

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
الْحَمْدُ لِلَّهِ الَّذِي
خَلَقَ السَّمَوَاتِ وَالْأَرْضَ
وَالَّذِي جَعَلَ مِنَ
النَّارِ سَمُوكًا
وَالَّذِي جَعَلَ
لِلنَّجْمِ كُوْنًا
قَدِيرًا
الْحَمْدُ لِلَّهِ الَّذِي
جَعَلَ اللَّيْلَ لِبَاسًا
وَالنَّوْمَ لِمَتًا
إِذَا نَادَى السَّامِعُ
بِالنَّاطِقِ
وَالْحَمْدُ لِلَّهِ الَّذِي
جَعَلَ الْجِبَالَ أَوْتَادًا
وَالْحَمْدُ لِلَّهِ الَّذِي
جَعَلَ الرِّيحَ رِيحًا
وَالْحَمْدُ لِلَّهِ الَّذِي
جَعَلَ الْوَسْمَانَ
سَمَاءً مَنِيرًا
وَالْحَمْدُ لِلَّهِ الَّذِي
جَعَلَ الْوَسْمَانَ
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وَالْحَمْدُ لِلَّهِ الَّذِي
جَعَلَ الْوَسْمَانَ
سَمَاءً مَنِيرًا

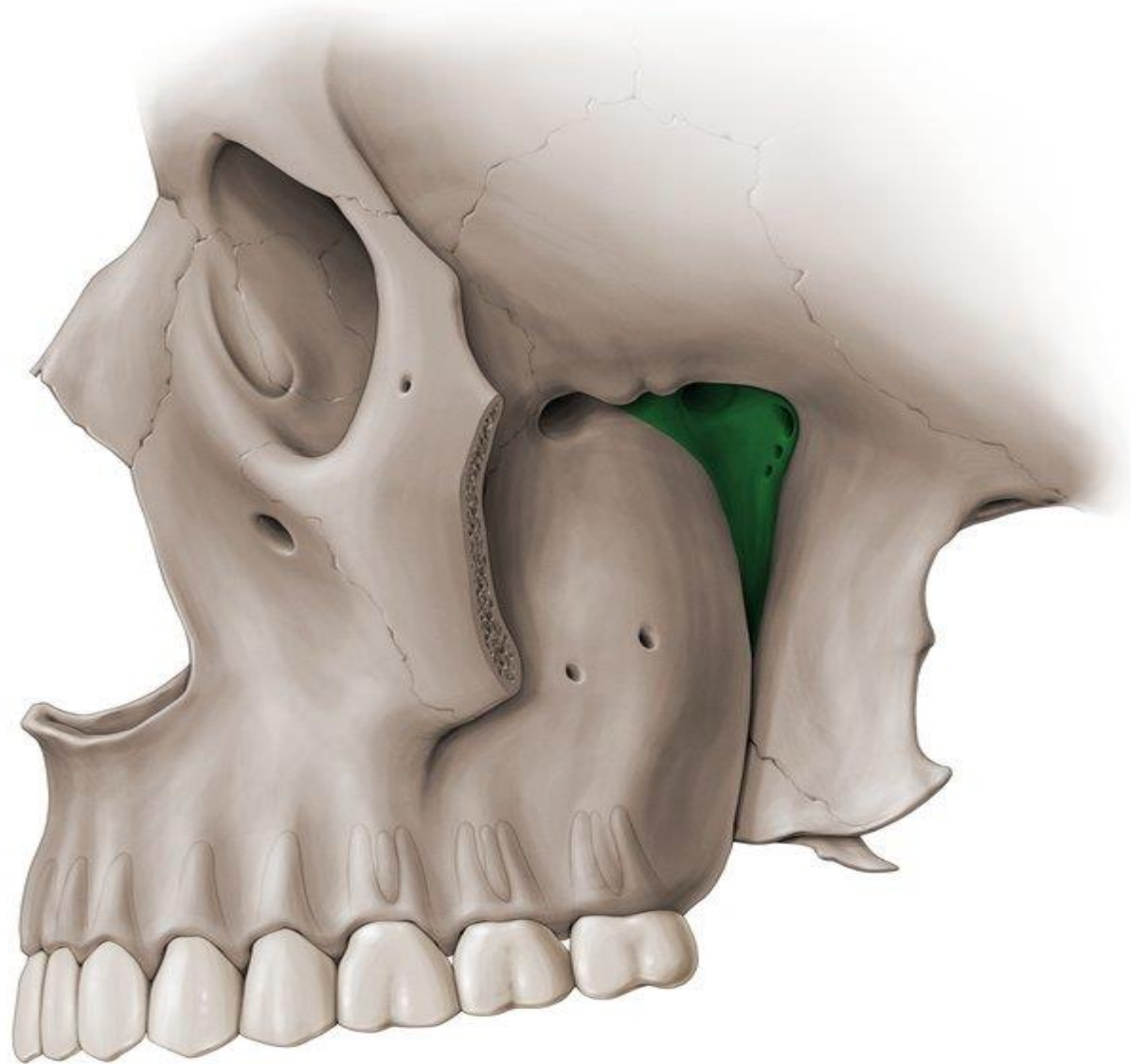
GROSS ANATOMY OF PTERYGOPALENTINE FOSSA

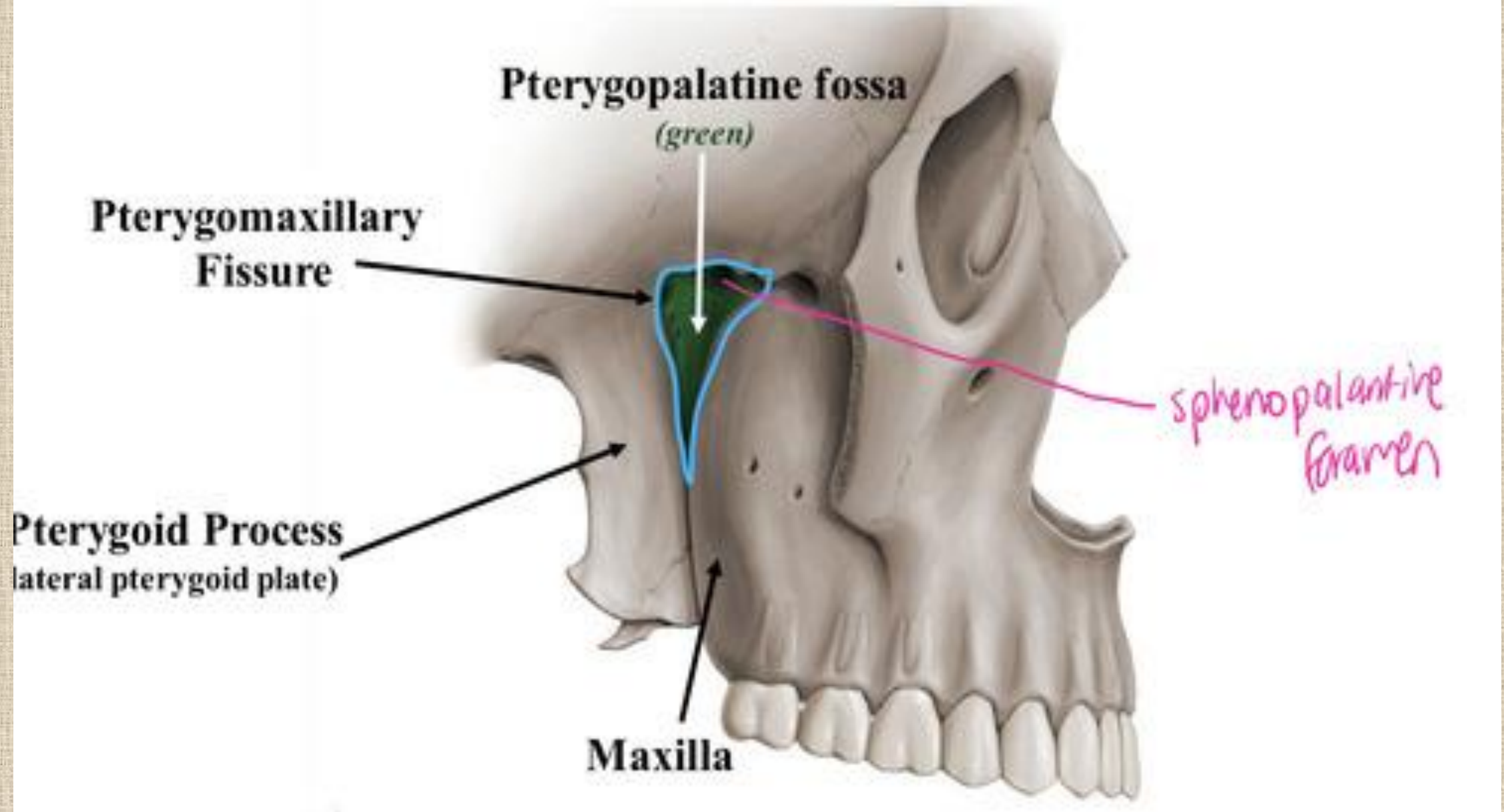
By

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- The **pterygopalatine fossa** is a bilateral, cone-shaped depression extending deep from the infratemporal fossa all the way to the nasal cavity via the sphenopalatine foramen.
- It is located between the maxilla, sphenoid and **palatine** bones, and communicates with other regions of the skull and facial skeleton via several canals and foramina.





