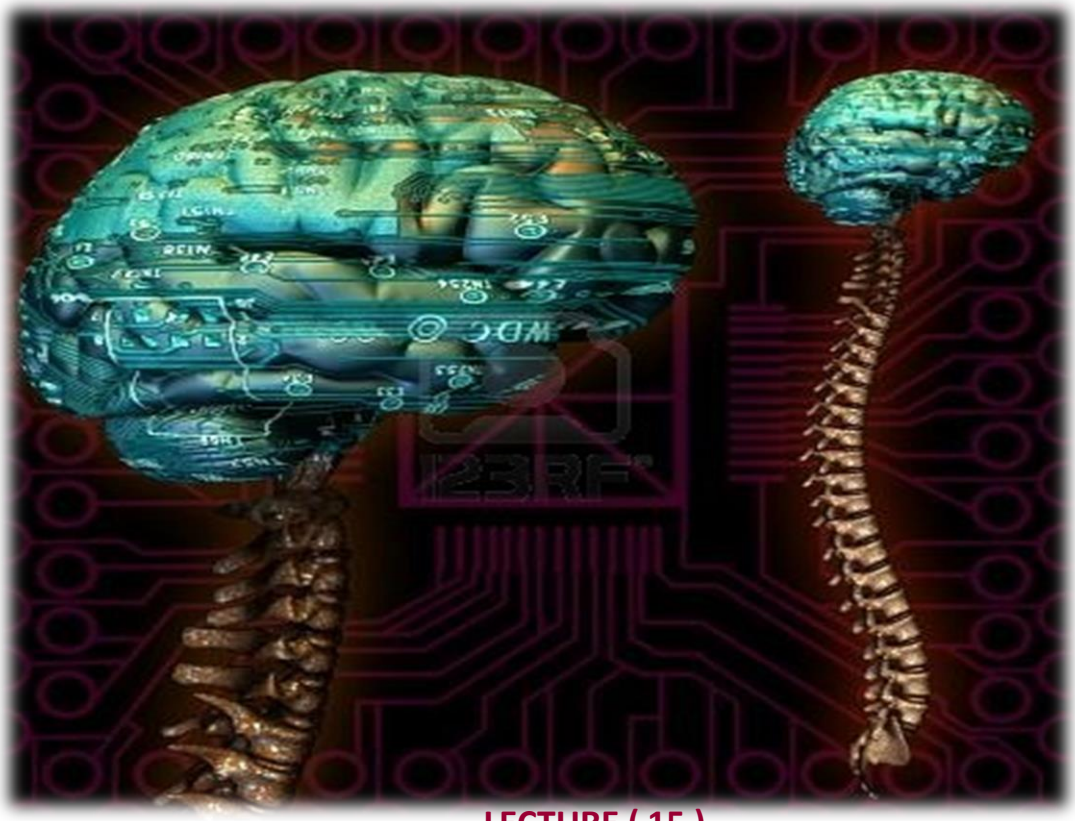
CNS Block



LECTURE (15)

NOSE & OLFACTORY NERVE

Done by: Latifah Al-Fahad

Reviewed by: Abdullah Alanazi

If there is any mistake please feel free to contact us:

