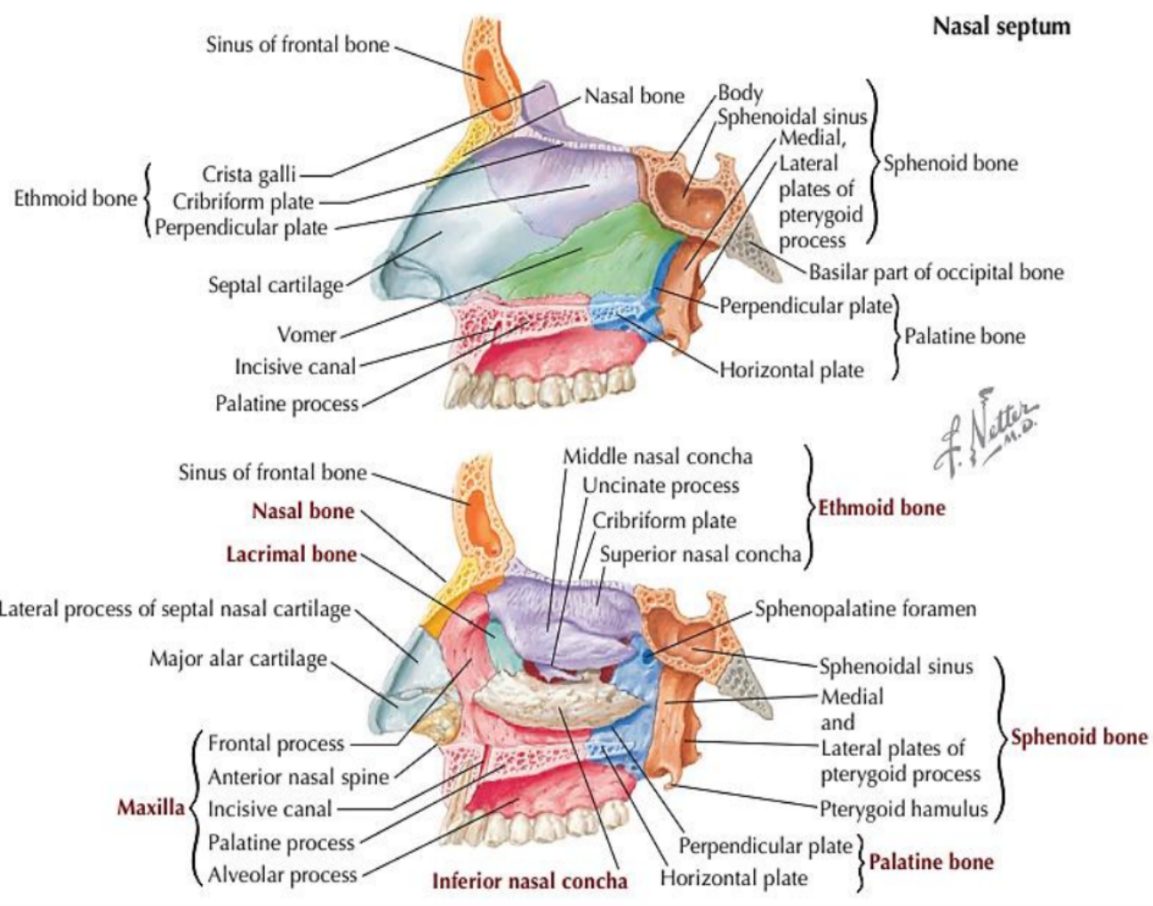
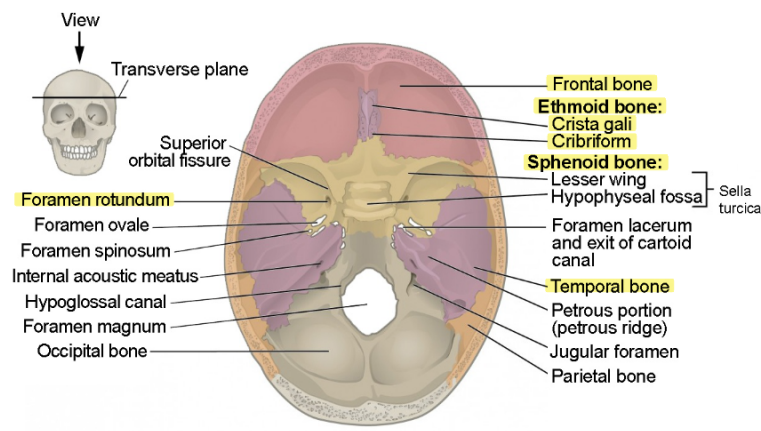
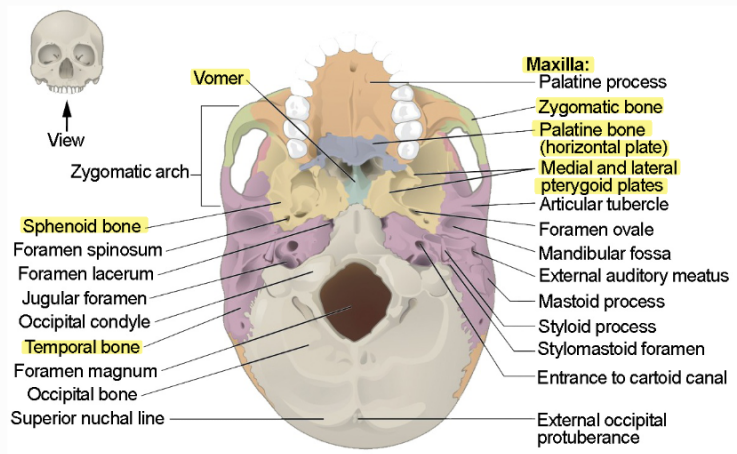