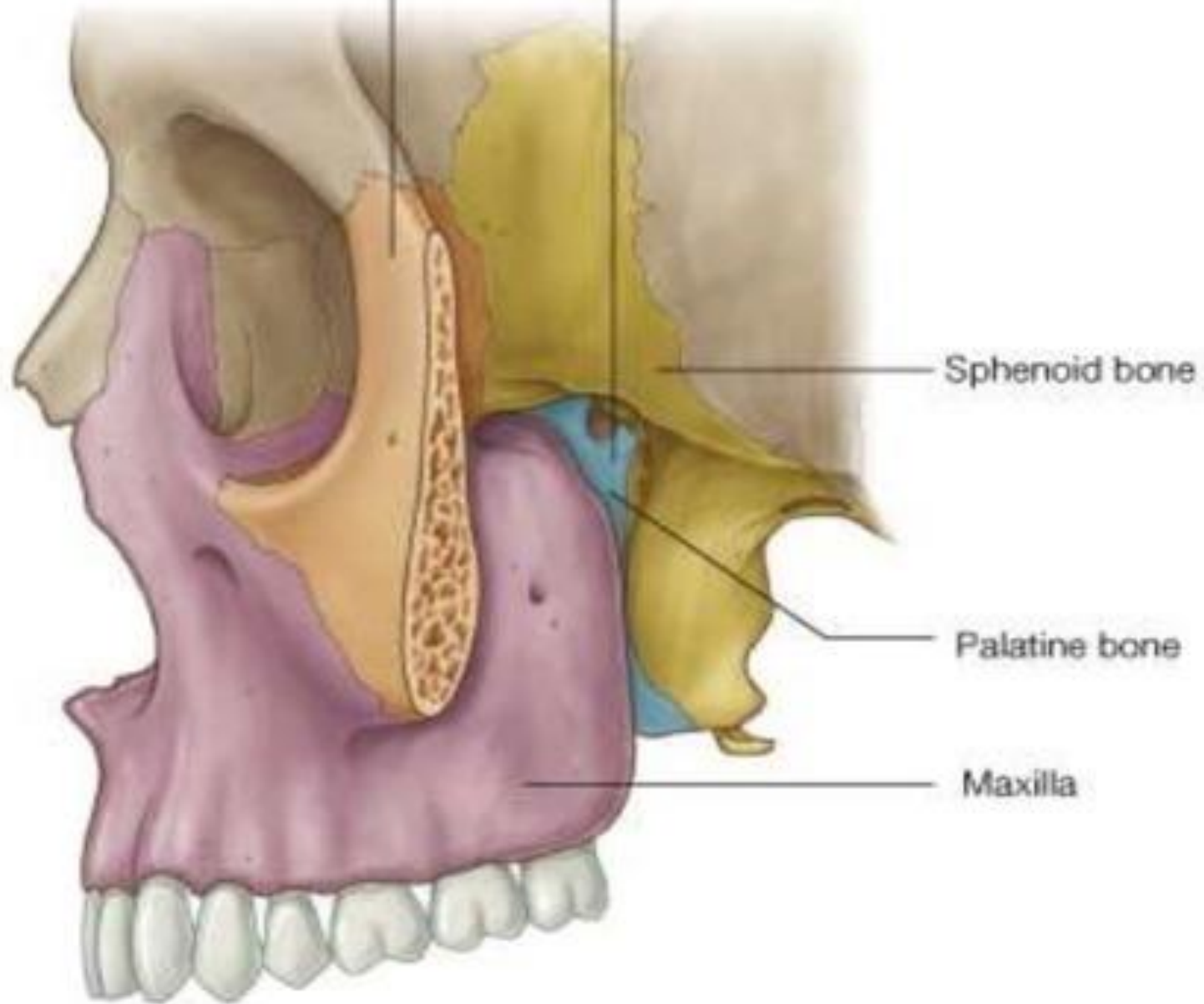
BORDERS

- The borders of the pterygopalatine fossa are formed by the palatine, maxilla and sphenoid bones:
- **Anterior:** Posterior wall of the maxillary sinus.
- **Posterior:** Pterygoid process of the [sphenoid](#) bone.
- **Inferior:** Palatine bone and palatine canals.
- **Superior:** Inferior orbital fissure of the eye.
- **Medial:** Perpendicular plate of the palatine bone
- **Lateral:** Pterygomaxillary fissure