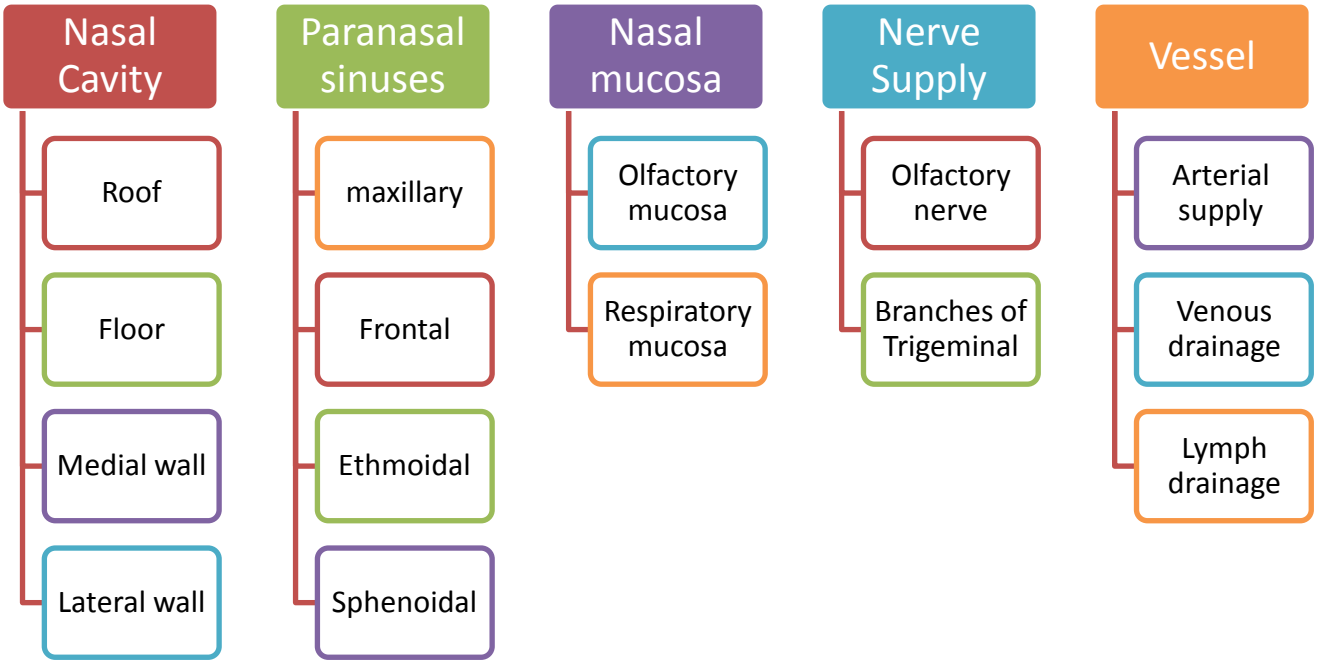
Anatomyteam32@gmail.com

Both - Black
Male Notes - BLUE
Female Notes - GREEN
Explanation and additional notes - ORANGE
Very Important note - Red

Objectives:

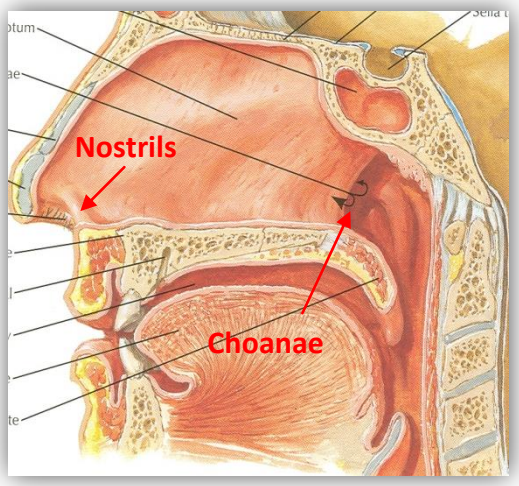
1. Describe the structures forming the walls of the nasal cavity.
2. List the main structures draining into the lateral wall of the nasal cavity.
3. Differentiate between the respiratory and olfactory regions of the nasal cavity.
4. List the main sensory and blood supply of the nose.
5. Describe the olfactory pathway.

Mind Map



Nasal cavity

- It extends from **nostrils** anteriorly to the **choanae** posteriorly. It's divided into right and left parts by the **nasal septum**. Each part has:
- **Roof , Floor, Lateral and Medial walls**.