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NASAL CAVITY AND PARANASAL SINUSES

NOSE:

* divided into rt & lt Cavities by medial septum

- ① Septal Cartilage (ant.)
- ② ethmoid (Sup)
- ③ vomer (post. inf)

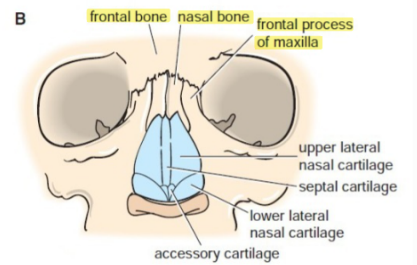
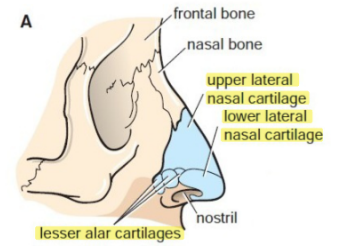
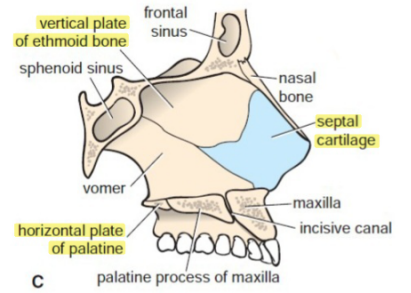
* divided into ext. & int. parts:

- ① ext: covered by ext. nose / opening: Naries
- ② int: choana leads to nasopharynx