A

Zygomatic bone

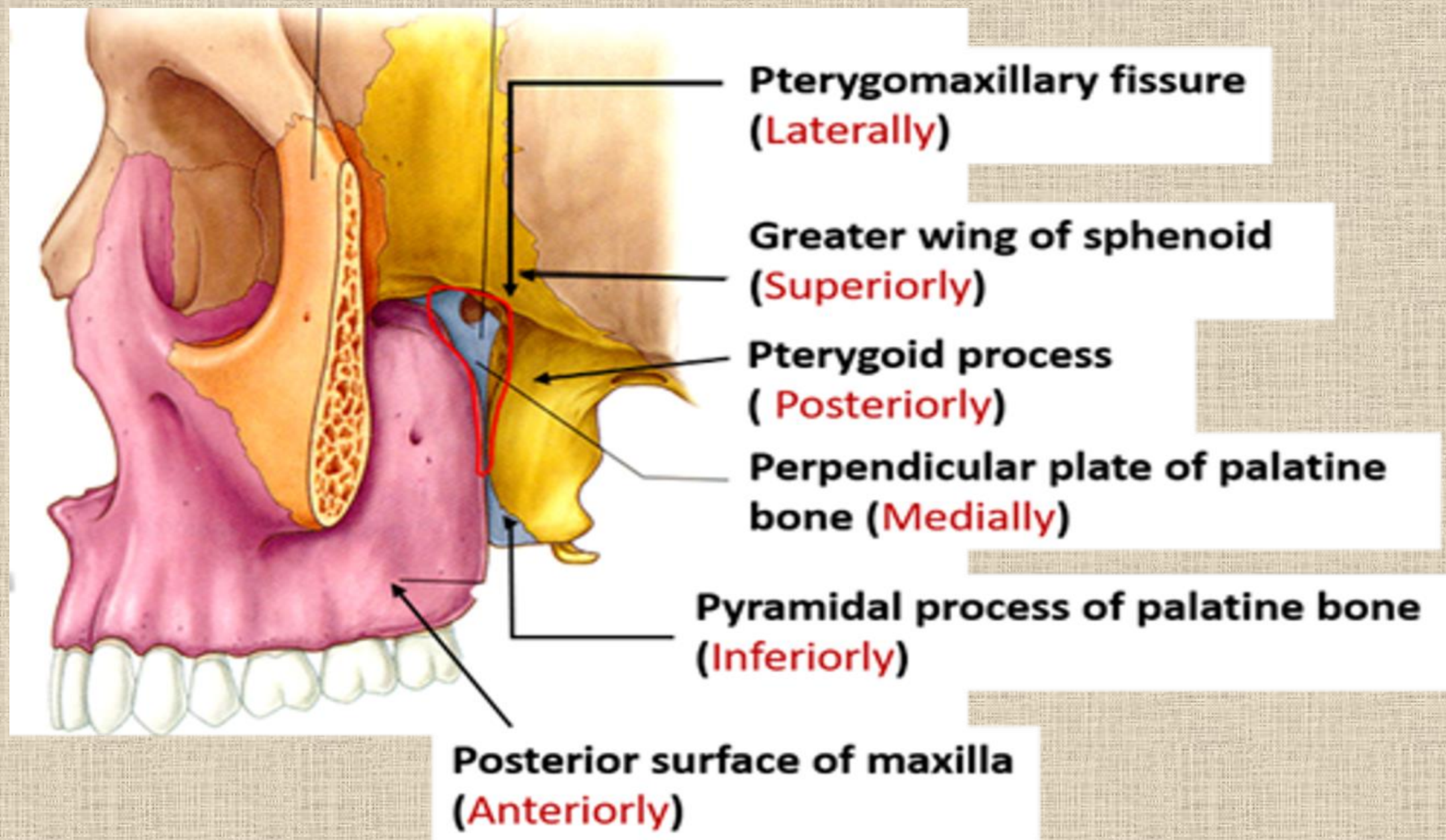
Pterygopalatine fossa



Sphenoid bone

Palatine bone

Maxilla



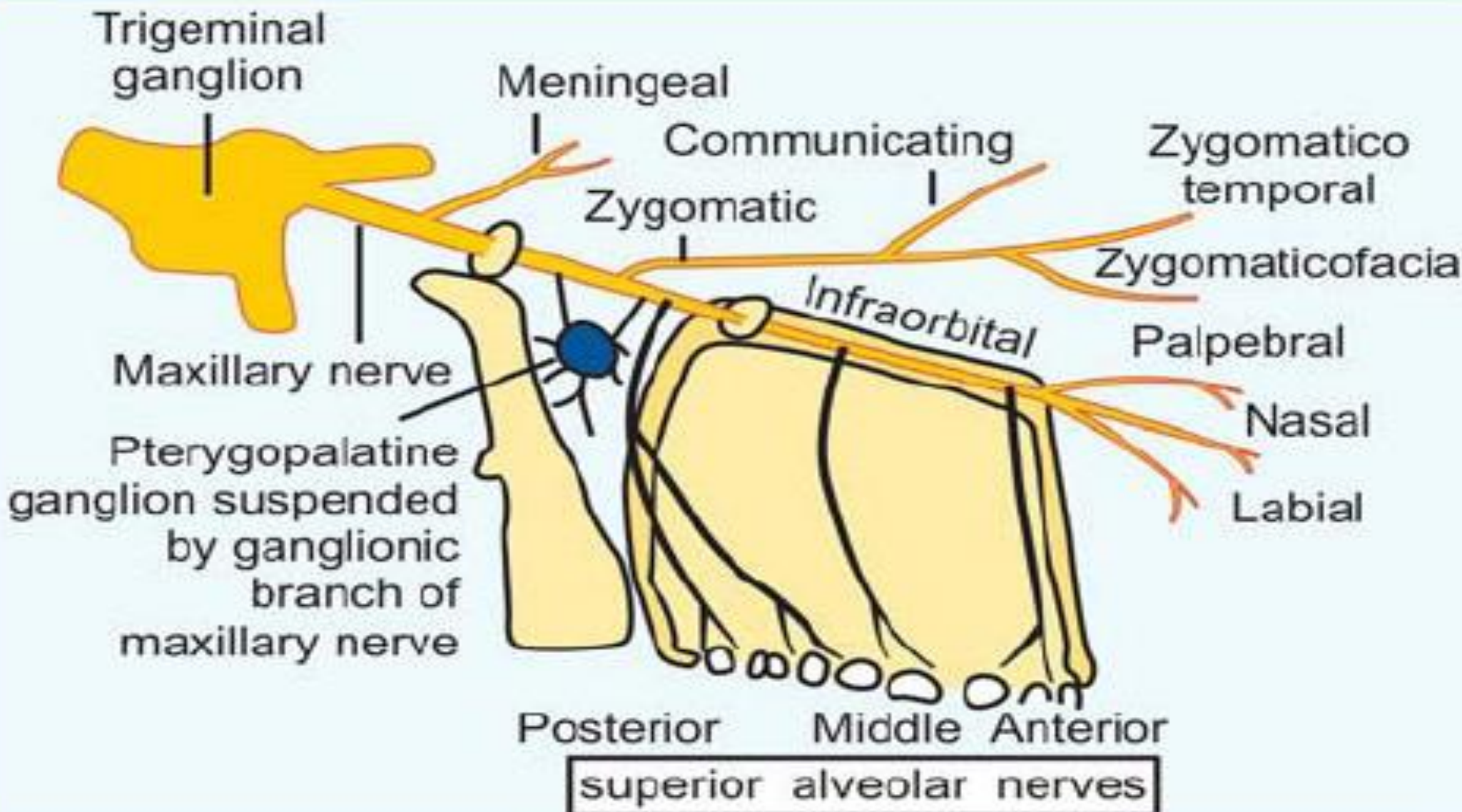
CONTENTS

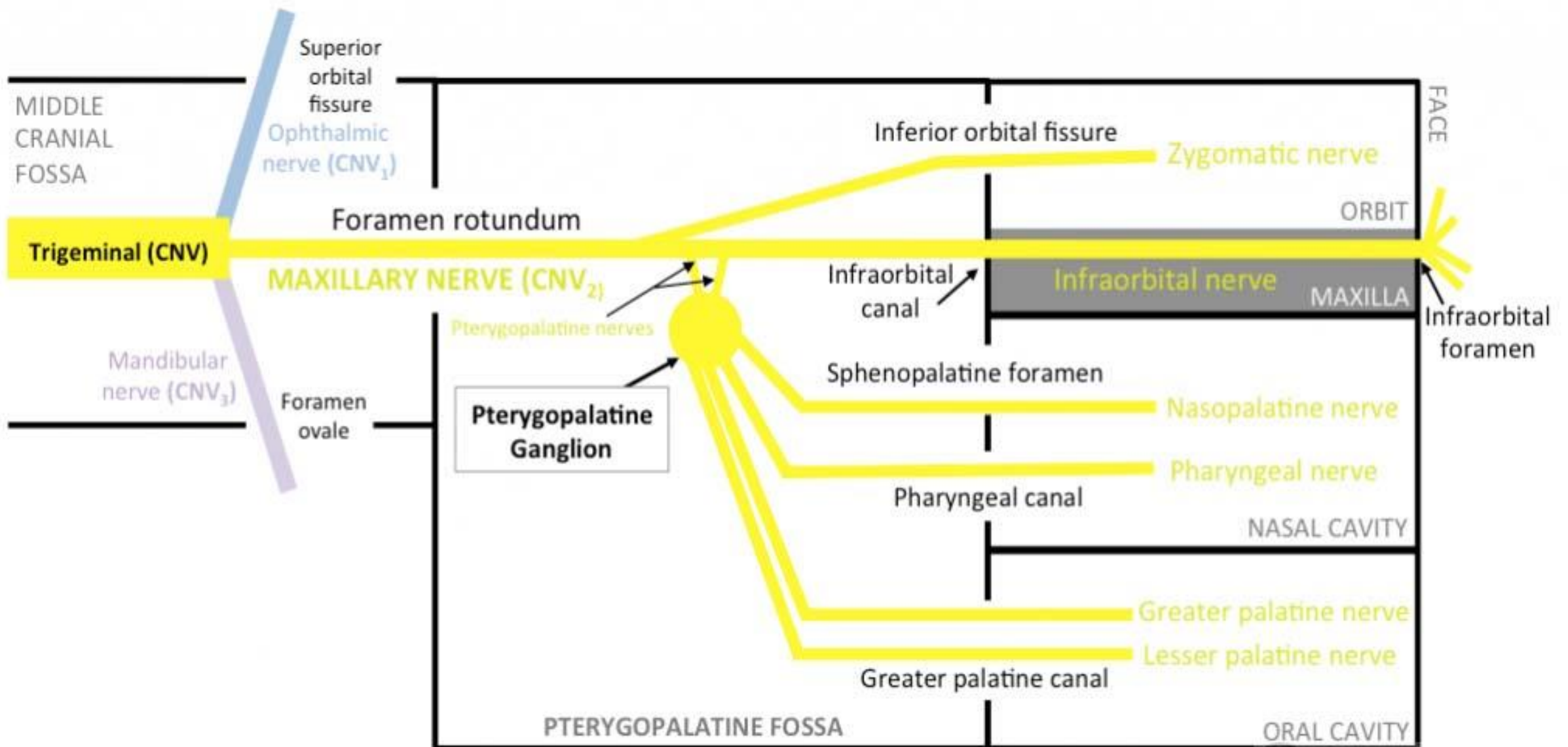
- The Pterygopalatine Fossa contains many important neurovascular structure ie, maxillary nerve and its branches, the pterygopalatine ganglion and the maxillary artery and its branches.

CONTENTS (CONTD)

MAXILLARY NERVE

- The maxillary nerve is the second branch of the [trigeminal nerve](#) (CNV₂). It passes from the middle cranial fossa into the pterygopalatine fossa through the **foramen rotundum**.
- The main trunk of the maxillary nerve leaves the pterygopalatine fossa via the **infraorbital fissure**. Here, it enters the infraorbital canal of the maxilla and exits below the orbit in the infraorbital foramen to contribute to the sensory innervation of the face (figures 2.0 & 2.1).
- While in the pterygopalatine fossa, the maxillary nerve gives off numerous branches including the infraorbital, zygomatic, nasopalatine, superior alveolar, pharyngeal and the greater and lesser palatine nerves. The maxillary nerve also communicates with the **pterygopalatine ganglion** (discussed below) via two small trunks, the **pterygopalatine nerves**. These nerves suspend the ganglion within the pterygopalatine fossa.