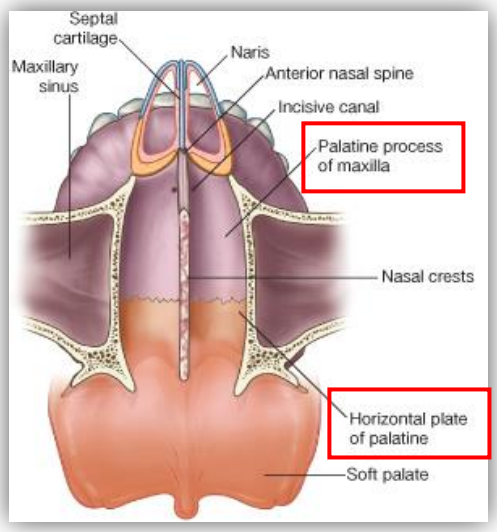


1.Floor

Which is the roof of the oral

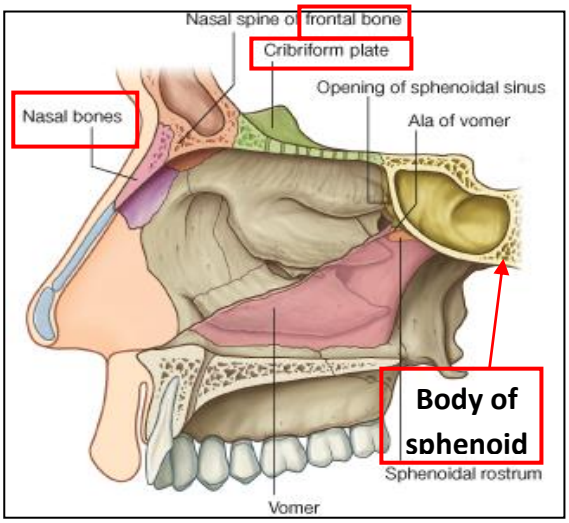
Formed by the nasal (or upper) surface of the hard (or bony) palate which is formed of:

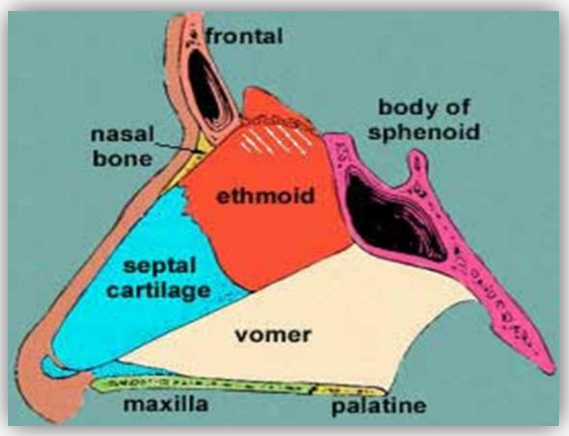
1. Palatine process of maxilla, anteriorly.
2. Horizontal plate of the palatine bone, posteriorly.



2.Roof

- Formed by:
  1. Body of sphenoid, posteriorly.
  2. Cribriform plate of ethmoid, in the middle.
  3. Frontal, and nasal bones, Anteriorly.





3.Medial Wall

Formed by the **nasal septum**, which is composed of:

1. Vertical plate of ethmoid.
2. Septal cartilage.
3. Vomer.

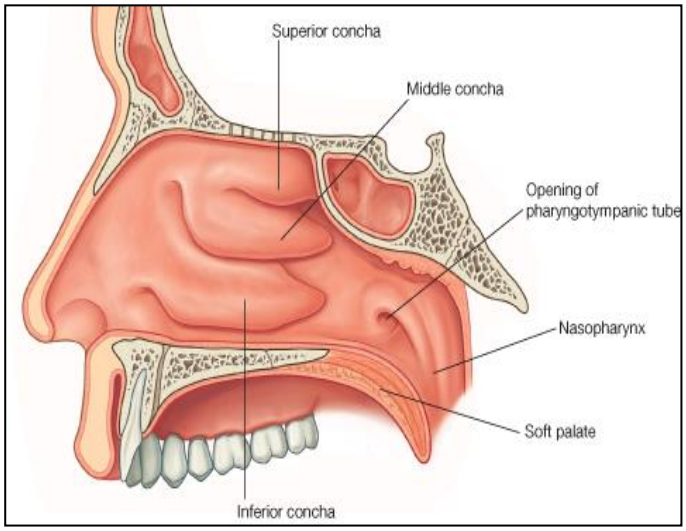
4.Lateral wall

Marked by three projections (called the Nasal Conchae):

Superior, middle, and inferior

The space below each concha is called Meatus.

Superior, middle, and inferior meatus.



