lateral walls of the nasal cavity and increase the turbulence of air flowing through the nasal passages.

Facial Bones

Fourteen bones compose the face. Twelve are paired; only the mandible and vomer are single. Figures 5.7 and 5.11 show most of the facial bones.

Maxillae The two maxillae (mak-si′le), or **maxillary bones,** fuse to form the upper jaw. All facial bones except the mandible join the maxillae; thus they are the main, or "keystone," bones of the face. The maxillae carry the upper teeth in the **alveolar margin.**

Extensions of the maxillae called the **palatine** (pal′ah-tīn) **processes** form the anterior part of the hard palate of the mouth (see Figure 5.9). Like many other facial bones, the maxillae contain **sinuses,** which drain into the nasal passages (see Figure 5.10). These **paranasal sinuses,** whose naming reveals their position surrounding the nasal cavity, lighten the skull bones and probably act to amplify the sounds we make as we speak. They also cause many people a great deal of misery. Since the mucosa lining these sinuses is continuous with that in the nasal passages and throat, infections in these areas tend to migrate into the sinuses, causing *sinusitis*. Depending on which sinuses are infected, a headache or upper jaw pain is the usual result.

Palatine Bones The paired palatine bones lie posterior to the palatine processes of the maxillae. They form the posterior part of the hard palate (see Figure 5.9). Failure of these or the palatine processes to fuse medially results in *cleft palate.*

Zygomatic Bones The zygomatic bones are commonly referred to as the cheekbones. They also form a good-sized portion of the lateral walls of the orbits, or eye sockets.

Lacrimal Bones The lacrimal (lak′rĭ-mal) bones are fingernail-size bones forming part of the medial walls of each orbit. Each lacrimal bone has a groove that serves as a passageway for tears (*lacrima* = tear).

Nasal Bones The small rectangular bones forming the bridge of the nose are the nasal bones. (The lower part of the skeleton of the nose is made up of cartilage.)

Vomer Bone The single bone in the median line of the nasal cavity is the vomer. (*Vomer* means "plow," which refers to the bone's shape.) The vomer forms most of the nasal septum.

Inferior Nasal Conchae The inferior nasal conchae (kong′ke) are thin, curved bones projecting from the lateral walls of the nasal cavity. (As mentioned earlier, the superior and middle conchae are similar but are parts of the ethmoid bone.)

Mandible The mandible, or lower jaw, is the largest and strongest bone of the face. It joins the temporal bones on each side of the face, forming the only freely movable joints in the skull. You can find these joints on yourself by placing your fingers over your cheekbones and opening and closing your mouth. The horizontal part of the mandible (the *body*) forms the chin. Two upright bars of bone (the *rami*) extend from the body to connect the mandible with the temporal bone. The lower teeth lie in *alveoli* (sockets) in the **alveolar margin** at the superior edge of the mandibular body.

The Hyoid Bone

Though not really part of the skull, the **hyoid** (hi′oid) **bone** (Figure 5.12) is closely related to the mandible and temporal bones. The hyoid bone is unique in that it is the only bone of the body that does not articulate directly with any other bone. Instead, it is suspended in the midneck region about 2 cm (1 inch) above the larynx, where it is anchored by ligaments to the styloid processes of the temporal bones. Horseshoe-shaped, with a *body* and two pairs of *horns,* or *cornua,* the hyoid bone serves as a movable base for the tongue and an attachment point for neck muscles that raise and lower the larynx when we swallow and speak.

Fetal Skull

The skull of a fetus or newborn infant is different in many ways from an adult skull. As Figure 5.13b illustrates, the infant's face is very small compared to the size of its cranium, but the skull as a whole is large compared to the infant's total body length. The adult skull represents only one-eighth of the total body length, whereas that of a newborn infant