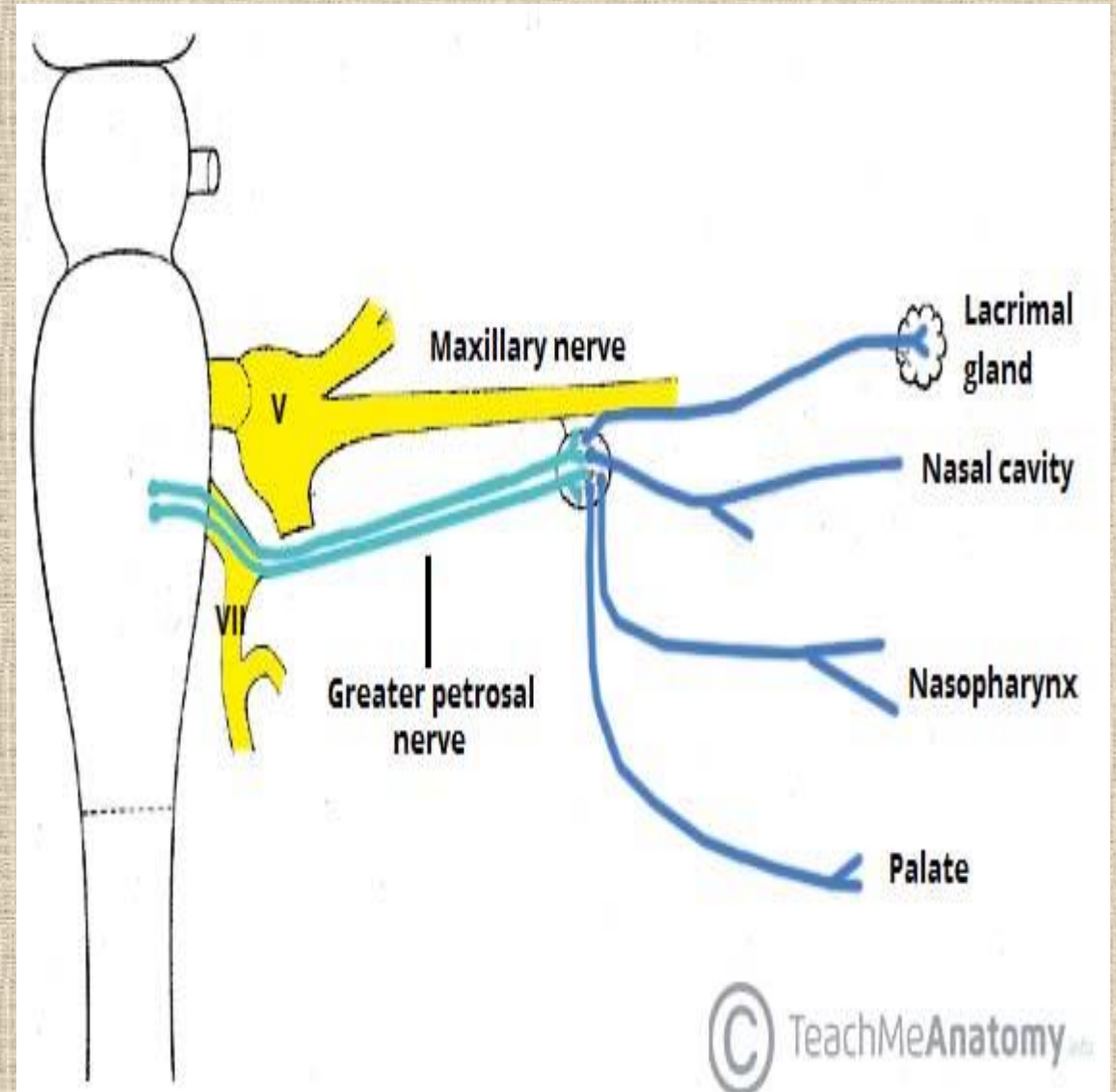


The branches of the pterygopalatine ganglion and the maxillary nerve. Note: For simplicity, this schematic does not show: the contribution of the facial nerve (CNVII) to the pterygopalatine ganglion, the posterior superior alveolar nerves, or the nerve of the pterygoid canal.

CONTENTS (CONTD)

PTERYGOPALATINE GANGLION

- The pterygopalatine ganglion sits deep within the pterygopalatine fossa near the sphenopalatine foramen. It is the largest parasympathetic ganglion related to branches of the maxillary nerve (via pterygopalatine branches) and is predominantly innervated by the **greater petrosal branch of the facial nerve (CNVII)**.
- Postsynaptic parasympathetic fibres leave the ganglion and distribute with branches of the maxillary nerve (CNV₂). These fibres are **secretomotor** in function, and provide **parasympathetic innervation** to the lacrimal gland, and muscosal glands of the oral cavity, nose and pharynx.

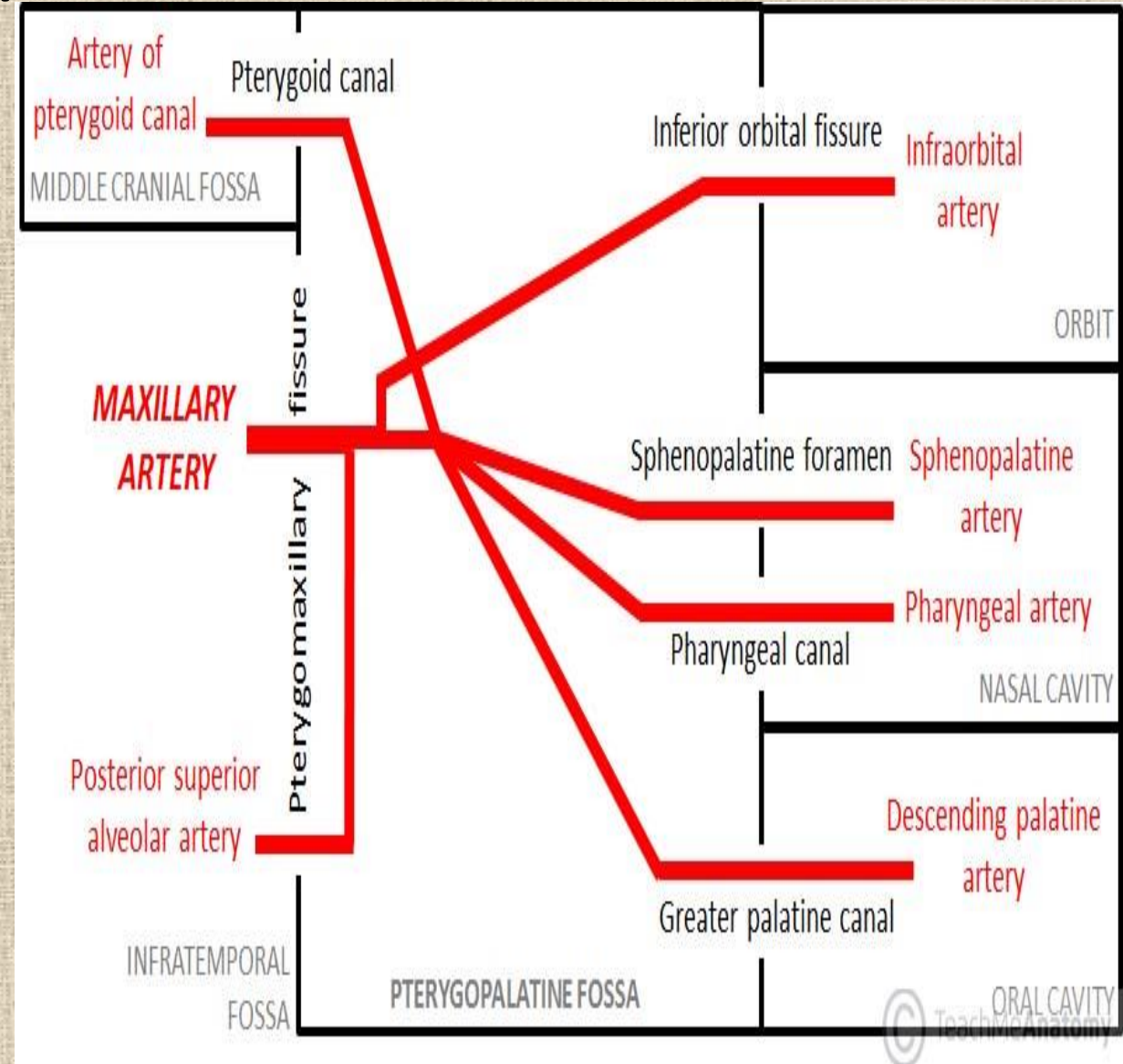


The pterygopalatine ganglion and its branches.