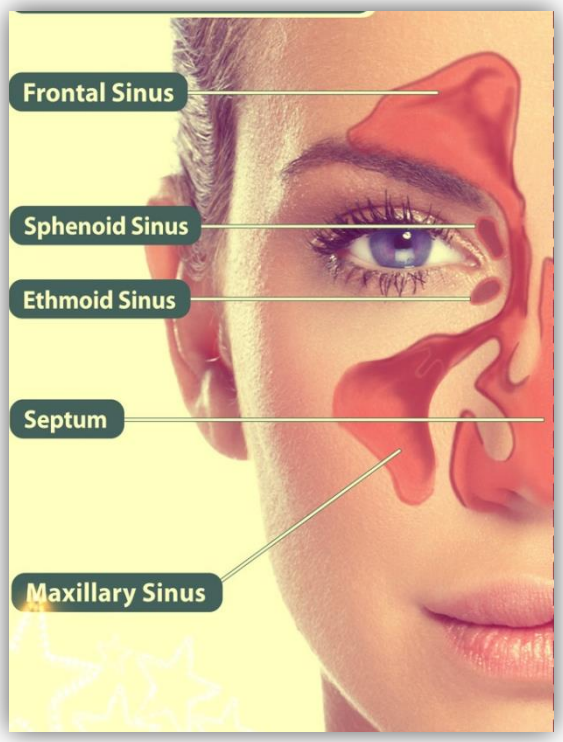
The space (fossa) above the superior concha is the Sphenoethmoidal recess.

Paranasal Sinuses

They are cavities inside these bones (and also named after them):

- Maxilla → Close to the teeth
- Frontal bone
- Sphenoid bone
- Ethmoid bone → Close to the orbit

Infections may spread



They are:

- ✓ Lined with **mucoperiosteum** (The lining is continuous with that in the nose and the throat). So, infection in this area tends to migrate into the sinuses causing sinusitis
- ✓ Filled with **air**
- ✓ Communicate with the nasal cavity (by sphenoethmoidal recess & the 3 meati)
- ✓ Open in the lateral wall of the nasal cavity

Function:

1. Lighten the skull weight
2. **Amplify the sound as we speak.**

SINUSES opening in lateral wall

Sphenoethmoidal recess	receives the opening of **sphenoidal sinus**
Superior meatus	receives the opening of **posterior ethmoidal sinus.**
Middle meatus	receives the opening of **maxillary sinus**
	receives the opening of **frontal sinus**
	receives the opening of **anterior ethmoidal sinus**
	receives the opening of **middle ethmoidal sinus**
Inferior meatus	nasolacrimal duct.

Remember them

Spheno- with spheno
Superior with posterior
The middle takes the rest
The only one receiving from a duct. (hated by sinuses!)

Note: all sinuses open into the middle meatus EXCEPT:

- Sphenoidal sinus : in sphenoethmoidal recess.
- Posterior ethmoidal sinus : in superior meatus.

Nasal mucosa

Small portion of the cavity is lined by skin. It's called the skin of vestibule

RESPIRATORY MUCOSA

It is thick, ciliated highly vascular and contains mucous glands & goblet cells

It lines the **lower part** of the nasal cavity (from skin of vestibule to the superior concha).

It functions to moisten, clean and warm the inspired air:

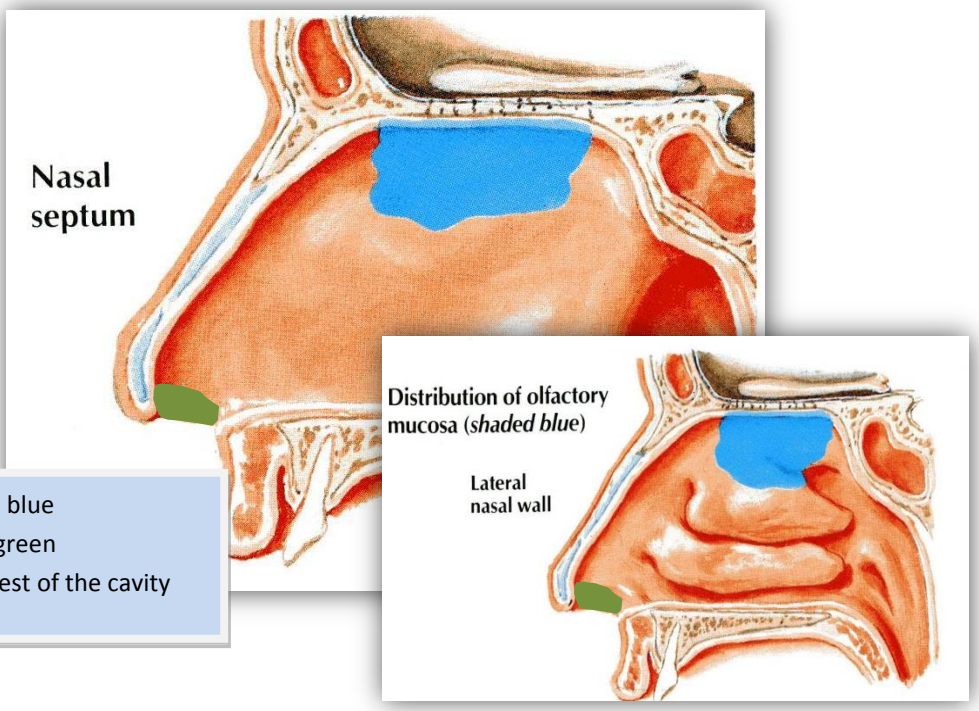
1. The air is moistened by the secretion of numerous serous glands.
2. It is cleaned by the removal of the dust particles by the ciliary action of the columnar ciliated epithelium that covers the mucosa.
3. The air is warmed by a *submucous venous plexus*.