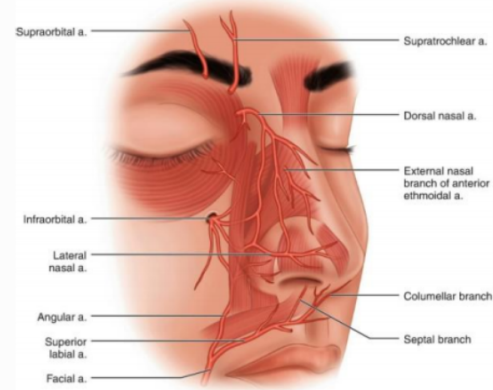
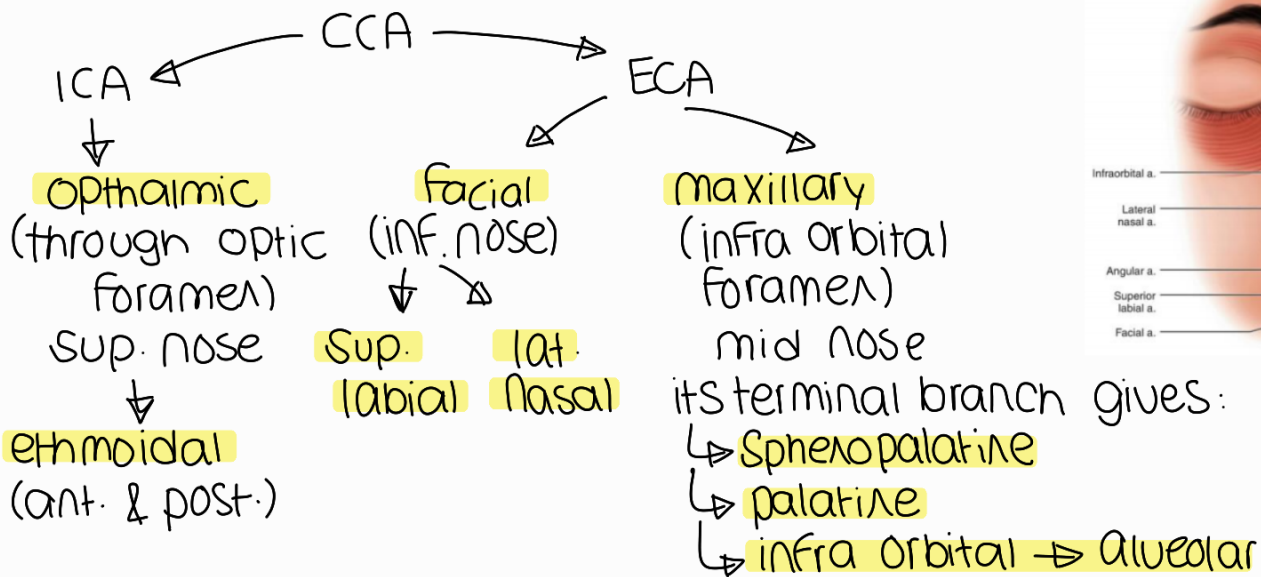
* ext. :

parts:

- 1] Cartilage → ant. & inf.
Septal / upper & lower lat. / alar
• alar has Naries compressor & dilator SM.
- 2] bone → Sup.
nasal / frontal maxillary / nasal frontal



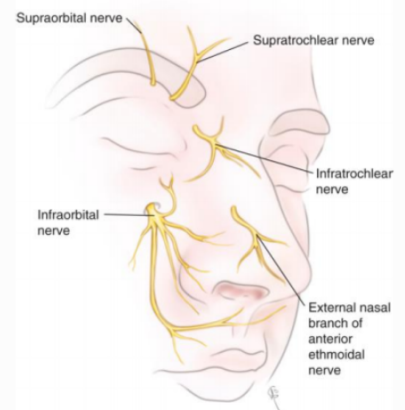
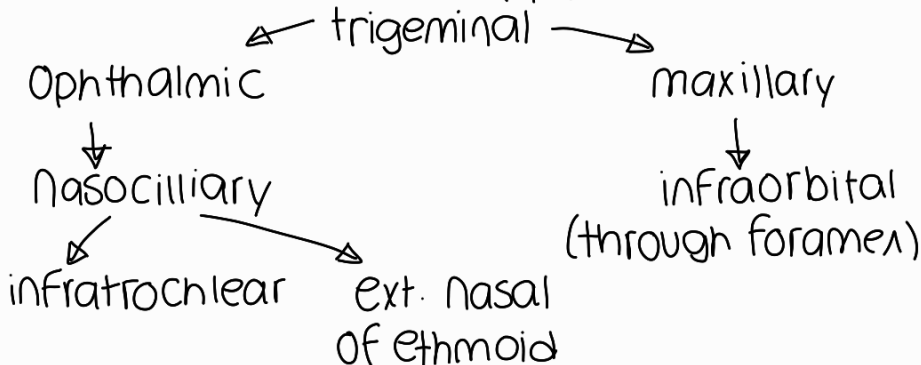
Blood Supply



its terminal branch gives:

- ↳ Sphero palatine
- ↳ palatine
- ↳ infra orbital → alveolar

Nerve supply



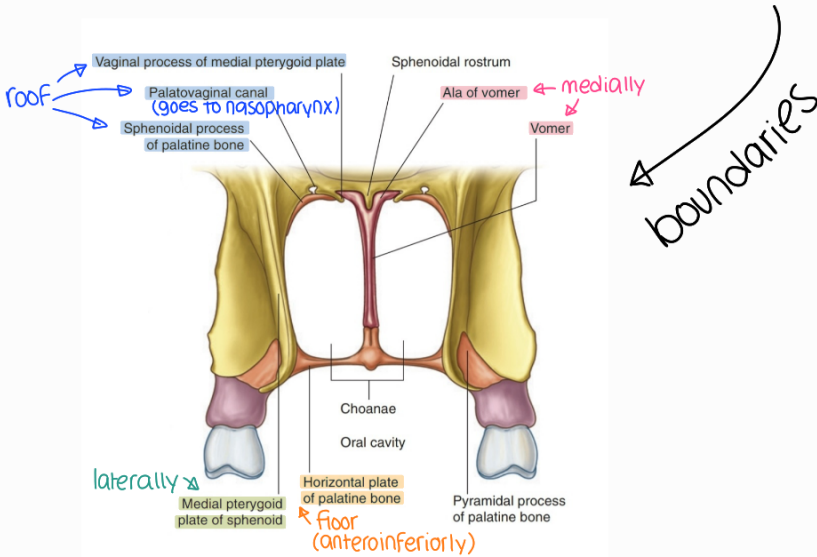
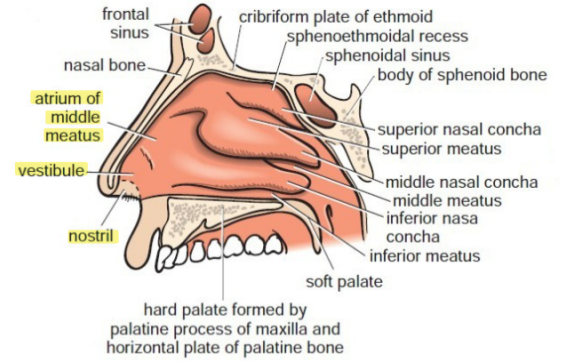
* Int. (nasal cavity)

parts:

① nostril → ant. nares
(Kept open by septal & alar)

② vestibule → dilated, surrounded by ala / Stratified squamous keratinized (Vibrissae thick hair) +

③ choanae (post. nares, to nasopharynx)



④ Others:

- 3 conchae
- 3 meatuses
- Sphenoethmoidal recess

AIR SINUSES & PARANASAL SINUSES

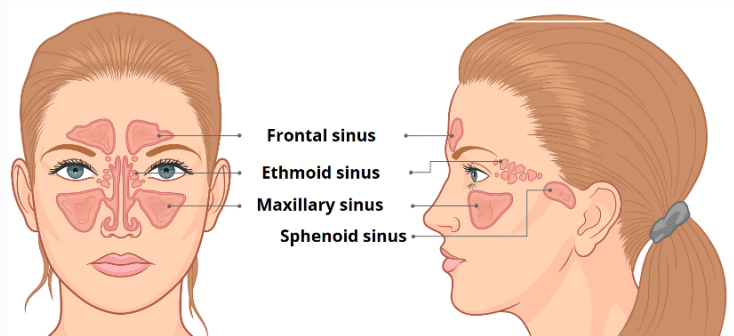
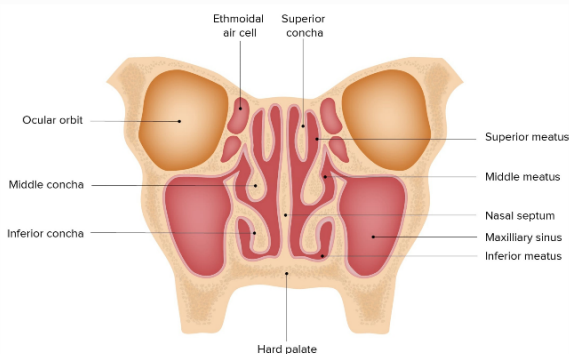
* fxn: respiratory, olfactory, voice resonance, drains lacrimal fluid, protective (warming, moisture, filter), ↓ skull volume & pressure

* lining mucosa of nasal sinuses: thin (pseudostratified ciliated columnar epithelium)

* ducts open at lat. wall to drain into nasal cavity

* there are 6 ethmoidal, 2 frontal, 2 maxillary, 2 sphenoidal

* lacrimal sac (medial eye) → tears drain into lat. wall (inf. meatus has opening for nasolacrimal duct)



* Nasal Cavity boundaries: (the 4 Cavities)

1 roof:

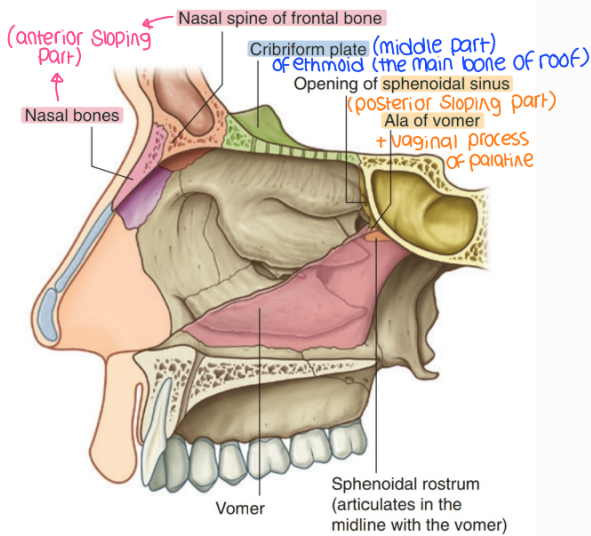


Fig. 8.238 Roof of the nasal cavity.

2 floor:

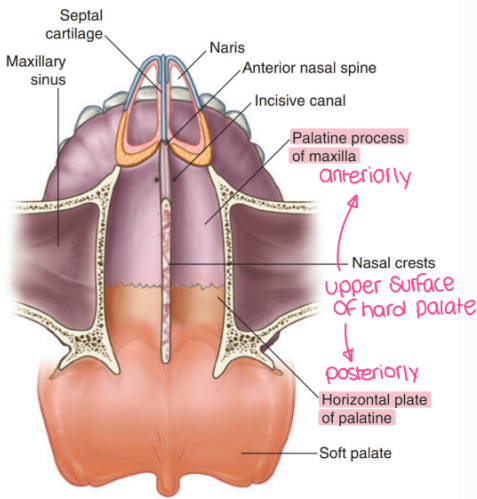


Fig. 8.237 Floor of the nasal cavity (superior view).

3 medial wall (septum)

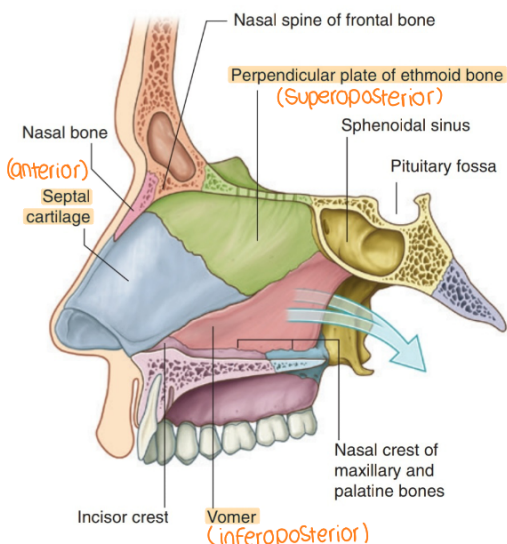


Fig. 8.236 Medial wall of the nasal cavity—the nasal septum.

4 lateral wall

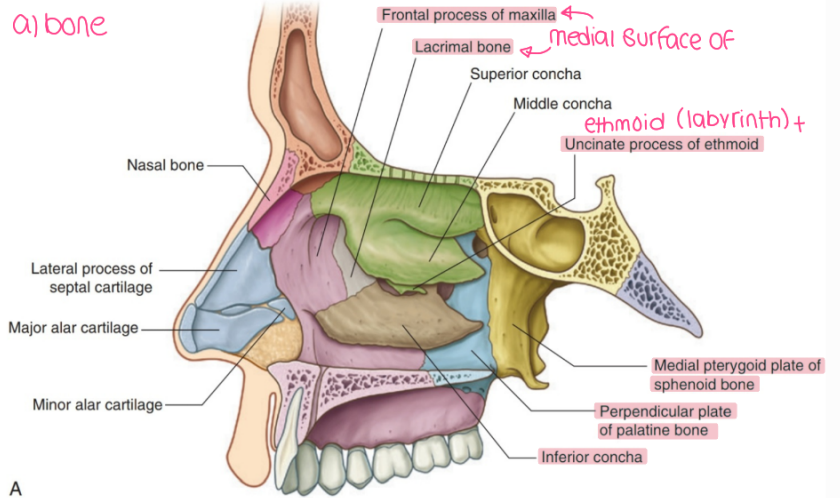
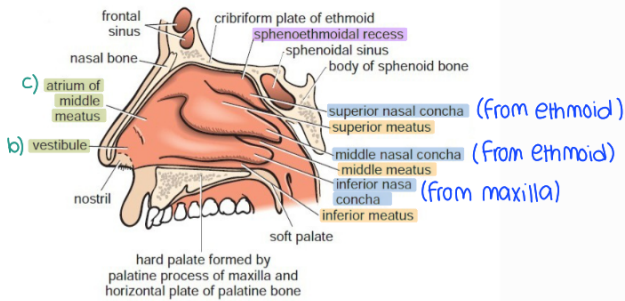