CONTENTS (CONTD)

MAXILLARY ARTERY

- The maxillary artery is a terminal branch of the **external carotid artery**. The terminal portion of the maxillary artery lies within the pterygopalatine fossa. Here, it separates into several branches which travel through other openings within the fossa to reach the regions they supply.
- These branches include, but are not limited to:
- **Sphenopalatine artery** (to the nasal cavity).
- **Descending palatine artery** – branches into greater and lesser palatine arteries (hard and soft palates).
- **Infraorbital artery** (lacrimal gland, and some muscles of the eye).
- **Posterior superior alveolar artery** (to the teeth and gingiva).
- At their terminal ends, the sphenopalatine and greater palatine arteries anastomose at the nasal septum.



Branches of the maxillary artery and their related foramina and cavities.

GATEWAYS

The pterygopalatine fossa serves as a gateway for seven openings that communicate with the orbit, the nasal cavity, the oral cavity, the middle cranial fossa, and the infratemporal fossa. These openings transmit branches of the maxillary nerve (V2), the pterygopalatine ganglion, and the maxillary vessels. The seven openings are the:

- pterygomaxillary fissure
- foramen rotundum
- pterygoid canal
- palatovaginal canal
- inferior orbital fissure
- palatine canal
- sphenopalatine foramen

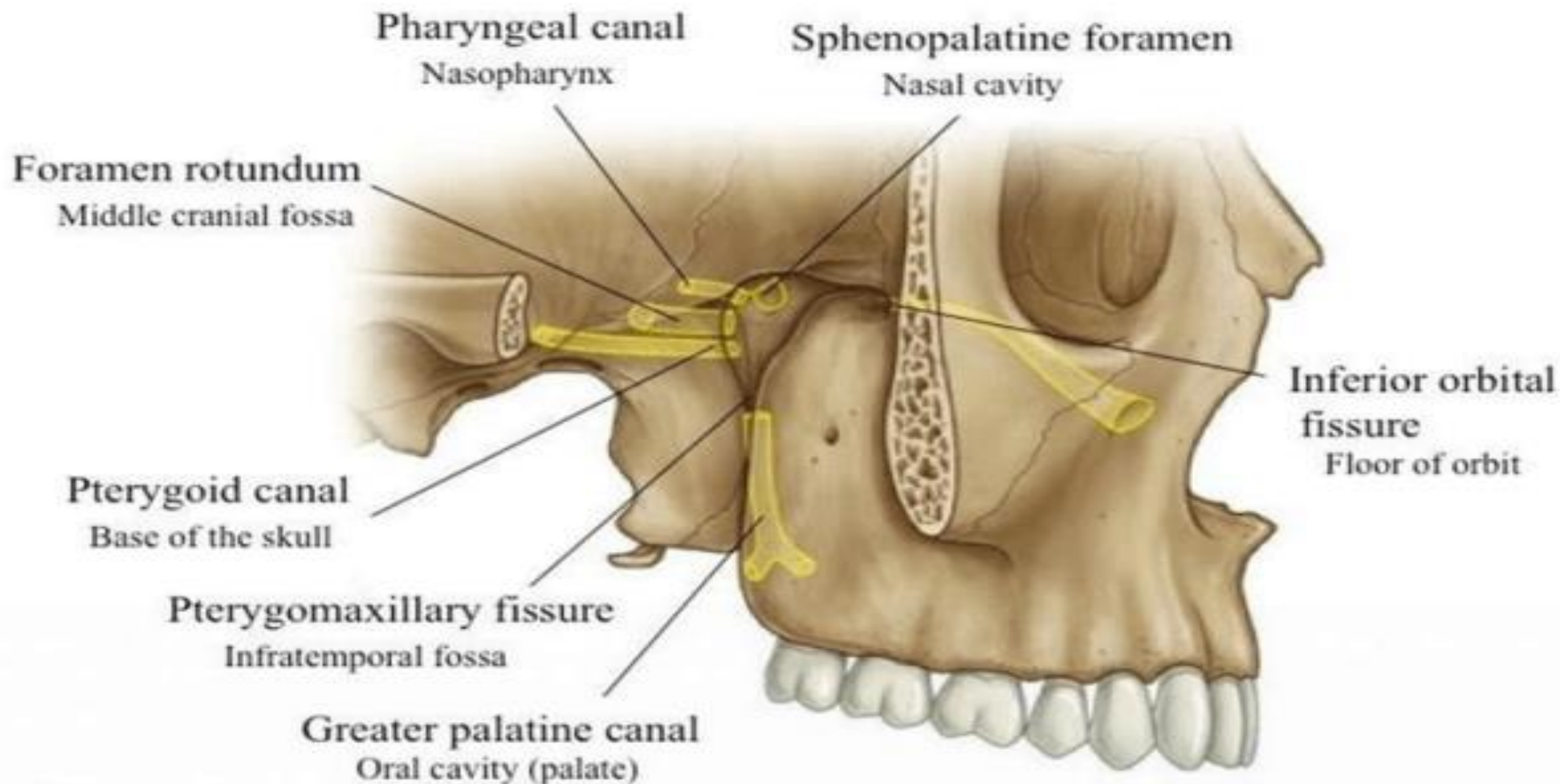
FORAMINA

There are seven openings (also known as foramina) that connect the pterygopalatine fossa with the orbit, nasal and oral cavities, middle cranial fossa and infratemporal fossa. The openings transmit blood vessels and nerves between these regions.

- **Pterygomaxillary Fissure**

The pterygomaxillary fissure connects the **infratemporal fossa** with the pterygopalatine fossa (see figure 1). It transmits two neurovascular structures:

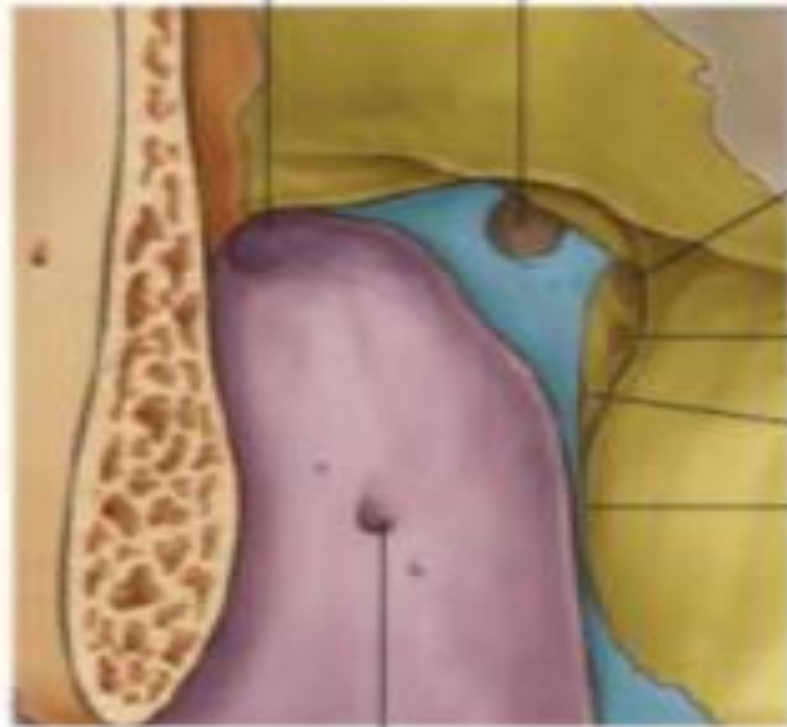
- **Posterior superior alveolar nerve** – a branch of the maxillary nerve. It exits through the fissure into the infratemporal fossa, where it goes on to supply the maxillary molars.
- **Terminal part of the maxillary artery** – enters the pterygopalatine fossa via the fissure.



B

Inferior orbital fissure

Sphenopalatine foramen



Foramen rotundum

Pterygoid canal

Palatovaginal canal

Palatine canal

Alveolar foramen

FORAMEN ROTUNDUM

- The foramen rotundum connects the pterygopalatine fossa to the **middle cranial fossa**. It is one of three openings in the posterior boundary of the pterygopalatine fossa. It conducts a single structure, the **maxillary nerve**.

PTERYGOID AND PHARYNGEAL CANALS

- These two canals, along with the foramen rotundum, are the three openings in the posterior wall of the pterygopalatine fossa:
- **Pterygoid canal** – runs from the middle cranial fossa and through the medial pterygoid plate. It carries the nerve, artery and vein of the pterygoid canal.
- **Pharyngeal canal** – communicates with the nasopharynx. It carries the pharyngeal branches of the maxillary nerve and artery. (**palato vaginal canal**)

- **Inferior Orbital Fissure**

- The inferior orbital fissure forms the superior boundary of the pterygopalatine fossa and communicates with the **orbit**. It is a space between the sphenoid and maxilla bones.

- The **zygomatic branch** of the maxillary nerve and the **infraorbital artery and vein** pass through the inferior orbital fissure.

- **Greater Palatine Canal or PALENTINE CANAL**

- The greater palatine canal lies in the inferior boundary of the pterygopalatine fossa, and communicates with the **oral cavity**. The canal is formed by a vertical groove in the palatine bone which is closed off by an articulation with the maxilla.

