Skull Base & Foramina

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THE SKULL FORAMINA

CRANIAL NERVES

The skull foramina are the entry/exit sites of the cranial nerves through the skull base and the entry/exit sites of the major cranial vasculature through the skull base.

Cribriform plate / CN 1

Within the ethmoid bone, lie the foramina of the cribriform plate. They contain CN 1, the olfactory nerve bundles.

Optic canal / CN 2

Next, medial to the anterior clinoid process, lies the optic canal and lateral to it, lies the superior orbital fissure. CN 2 traverses the optic canal.

Superior orbital fissure / CNs 3, 4, and 6, CN 5(1)

CNs 3, 4, and 6, CN 5(1) pass through the superior orbital fissure.

Foramen rotundum / CN 5(2)

Posterior to the superior orbital fissure, within the greater wing of the sphenoid bone, lies foramen rotundum, and posterior to it, lies foramen ovale. CN 5(2) traverses foramen rotundum. Think of **R2D2** *from "Star Wars"* to help remember this association.

Foramen ovale / CN 5(3)

CN 5(3) traverses foramen ovale.

Internal acoustic meatus / CNs 7 and 8

Along the petrous apex of the temporal bone, lies the internal acoustic meatus.. CNs 7 and 8 pass through the internal acoustic meatus.

Clinical Correlation - 8th Nerve Palsy

Jugular foramen / CNs 9, 10, and 11

Posterior to the internal acoustic meatus, lies the jugular foramen.. CNs 9, 10, and 11 pass through the jugular foramen.

Hypoglossal canal / CN 12

Medial to the internal acoustic meatus, lies the hypoglossal canal.. CN 12 passes through the hypoglossal canal.

VASCULATURE

Ophthalmic artery

The ophthalmic artery traverses the optic canal.

Superior ophthalmic vein

The superior ophthalmic vein passes through the superior orbital fissure.

Internal auditory artery

The internal auditory artery (aka labyrinthine artery) passes through the internal acoustic meatus.

Internal jugular vein

The internal jugular vein passes through the jugular foramen.

Hypoglossal canal venous plexus

The hypoglossal canal contains a venous plexus.

Middle meningeal artery

Posterior to foramen ovale, lies foramen spinosum. The meningeal branch of CN 5(3) passes through foramen

spinosum and the middle meningeal artery passes through it, as well. Middle meningeal artery rupture is the major cause of epidural hematoma.

Internal carotid artery

The carotid canal lies along the petrous ridge. The internal carotid artery runs within it.

Vertebral arteries

Foramen magnum lies in midline. CN 11 passes up through foramen magnum (before it passes out of the cranium through the jugular foramen) and the vertebral arteries and spinal vessels traverse foramen magnum, as well.

THE CRANIAL FOSSAE

The three cranial fossa are the: anterior, middle, and posterior fossae.

The anterior cranial fossa

Lies anterior to the posterior aspect of the lesser wing of the sphenoid bone. The basal portions of the frontal lobes lie within this fossa.

The middle cranial fossa

Lies between the anterior cranial fossa and the petrous ridge of the temporal bone. The basal portions of the temporal lobes lie within this fossa.

The posterior cranial fossa

Lies posterior to the petrous ridge. The cerebellum and brainstem lie within this fossa.

Depressions = Fossa

The anterior depression is the anterior cranial fossa. The middle depression is the middle cranial fossa. The posterior depression is the posterior cranial fossa.

BONES OF THE SKULL BASE

The anterior one-third is the frontal bone. The ethmoid bone, which comprises the steeply peaked crista galli and the surrounding cribriform plate, lies in midline. Posterior to the frontal bone, lies the sphenoid bone. The midline portion of the sphenoid bone is the sphenoid body.

- It subdivides into the jugum sphenoidale, anteriorly, and the sella turcica, posteriorly.

- The lesser wing of the sphenoid bone lies anteriorly, and the greater wing lies posteriorly.

- Topographically, the lesser sphenoid wing angles up over the greater sphenoid wing, which rolls downward.

- The protuberance lies along the posteromedial ridge of the lesser wing as the anterior clinoid process.

The temporal bone lies posterior to the greater wing of the sphenoid bone.

• We see the petrous ridge and the squamous part of the temporal bone lies laterally.

- The squamous part makes up the bulk of the external surface of the temporal bone, whereas the petrous part makes up the bulk of the internal surface.

Posteromedial to the temporal bone, lies the occipital bone; it extends back to the occiput. In the anterior one-third of the occipital bone, lies the foramen magnum, which is the entry zone of the brainstem. The combined anterior occipital bone and posterior sphenoid bone form the clivus, which is steeply sloped, and is a clinically important anatomical region. Along the lateral edge of the skull base, lies the parietal bone. The parietal bones make up much of the lateral and superior surfaces of the skull.

Photos of the Inferior Aspect of the Skull:

!Foramina of Sphenoid bone !Foramina of Temporal bone !Inferior view Maxilla bone !Foramina of Occipital bone