Olfactory mucosa

It is delicate and contains olfactory nerve cells.

It is present in the roof, **upper** lateral and medial walls of the nasal cavity.

- On the lateral wall, it lines the upper surface of the superior concha and the sphenoethmoidal recess.
- On the medial wall, it lines the superior part of the nasal septum.

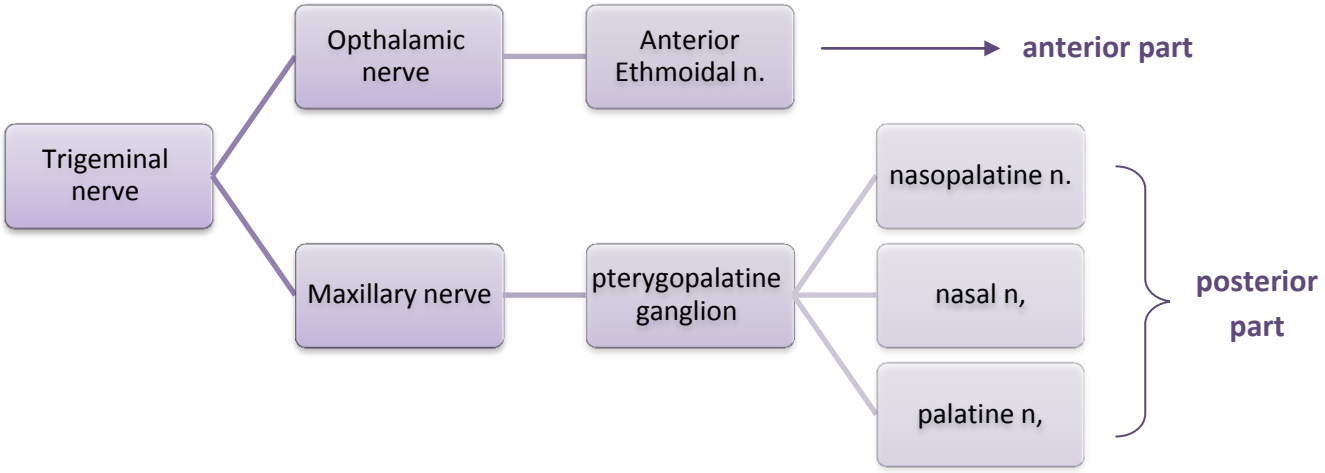


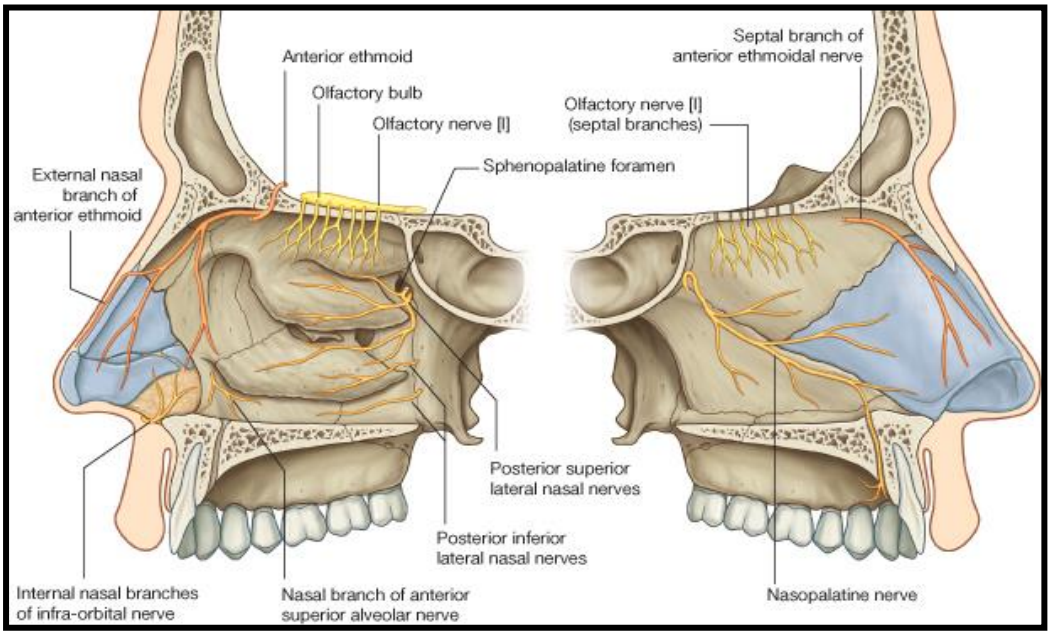
- Olfactory mucosa: shaded blue
- Skin of vestibule: shaded green
- Respiratory mucosa: the rest of the cavity

1 Nerve supply

The nerves of **General Sensation** are derived from the Ophthalmic & Maxillary divisions of **trigeminal nerve**.

- The anterior part is supplied by: Anterior Ethmoidal nerve.
- The posterior part is supplied by branches of the pterygopalatine ganglion:
  A. Nasopalatine
