

Miraculous Our Sensory World: How Do Four Anatomical Structures of Skeletal, Muscular, Nervous and Sensory Systems Work Together to see, smell, smile and taste?

Module 1-Skeletal System

Let's look at the topography of our skull. As you see there are many holes of different sizes and bumps around the surface of the skull bone as in mountainous terrain. Let us start our journey with one of the largest holes in the human skull. The foramen magnum, which means "large hole." It is found at the base of the skull in the occipital bone. From the external inferior view there are two projections on either lateral side of the foramen magnum. These projections are the occipital condyles, which articulate with the atlas, or first vertebra of the spine. From the interior view there are two small openings on each lateral side of the foramen magnum. These openings are the hypoglossal canals, in which the hypoglossal nerves travel through. The jugular foramen, where arteries and nerves exit the skull, are the two larger openings on the lateral sides of the hypoglossal canals. Lateral to the jugular foramen in a external inferior view are the stylomastoid foramen, which are openings for cranial nerves. Anterior to the stylomastoid foramen is the styloid process, which is an attachment site for several neck muscles and a ligament for the hyoid bone. Internal and anterior to the jugular foramen are the internal acoustic meatus. The external acoustic meatus, which is externally lateral to the internal acoustic meatus, along with the internal acoustic meatus are tube like structures that make up the internal and external ear canals. Posterior to the external acoustic meatus is the mastoid process, which is an attachment site for several neck and tongue muscles.

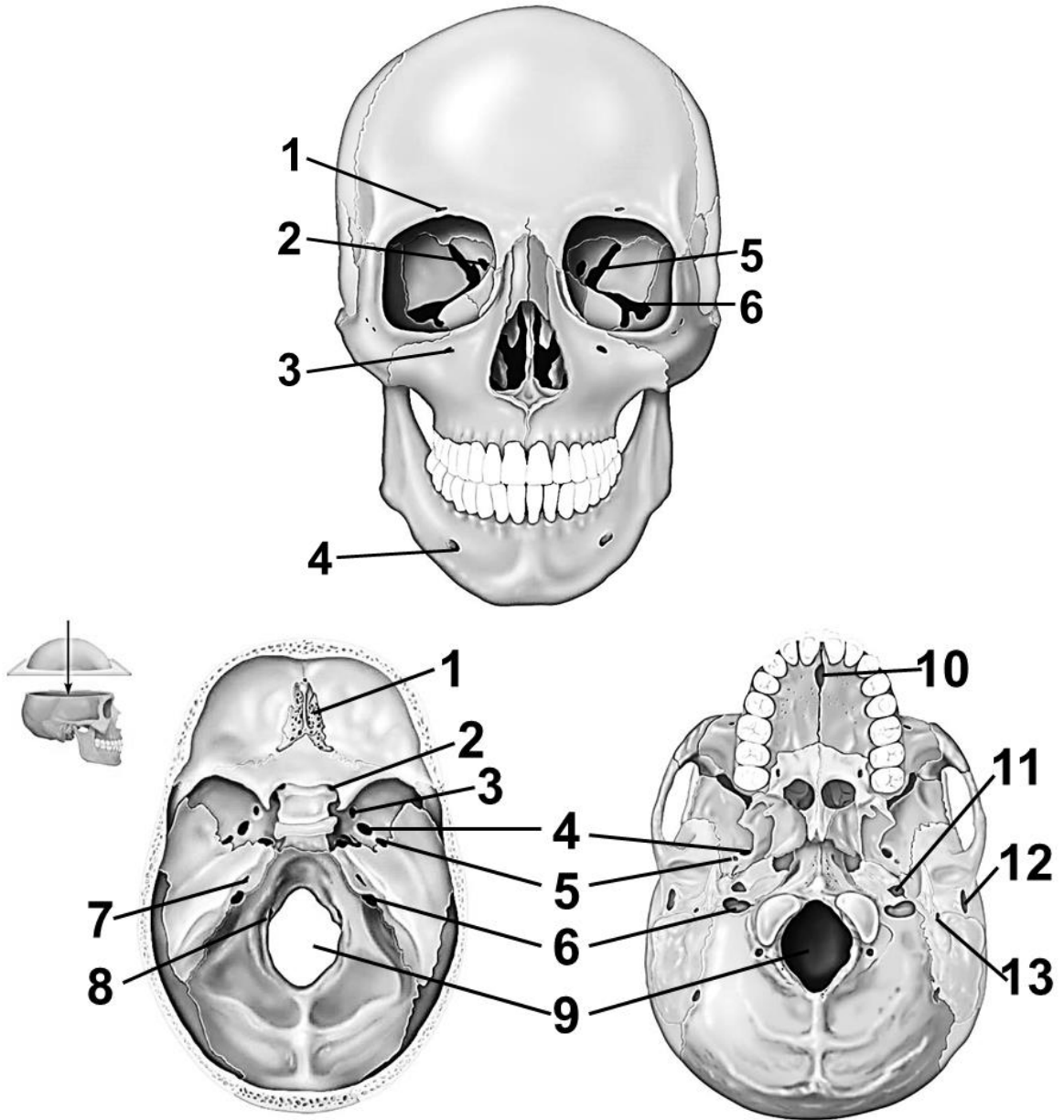
Anterior to the internal acoustic meatus are openings on each greater wing of the sphenoid bone called the foramen ovale. The anterior sphenoid bone has two lesser wings that house the foramen rotundum and the superior orbital fissure, which are openings for cranial nerves. The superior orbital fissure leads into the orbital bone and below the superior orbital fissure is the inferior orbital fissure. On the medial side of the lesser wings are the two optic foramen that are openings for cranial nerves.