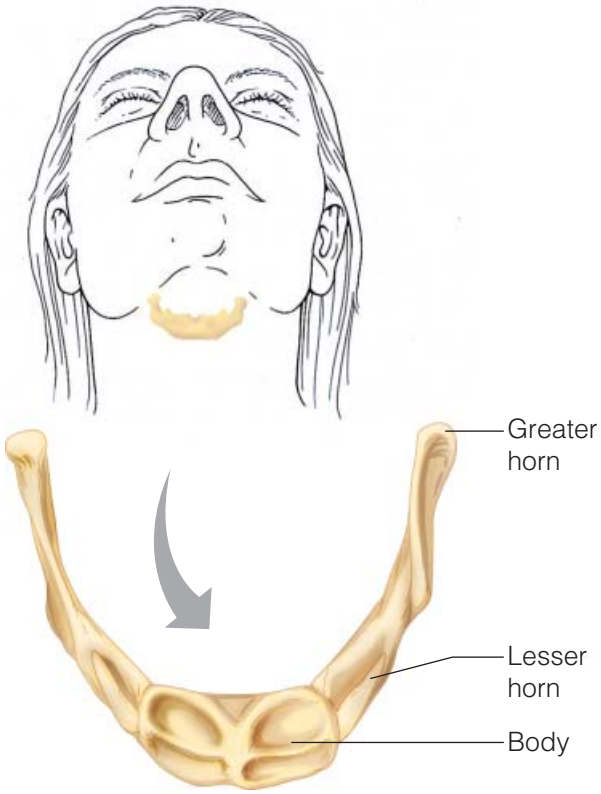

FIGURE 5.12 Anatomical location and structure of the hyoid bone. The hyoid bone is suspended in the midanterior neck by ligaments attached to the lesser horns and the styloid processes of the temporal bones.

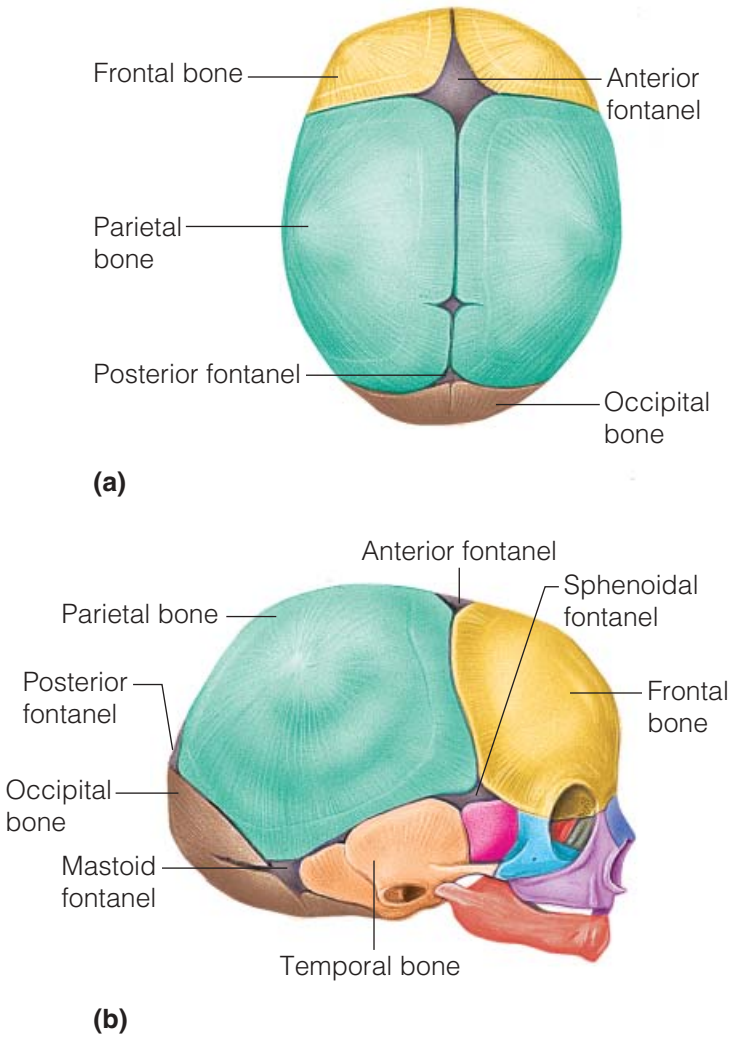

FIGURE 5.13 The fetal skull. (a) Superior view. **(b)** Lateral view.

is one-fourth as long as its entire body. When a baby is born, its skeleton is still unfinished. As noted earlier, some areas of hyaline cartilage still remain to be ossified, or converted to bone. In the newborn, the skull also has fibrous regions that have yet to be converted to bone. These fibrous membranes connecting the cranial bones are called **fontanels** (fon″tah-nelz′). The rhythm of the baby's pulse can be felt in these "soft spots," which explains their name (*fontanel* = little fountain). The largest fontanels are the diamond-shaped *anterior fontanel* and the smaller triangular *posterior fontanel*. The fontanels allow the fetal skull to be compressed slightly during birth. In addition, because they are flexible, they allow the infant's brain to grow during the later part of pregnancy and early infancy. This would not be possible if the cranial bones were fused in sutures as in the adult skull. The fontanels are gradually converted to bone during the early part of infancy and can no longer be felt by 22 to 24 months after birth.

Vertebral Column (Spine)

Serving as the axial support of the body, the **vertebral column,** or **spine,** extends from the skull, which it supports, to the pelvis, where it transmits the weight of the body to the lower limbs. Some people think of the vertebral column as a rigid supporting rod, but that picture is inaccurate. Instead, the spine is formed from 26 irregular bones connected and reinforced by ligaments in such a way that a flexible, curved structure results