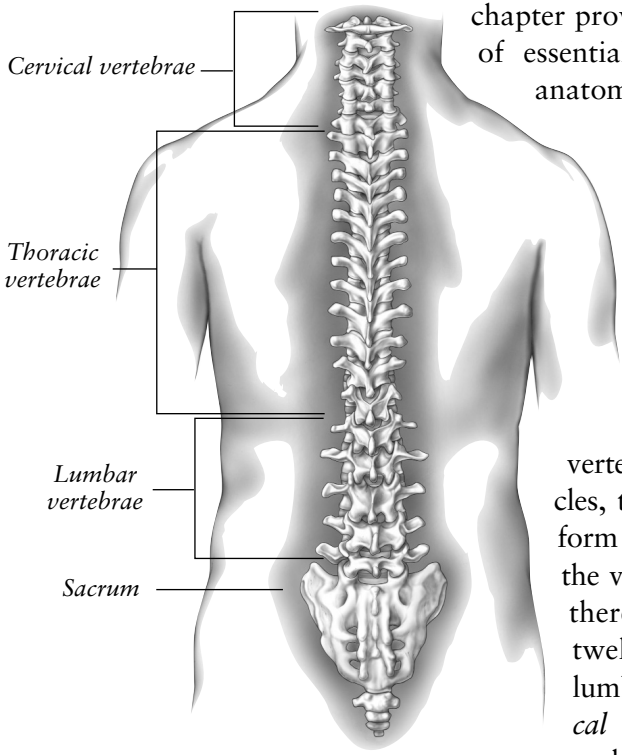

FIGURE 2.1A
A back view of the spinal column.

THE SPINAL COLUMN

The spinal column is the deepest layer of the spine and is composed of the vertebral body, the discs between each vertebral body, and the muscles, tendons, and nerves that form a complex web around the vertebral body. Normally, there are seven cervical, twelve thoracic, and five lumbar vertebrae. The *cervical vertebrae* comprise the neck region. The *thoracic vertebrae* comprise the mid back region. The *lumbar vertebrae* comprise the low back region (Figure 2.1).

CHAPTER 5

Medications

A wide variety of medications are utilized in treating patients who suffer with low back pain or related conditions. This chapter includes a summary of commonly used medications, which are grouped according to their general mechanism of action.

FOOD AND DRUG ADMINISTRATION APPROVAL

A discrepancy often exists between the manner in which medications are prescribed by physicians and the strict guidelines outlined by the Food and Drug Administration (FDA). By the time a new medication is approved for marketing to physicians and to the general public, it has been analyzed in numerous studies that are meant to evaluate safety and efficacy. A pharmaceutical company typically applies for approval of a medication for a specific indication. Some typical indications include: for relief of signs and symptoms of osteoarthritis; for the management of acute pain in adults; for the treatment of generalized tonic-clonic seizures; for the treatment of major depressive disorders in adults; and for management of neuropathic pain associated with diabetic peripheral neuropathy.

Even though pharmaceutical companies may market a medication only for its approved indication, physicians may prescribe a medication for nonapproved indications. For example, gabapentin (Neurontin) is an anticonvulsant medication that originally was approved by the FDA for use in a particular type of seizure disorder. Soon after its market availability, physicians began to prescribe gabapentin for other, non-FDA approved uses. One such use is neuropathic pain. There exists a large body of literature supporting the clinical benefit of anticonvulsants in alleviating symptoms of neuropathic pain. Because gabapentin is extremely effective for this use, it became common practice for pain medicine physi-

CHAPTER 6

Nonsurgical Treatments

HANDS-ON TREATMENT AND EXERCISE

Physical Therapy

Physical therapy is often the first line of treatment for patients who suffer with low back pain, especially if their first contact has been with an internist, primary care physician, or orthopedic surgeon. Physical therapy treatment can include modalities, hands-on massage and manipulation, and therapeutic exercises.