  B. Nasal
  C. Palatine





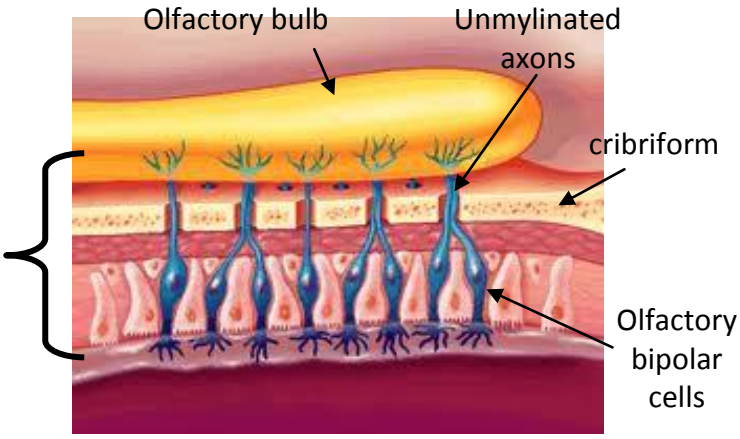
2 Nerve supply

Olfactory Nerve

Olfactory pathway

1st order neuron

- **Olfactory receptors** are specialized, ciliated nerve cells that lie in the olfactory epithelium. The axons of these **bipolar** cells (12-20 fibers) form the true olfactory nerve fibers, which passes through the cribriform plate of ethmoid. After that, the fibers join the **olfactory bulb**



2nd order neuron

- It is formed by the **Mitral cells of olfactory bulb.** The axons of these cells form the olfactory tract. Each tract divides into 2 roots at the anterior perforated substance

the figure is in the next page.

Lateral root

- Carries olfactory fibers to end in cortex of the **Uncus** & adjacent part of **Hippocampal gyrus (center of smell).**