- The greater palatine canal transmits the descending palatine artery and vein, the **greater palatine nerve** and the **lesser palatine nerve**.

SPHENOPALATINE FORAMEN

- This foramen is the only opening in the medial boundary. It connects the pterygopalatine fossa to the **nasal cavity** – specifically the superior meatus.
- It is formed by the sphenopalatine notch at the superior aspect of the perpendicular plate of the palatine bone and the body of the sphenoid.
- The sphenopalatine foramen transmits the **sphenopalatine artery and vein**, as well as the **nasopalatine nerve** (a large branch of the pterygopalatine ganglion – CNV₂).

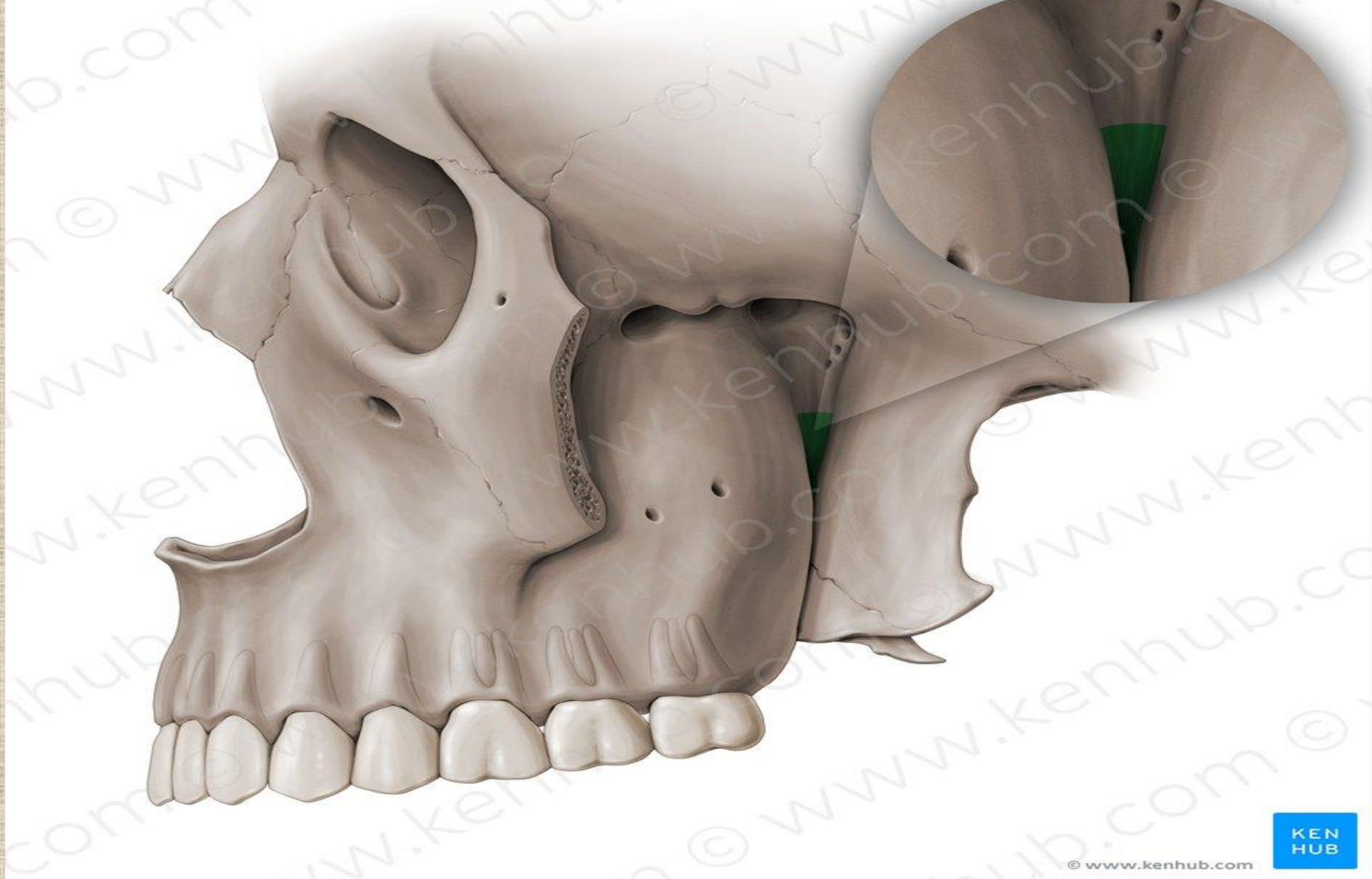
PTERYGOMAXILLARY FISSURE

The pterygomaxillary fissure is located between the anterior and posterior wall of the pterygopalatine fossa. It communicates with the **infratemporal fossa** and transmits the posterior superior alveolar nerve and the maxillary artery.

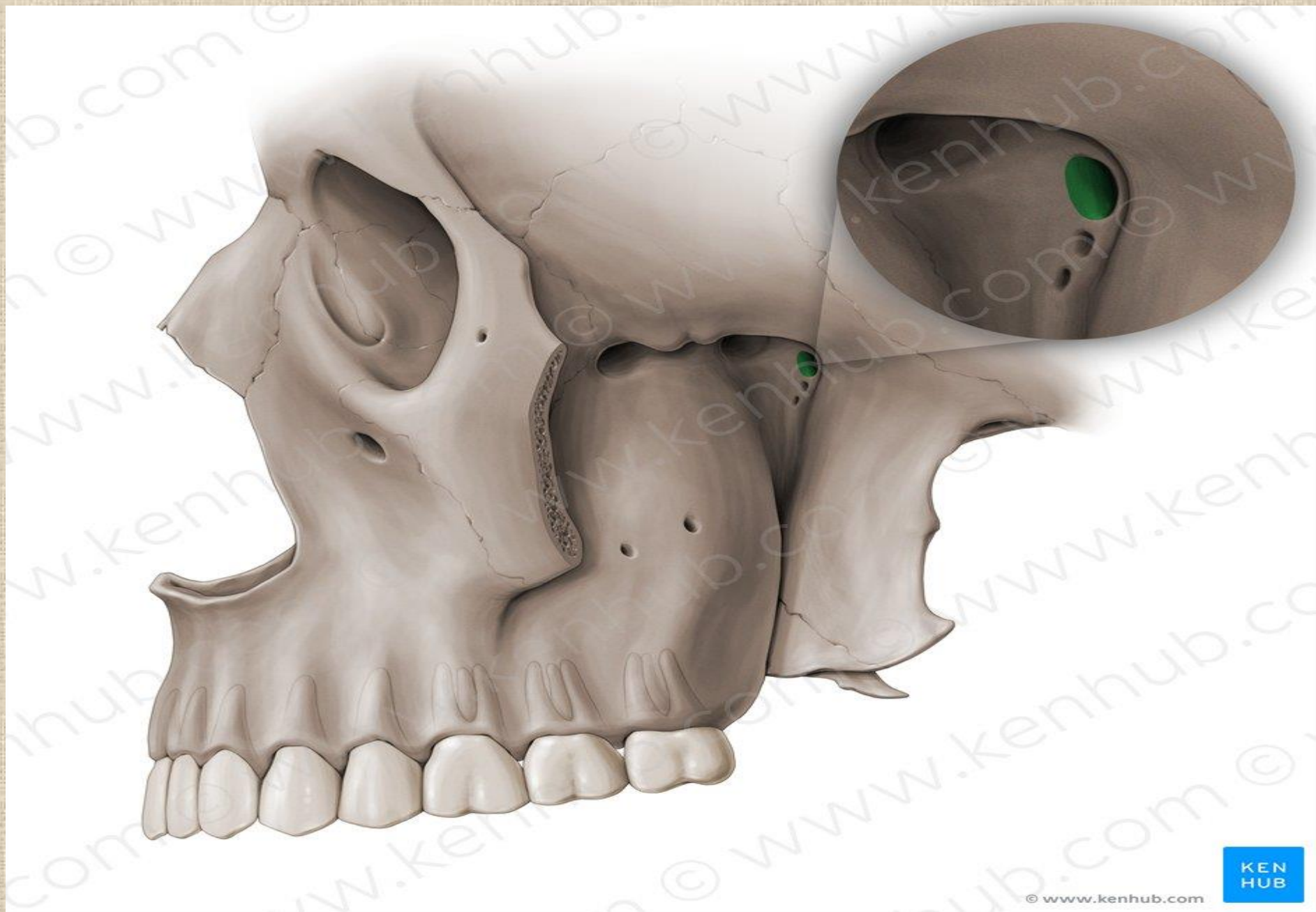
Passages

The passages connect the fossa with other parts of the skull.