Physical therapy modalites include, but are not limited to, the application of ice, ultrasound (Figure 6.1), electrical stimulation (Figure 6.2), heat, and topical creams. Some physical therapists are specialized in spinal manipulation, and others specialize in more intuitive techniques such as craniosacral technique and myofascial release, which are described below. These latter two techniques require extensive one-on-one time, at least 30 to 60 minutes, and the therapist is constantly monitoring the patient's physical and emotional response to the treatment.

Therapeutic exercises range from the most simplistic of low back exercises to progressive spinal stabilization techniques and the use of specialized weight machines. Too often, patients enter a physical therapy facility, receive a cursory treatment with one modality or another, undergo simple stretching and strengthening exercises, and are then provided cookbook exercises to perform. Although this may work for uncomplicated low back pain, it is generally ineffective for more complicated or chronic low back conditions.

For more complicated or chronic cases, specialized care is required. This specialized care includes more extensive one-on-one manual work, by way of either manipulation, myofascial release, craniosacral technique,

Figure 6.15
Interplay between instructor and client with Pilates exercises.

Exercise can be extremely effective in promoting the health of the body in general and the low back in particular. All exercise requires careful attention to the body's mechanics and to the mind–body continuum. Exercise is also an extremely effective form of stress release; this in and of itself may be one of its most salient features. As with the more specific exercises described in the preceding sections, a general exercise program should be started following clearance from the patient's clinician.

CHAPTER 7

Surgical Treatments

Spinal surgery may be an important aspect not only of pain management, but also in restoring neurologic or biomechanical stability. However, just as spinal surgery may ameliorate symptoms in patients with low back pain or related conditions, spinal surgery also may worsen symptoms. Some patients have multiple failed interventions, only to have another failed surgery in an attempt to rectify the pain. Two conditions necessitate performing immediate lumbar spine surgery:

- Loss of bowel control, bladder control, or both as a result of the lumbar spine condition.
- Rapidly progressive or absolute muscle weakness as a result of the low back condition.

A relative indication for low back surgery is that the patient has failed good, nonsurgical management for treatment of his low back condition, and the patient is presenting with a well-defined, anatomic basis as a cause of low back pain. As discussed earlier, it is more often the case that pain is driven by both anatomic and physiological factors. However, an astute clinician can discern when pain is primarily the result of an anatomic malfunction.

Medical Risks of Surgery

Before a patient can be considered for surgery, an internist or primary care physician and an anesthesiologist must assess the medical risks of surgery. Most lumbar spine surgery involves placing the patient under general anesthesia. This is a coma-like state in which the patient is *intubated*, which means that a ventilator is performing the action of breathing for

CHAPTER 8

Mind–Body and Integrative Strategies

MIND–BODY

Mind–body refers to the practice of understanding the relationship between thought and emotions on the one hand, and the physical body on the other. Philosophers and theologians have debated the origin and essence of thought for years. From a neuroscience perspective, thought is the result of brain processes, and thought is perceived within the human body as a result of the activation of physical pathways.

Emotions, Chemicals, and Receptors

Fear is associated with muscle contraction, pupil dilation, and a heightened state of awareness. Love is associated with muscle relaxation, giddy behavior, and an increased sense of well-being. Rage is associated with piloerection (arm hairs standing on end), forceful heart muscle contractility, and a diminution of rational feedback on action.

Functional brain imaging studies demonstrate that certain thought patterns are associated with metabolic or physiologic changes within certain areas of the brain. In addition, neuroscience and immunologic studies have revealed a key link between the emotions and related receptors throughout the body.

As discussed in Chapter 5, the body has an innate narcotic or opiate system, which means that the body produces its own morphine-like chemicals. These chemicals are released into the body and make connections with specific receptors. A chemical–receptor connection works in a manner similar to a lock and key. When the chemical connects with a receptor that matches its properties, a specified chemical–physical reaction occurs. When the mind–body is in a relaxed, peaceful, or euphoric