medial root

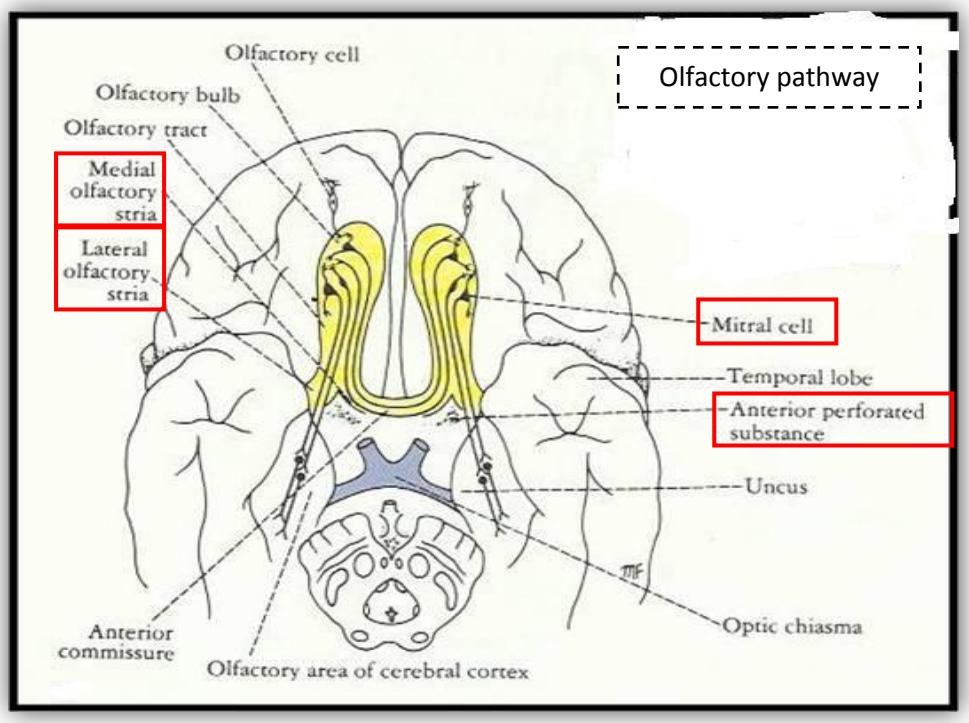
- crosses midline through anterior commissure and joins the uncrossed lateral root of opposite side. It connects olfactory centers of 2 cerebral hemispheres. So each olfactory centre receives smell sensation from both halves of nasal cavity.

Nerve supply (cont.)

Notes:

- Preliminary processing of olfactory information is within the olfactory bulb, which contains interneurones and large Mitral cells; axons from the latter leave the bulb in the olfactory tract.
- **Olfactory pathway is the only sensory pathway which reaches the cerebral cortex without passing through the Thalamus.**