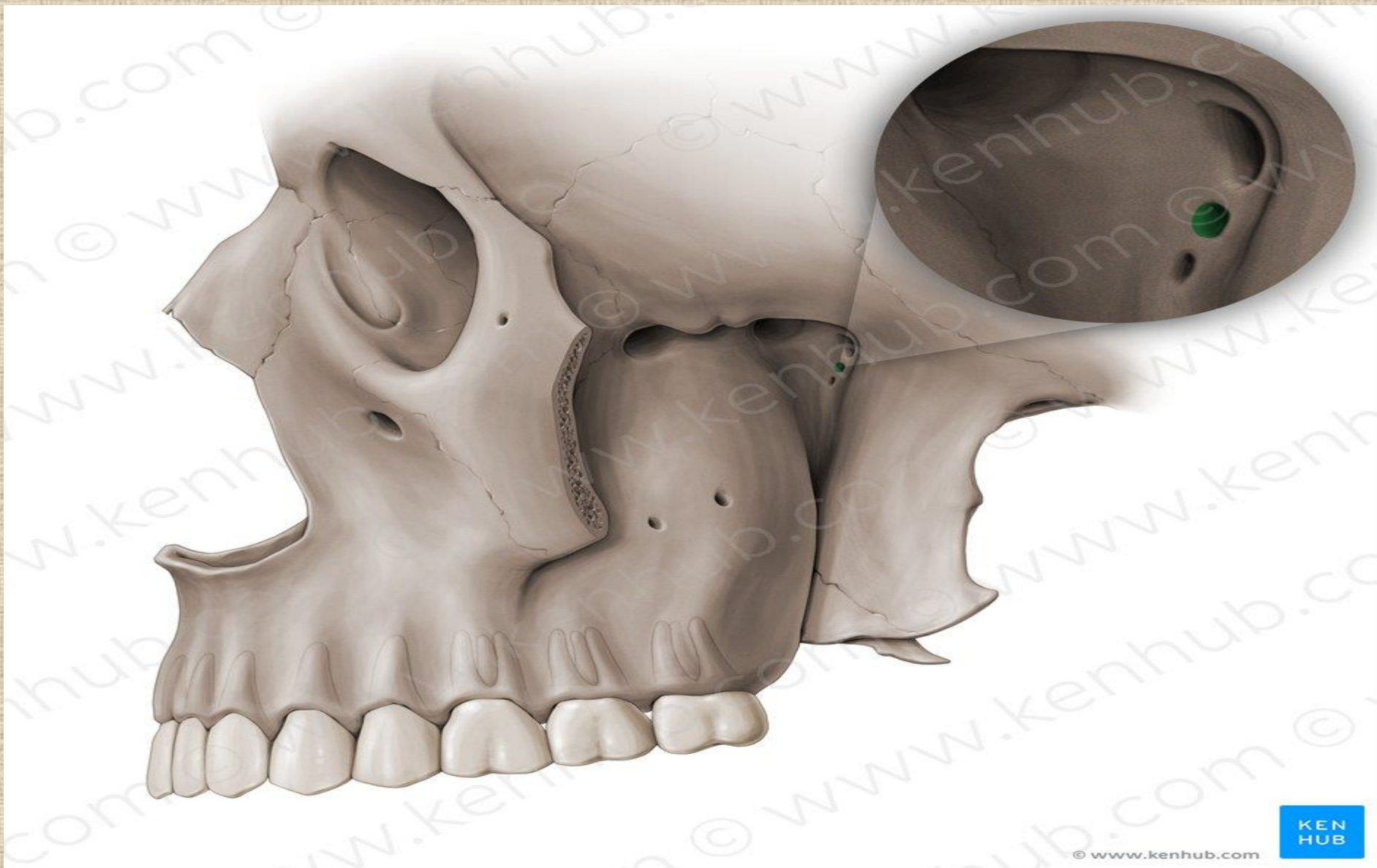
Direction	Passage	Connection
Posteriorly	<u>foramen rotundum</u>	<u>middle cranial fossa</u>
Posteriorly	<u>pterygoid canal</u> (Vidian)	<u>middle cranial fossa</u> , <u>foramen lacerum</u>
Posteriorly	<u>palatovaginal canal</u> (pharyngeal)	<u>nasal cavity</u> / <u>nasopharynx</u>
Anteriorly	<u>inferior orbital fissure</u>	<u>orbit</u>
Medially	<u>sphenopalatine foramen</u>	<u>nasal cavity</u>
Laterally	<u>pterygomaxillary fissure</u>	<u>infratemporal fossa</u>
Inferiorly	<u>greater palatine canal</u> (pterygopalatine)	<u>oral cavity</u> , <u>lesser palatine canals</u>



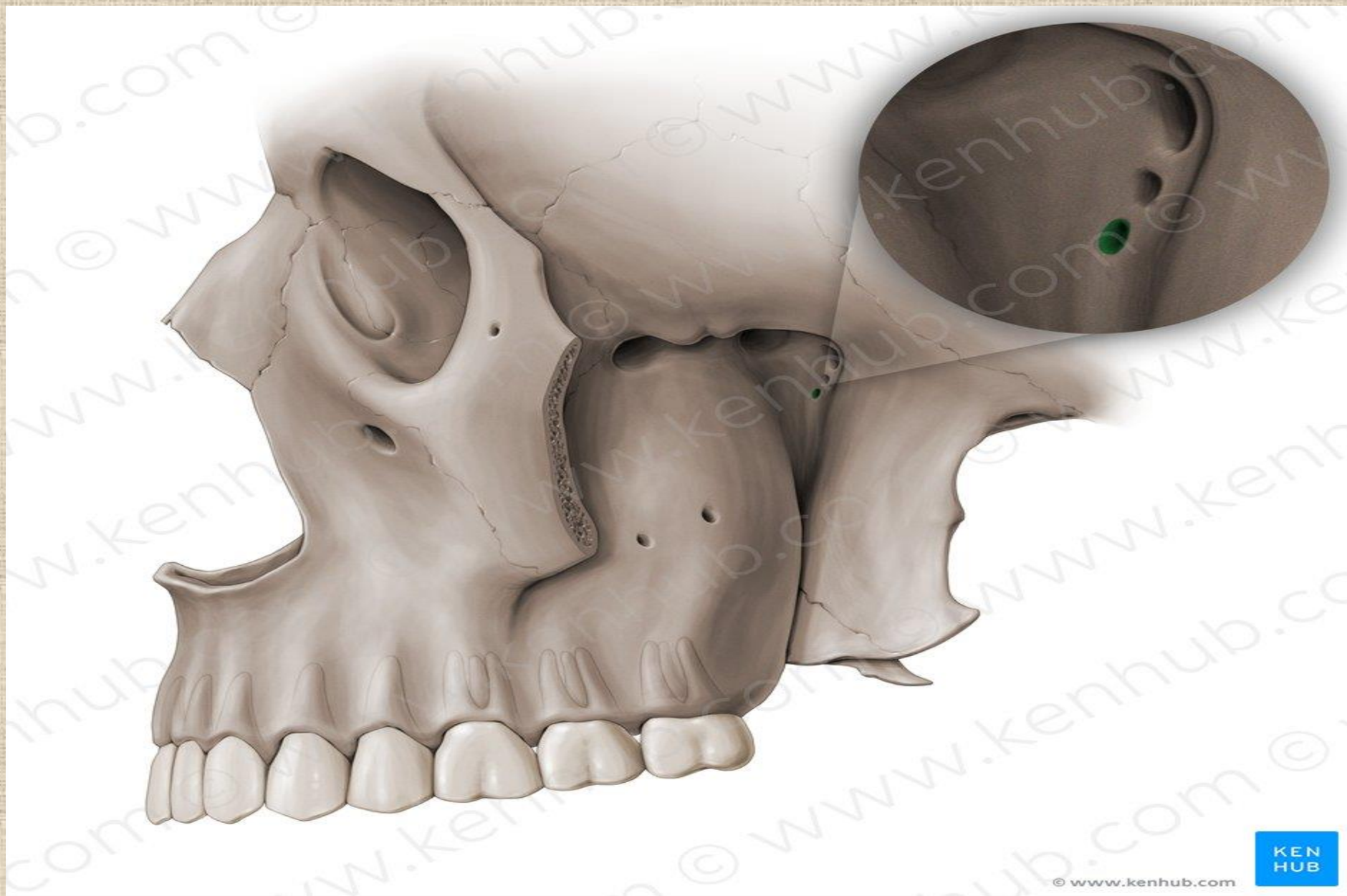
Pterygomaxillary fissure
Fissura pterygomaxillaris



