

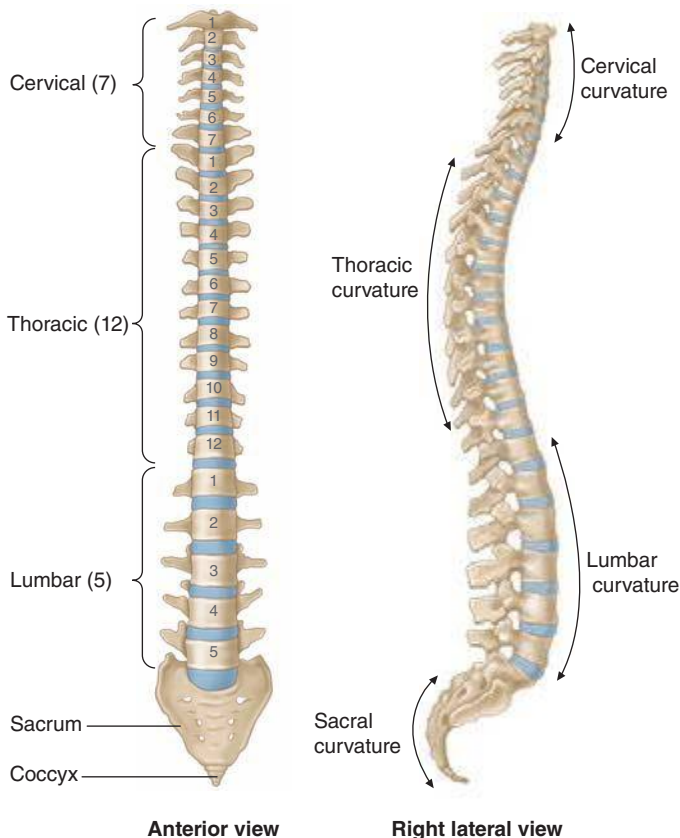
**FIGURE 22-1** Vertebral anatomy. (From A Gauthier Cornuelle, DH Gronefeld: *Radiographic Anatomy Positioning*. New York, McGraw-Hill, 1998; with permission.)

*Radicular pain* is typically sharp and radiates from the low back to a leg within the territory of a nerve root (see “Lumbar Disk Disease,” below). Coughing, sneezing, or voluntary contraction of abdominal muscles (lifting heavy objects or straining at stool) may elicit the radiating pain. The pain may increase in postures that stretch the nerves and nerve roots. Sitting with the leg outstretched places traction on the sciatic nerve and L5 and S1 roots because the nerve passes posterior to the hip. The femoral nerve (L2, L3, and L4 roots) passes anterior to the hip and is not stretched by sitting.

The description of the pain alone often fails to distinguish between referred pain and radiculopathy, although a burning or electric quality favors radiculopathy.

*Pain associated with muscle spasm*, although of obscure origin, is commonly associated with many spine disorders. The spasms are accompanied by abnormal posture, tense paraspinal muscles, and dull or achy pain in the paraspinal region.

Knowledge of the circumstances associated with the onset of back pain is important when weighing possible serious underlying causes for the pain. Some patients involved in accidents or work-related injuries may exaggerate their pain for the purpose of compensation or for psychological reasons.



**FIGURE 22-2** Spinal column. (From A Gauthier Cornuelle, DH Gronefeld: *Radiographic Anatomy Positioning*. New York, McGraw-Hill, 1998; with permission.)

#### EXAMINATION OF THE BACK

A physical examination that includes the abdomen and rectum is advisable. Back pain referred from visceral organs may be reproduced during palpation of the abdomen (pancreatitis, abdominal aortic aneurysm [AAA]) or percussion over the costovertebral angles (pyelonephritis).

The normal spine has a cervical and lumbar lordosis and a thoracic kyphosis. Exaggeration of these normal alignments may result in hyperkyphosis of the thoracic spine or hyperlordosis of the lumbar spine. Inspection may reveal a lateral curvature of the spine (scoliosis). An asymmetry in the prominence of the paraspinal muscles suggests muscle spasm. Spine pain reproduced by palpation over the spinous process reflects injury of the affected vertebrae or adjacent pain-sensitive structures.

Forward bending is often limited by paraspinal muscle spasm; the latter may flatten the usual lumbar lordosis. Flexion at the hips is normal in patients with lumbar spine disease, but flexion of the lumbar spine is limited and sometimes painful. Lateral bending to the side opposite the injured spinal element may stretch the damaged tissues, worsen pain, and limit motion. Hyperextension of the spine (with the patient prone or standing) is limited when nerve root compression, facet joint pathology, or other bony spine disease is present.

Pain from hip disease may mimic the pain of lumbar spine disease. Hip pain can be reproduced by internal and external rotation at the hip with the knee and hip in flexion or by compressing the heel with the examiner's palm while the leg is extended (heel percussion sign).

The *straight leg-raising (SLR)* maneuver is a simple bedside test for nerve root disease. With the patient supine, passive flexion of the extended leg at the hip stretches the L5 and S1 nerve roots and