a. Bone Markings

Bone Markings	Match the description	Description/Purpose
1. Fissure 2. Foramen 3. Fossa 4. Meatus 5. Condyle 6. Ramus 7. Spine		A. Smooth round articular process for articulation B. Tube-like passageway for vessels and nerves C. Small branch for articulation D. Shallow depression for muscle attachment E. Pointed process for articulation

		F. Hole or opening for vessels and nerves G. Narrow cleft for vessels and nerves
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b. Anatomical Structure



Using the Word Bank, choose the right name for bone markings numbered 1-13.

1.	2.	3.	4.	5.
6.	7.	8.	9.	10.
11.	12.	13.		

Word Bank: Keep in mind that you will have to use several of these terms more than once. Also keep in mind that not all terms are used.

Frontal	Mental Foramen	Jugular Foramen
Temporal	Cribiform Foramina	Foramen Spinosum
Parietal	External Acoustic Meatus	Stylomastoid Foramen
Occipital	Internal Acoustic Meatus	Hypoglossal Canal
Maxilla	Infraorbital Foramen	Optic Canal
Mandible	Supraorbital Foramen	
Sphenoid	Superior Orbital Fissure	
Ethmoid	Inferior Orbital Fissure	
Zygomatic	Incisive Fossa	
Vomer	Foramen Ovale	
Nasal	Foramen Rotundum	
Lacrimal	Foramen Magnum	
Palatine	Foramen Lacerum	
Inferior Nasal Concha	Carotid Canal	

Critical Thinking

1. The majority of openings in the skull are for something to pass through, so why is the foramen magnum so much bigger than the rest?
2. There are other names for bone marking than the ones listed on the previous page. From what you know, what would be the purpose of the external occipital crest? A portion of the occipital bone posterior to the foramen magnum that is raised above the rest of the bone.
3. If the olfactory nerve controls sense of smell, what opening do you suppose this nerve travels through?
4. If I were to tell you, "I can see your superior orbital fissure," where would I be looking?
5. The mental foramina are openings for blood vessels and nerves. Where would they be located?

Skeletal System Module Review Questions

1. The foramen magnum is the largest opening on the skull; this opening is so large because:
 - A. all the cranial nerves emerge from the brain through this opening.
 - B. all the arteries and veins enter and leave the skull through this opening.
 - C. the spinal cord emerges from the skull through this opening.**
 - D. the brain can expand outward through this opening when needed.
2. The function of the openings in the skull is to:
 - A. allow muscles to enter the cranium.
 - B. allow the brain to expand if it needs to.
 - C. allow blood vessels to enter and exit the cranium.
 - D. allow nerves to exit the cranium.
 - E. both C and D.**
3. Most of the openings in the skull are paired; an opening on the left and the right side of the cranium. This pairing of openings:
 - A. allow a secondary opening should the primary opening become plugged.
 - B. reflect the fact that the human body is bilaterally symmetrical; structures tend to be paired left and right.**
 - C. allow for one side of the brain to control ipsilateral and contralateral sides of the body (both sides).
 - D. allow for blood and nerve impulses to flow in a complete circuit from left side to right side.
4. The supraorbital and infraorbital fissures are larger openings, with the exception of the foramen magnum, than other foramina in the skull. This is most likely because:
 - A. a very large triangular shaped vessel emerges from the skull cavity at these points.
 - B. the sense of sight is so important that it needs more blood vessels and nerves.
 - C. part of the olfactory nerve passes from the nose through these openings.
 - D. multiple cranial nerve branches and blood vessels that pass through these openings.**

**** Correct answers in red. ****