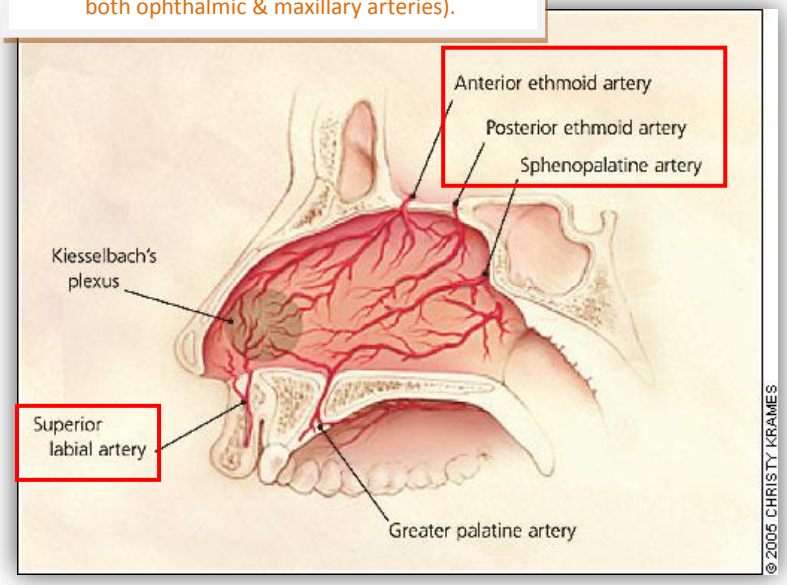
No 3rd order neuron

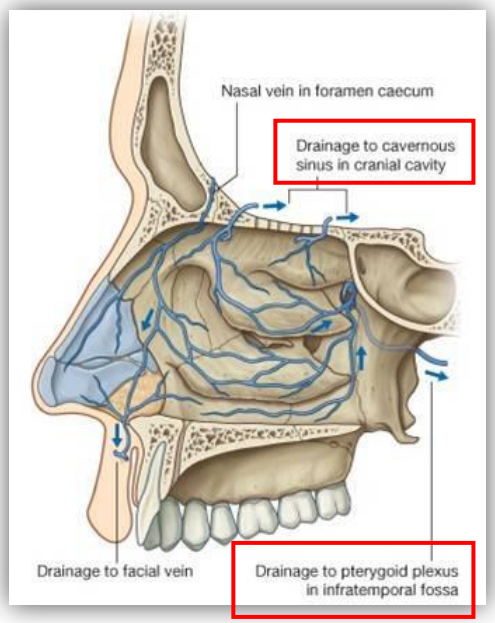


Vessels of the nose

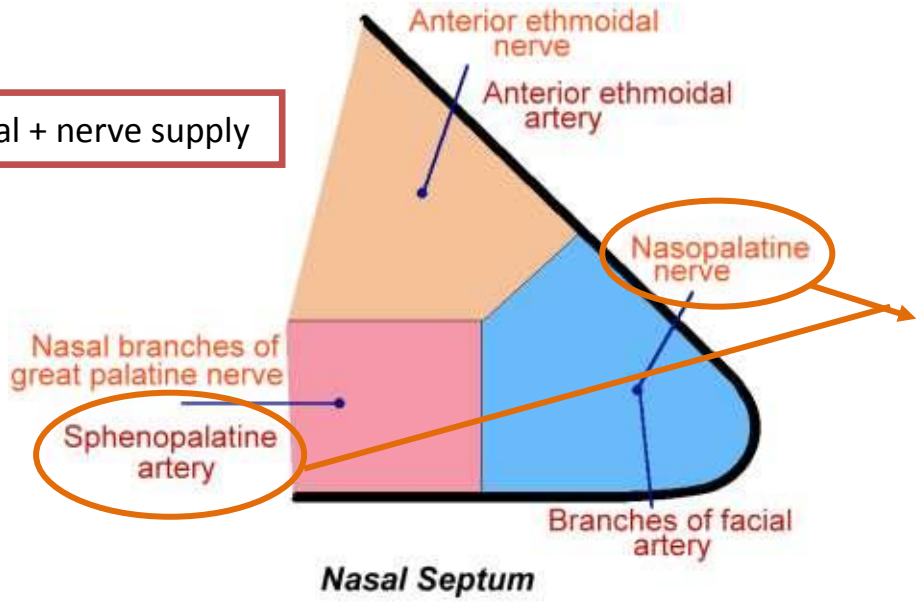
Arterial supply	Venous drainage	Lymph drainage
1. Sphenopalatine artery (branch of maxillary a.) 2. Ethmoidal :anterior and posterior (ophthalmic) 3. Superior labial (facial) **Applied anatomy :** Rich arterial anastomosis on anterior & inferior part of nasal septum (Little's area) is the most common site for epistaxis.	Venous plexus in the sub mucosa formed by veins accompanying the arteries. They drain into cavernous sinus & pterygoid venous plexus.	To Submandibular& Upper deep cervical nodes.

The anastomosis is between the internal & external carotid. (because these two give rise to both ophthalmic & maxillary arteries).





Arterial + nerve supply



Nasal Septum

make sure not to confuse these two. As the **naso**palatine nerve comes from the **maxillary nerve**, and the **spheno**palatine artery comes from **maxillary artery**

MCQs

1- which is the most area affected by epistaxis?
a.nasal roof
b. nasal septum
c. anterior inferior area
d. lateral side

2- Superior meatus receives the opening of ?

a. posterior ethmoidal sinus.

b. middle ethmoidal sinus

c. sphenoidal sinus

d. maxillary sinus

3- The medial wall of the nasal cavity is composed of which of the following ?

A. Superior choncae
B. Body of sphenoid
C. nasal bone
D. vomer

4- The nerves of General Sensation are derived from

a. facial nerve
b. trigeminal nerve
c. olfactory nerve
d. vagus nerve

5- The anterior part of the nose is supplied by ?

A. Nasopalatine nerve
B. Olfactory nerve
C. Facial nerve
D. Anterior Ethmoidal nerve

1-c, 2-a, 3-d, 4-b, 5-d

GOOD LUCK

Anatomy Team Leaders:

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