

## FORAMINA OF SKULL: SKULL SESSION

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The skull is rigidly structured to protect the brain but has many foramina (openings) for passage of nerves (nn.), arteries (aa.) and veins (vv.); knowledge of the foramina of the skull is ESSENTIAL to understanding head and neck anatomy. The foramina are listed below according to how one can view them on a skull. Each entry indicates the bone the foramen is in, the areas it connects and structures that pass through it; many foramina are doubly listed as they can be seen from the inside or outside of the skull.

### I. FACE

1. Supraorbital notch or foramen - in frontal bone; connects orbit and forehead; contains Supraorbital n., a. and v.
2. Infraorbital foramen - in maxillary bone; connects orbit and face; contains Infraorbital n., a. and v.
3. Mental foramen - in mandible; connects mandibular canal to face; contains Mental n., a. and v.

### II. CALVARIUM AND CRANIAL VAULT

1. Parietal foramen - in parietal bone on either side of sagittal suture; connects; diploe in bone to scalp; contains Emissary veins.

### III. INTERIOR OF SKULL

1. Olfactory foramen - located in cribriform plate of ethmoid bone in anterior cranial fossa; connects anterior cranial fossa and nasal cavity; contains branches of Olfactory nerve (fila olfactoria) (I).
2. Optic foramen and canal - located at base of Lesser wing of sphenoid bone in middle cranial fossa; connects middle cranial fossa to orbit; contains Optic nerve (II) and Ophthalmic artery.
3. Superior Orbital fissure - located between Greater and Lesser wings of Sphenoid bone in Middle Cranial fossa; connects middle cranial fossa and orbit; contains Oculomotor (III), Trochlear (IV), Abducens (VI) nerves and Ophthalmic division of Trigeminal nerve (V1) and Ophthalmic veins.
4. Carotid canal - located in temporal bone; connects base of skull to middle cranial fossa (opening of Carotid canal in middle cranial fossa called Foramen Lacerum); contains Internal carotid artery and Sympathetic Plexus surrounding artery.

5. Foramen rotundum - located in Greater wing of Sphenoid bone; connects middle cranial fossa and Pterygopalatine fossa; contains Maxillary division of Trigeminal nerve (V2).
6. Foramen ovale - located in sphenoid bone; connects middle cranial fossa and infratemporal fossa; contains Mandibular division of V (V3) and Accessory Meningeal artery (when present).
7. Foramen spinosum - located in sphenoid bone; connects middle cranial fossa and infratemporal fossa; contains Middle meningeal artery and Nervus spinosus (from V3).
8. Internal auditory meatus - located in temporal bone; connects posterior cranial fossa to Inner ear and (via facial canal) Stylomastoid foramen; contains Facial (VII) and Vestibulocochlear (VIII) nerves.
9. Jugular foramen - located in temporal and occipital bones; connects posterior cranial fossa and base of skull; contains Internal Jugular vein, Glossopharyngeal (IX), Vagus (X) and Accessory (XI) nerves.
10. Hypoglossal canal - located in occipital bone; connects posterior cranial fossa and base of skull; contains Hypoglossal nerve (XII).
11. Foramen magnum - located in occipital bone; connects posterior cranial fossa and vertebral canal; contains Spinal Cord (with meninges) and Vertebral arteries and veins.

#### IV. ORBIT

1. Optic foramen and canal - located at base of Lesser wing of sphenoid bone in middle cranial fossa; connects middle cranial fossa to orbit; contains Optic nerve (II) and Ophthalmic artery.
2. Superior Orbital fissure - located between Greater and Lesser wings of Sphenoid bone in Middle Cranial fossa; connects middle cranial fossa and orbit; contains Oculomotor (III), Trochlear (IV), Abducens (VI) nerves and Ophthalmic division of Trigeminal nerve (V1) and Ophthalmic veins.
3. Inferior Orbital fissure - located between sphenoid and maxillary bones; connects pterygopalatine fossa and infratemporal fossa to orbit; contains Infraorbital and Zygomatic nn., aa. and vv. (nerves are branches of V2).
4. Anterior and Posterior Ethmoidal Foramina - located between ethmoid and frontal bones; connect orbit and nasal cavity; contain (respectively) Anterior and Posterior Ethmoidal nerves (branches of V1), arteries (branches of Ophthalmic artery), and veins.

5. Supraorbital notch or foramen - located in frontal bone; connect orbit and forehead; contain Supraorbital n., a. and v.

6. Infraorbital foramen - in maxillary bone; connects orbit and face; contains Infraorbital n., a. and v.

7. Nasolacrimal duct - located in maxillary, lacrimal bones and Inferior nasal concha; connects orbit and nasal cavity; contains Membranous Nasolacrimal duct and tears.

#### CHART OF FORAMINA FOR SKULL SESSION

Foramen	Contains
Supraorbital Foramen	Supraorbital nerve V1, artery (from Ophthalmic artery), vein
Infraorbital Foramen	Infraorbital nerve V2, artery (rom Maxillary artery), vein
Mental Foramen	Mental nerve V3, artery (from Maxillary artery), vein
Parietal Emissary Foramina	Emissary veins (connect scalp to diploe, venous sinuses in cranial cavity)
Olfactory Foramina	Olfactory nerves (I)
Optic Foramen (canal)	Optic nerve (II), Ophthalmic artery (from Internal Carotid artery)
Superior Orbital Fissure	III, IV, V1 (Ophthalmic division of Trigeminal nerve), VI; Ophthalmic veins
Foramen Rotundum	Maxillary division of Trigeminal nerve (V2).
Foramen Ovale	Mandibular division of V (V3) and Accessory Meningeal artery (when present)
Foramen Spinosum	Middle Meningeal artery and Nervus Spinosus
Carotid canal	Internal carotid artery and Sympathetic plexus surrounding artery
Internal Auditory Meatus	Facial nerve (VII and Vestibulocochlear nerve (VIII)
Stylomastoid foramen	Facial nerve (VII)
Jugular foramen	Glossopharyngeal (IX), Vagus (X) and Accessory (XI) nerves.
Hypoglossal canal	Hypoglossal nerve (XII)
Foramen Magnum	Spinal cord and Vertebral arteries and veins
Inferior Orbital Fissure	Infraorbital Nerve V2, artery, vein
Anterior and Posterior Ethmoidal Foramina	Anterior and Posterior Ethmoidal nerves (V1), artery, vein
Nasolacrimal Duct	Membranous lacrimal duct (to Inferior Meatus of Nasal Cavity)