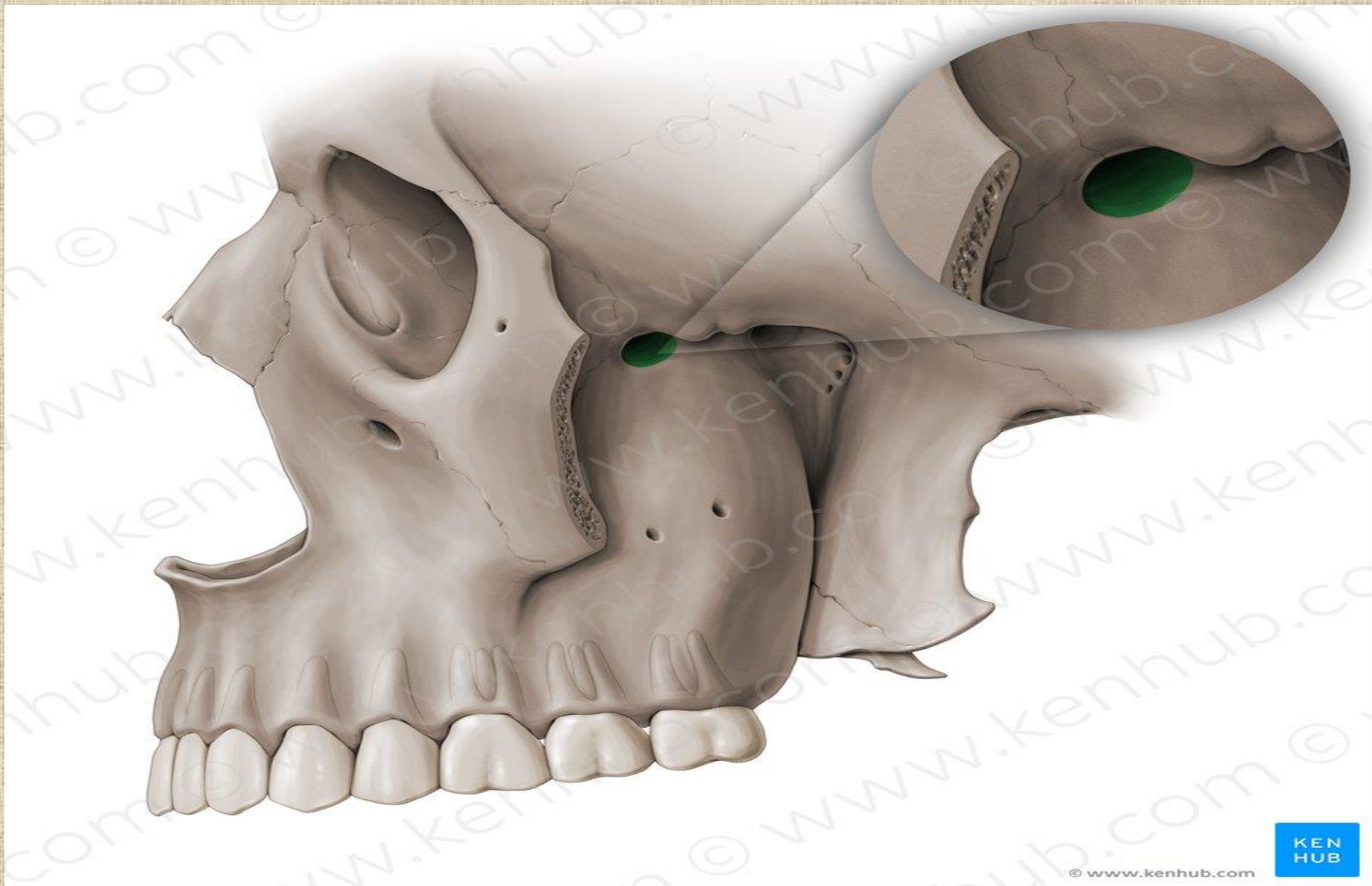
FORAMEN ROTUNDUM



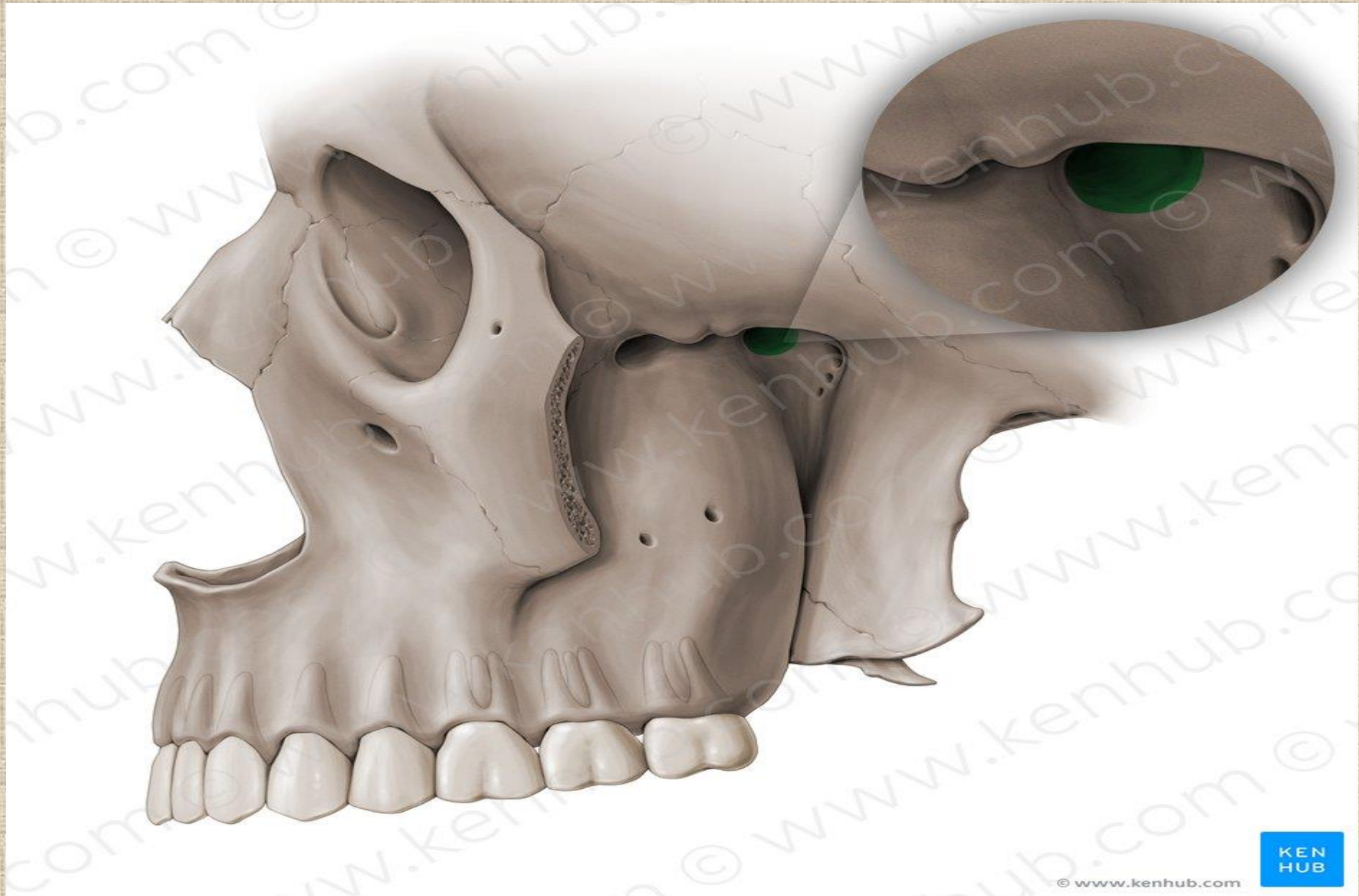
**PTERYGOID CANAL
CANALIS PTERYGOIDEUS**



Palatovaginal canal
Canalis palatovaginalis



Inferior orbital fissure
Fissura orbitalis inferior



**SPHENOPALATINE FORAMEN
FORAMEN SPHENOPALATINUM**

CLINICAL RELEVANCE

Maxillary Nerve Block

- Extensive dental surgery may require total nerve block of the maxillary branch of the trigeminal nerve (CNV₂). The maxillary nerve in the pterygopalatine fossa is most often approached intraorally via the **greater palatine canal**.

Chronic Epistaxis

- The sphenopalatine artery is often referred to as the artery of **epistaxis** (nosebleed). In cases of chronic epistaxis, the pterygopalatine fossa can be surgically approached via the maxillary sinus, and the artery ligated to control bleeding.

CLINICAL ASPECTS

- Because of its location and associated connections, the pterygopalatine fossa is often involved in the spread of tumours, infections, and inflammations caused by neoplastic diseases in the [head and neck](#) (such as juvenile nasopharyngeal angiofibroma, nasopharyngeal carcinoma, bacterial sinusitis, etc.).
- For instance, in juvenile nasopharyngeal angiofibroma, the tumour extends into the pterygopalatine fossa via the sphenopalatine foramen, and spreads in a multidirectional fashion into other regions of the head, such as the sinuses, the infratemporal fossa, the orbit, and the cranial fossa.

THANK YOU