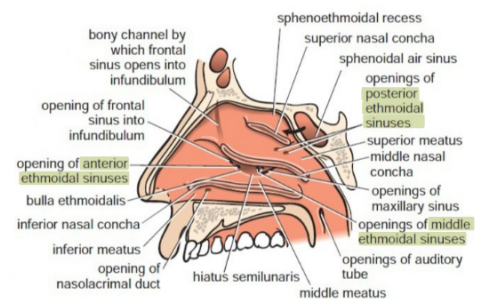
Fig. 8.239 Lateral wall of the nasal cavity. A. Bones.



d) 3 concha
3 meatus
1 recess

- **concha**: bulge of bone covered by thick mucosa
- **mucosa**: respiratory pseudostratified ciliated columnar epithelium
- **Submucosa & concha & meatuses** are thick due to large venous plexus (warms air)
- **Concha importance**: ↑ Surface area of cavity
- **Concha** extend medially across cavity creating 4 air channels (meatuses & recess)
- **meatus**: groove below bulge or shelf (concha)
- **recess**: drains sphenoid air sinus

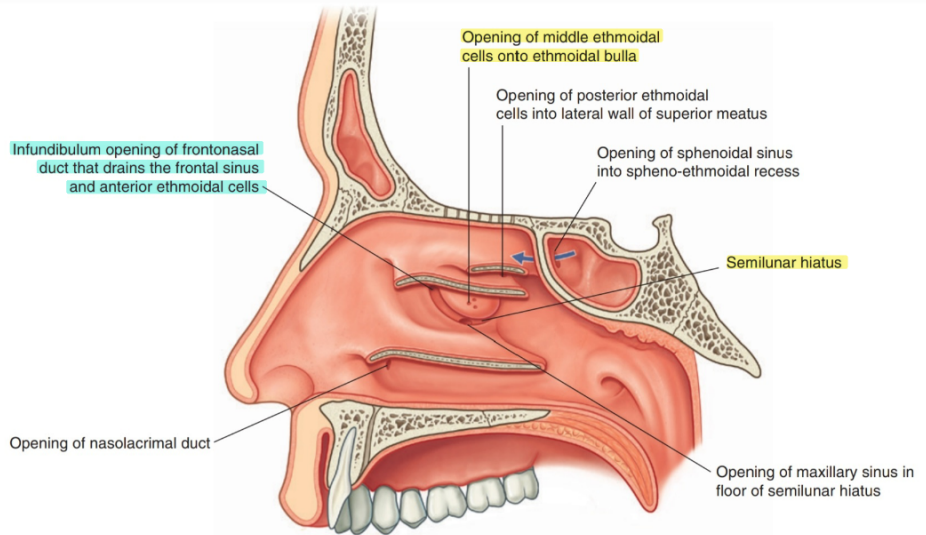
- there are 3 ethmoidal sinuses each side (6 total)



• Middle meatus lies under middle concha, & has 2 anatomical structures:

① bulla ethmoidalis

dome shaped bulge resulted from elevation of lateral wall of middle meatus (formed by underlying middle ethmoidal cells which expand medial wall of ethmoidal labyrinth)



② hiatus Semilunaris

Curved gutter (groove) inferior to ethmoidal bulla (formed by mucosa of lateral wall / defect in bony wall between ethmoidal bulla & unciniate process)

• anterior end of hiatus semilunaris forms channel (ethmoidal infundibulum) that curves upwards & continues as frontonasal duct through ant. part of ethmoidal labyrinth to open into frontal sinus)

lateral wall structure

associated air sinus

sphenoethmoidal recess	Sphenoidal
Superior Meatus	posterior ethmoidal
inferior meatus	nasolacrimal duct (lat. wall) <small>nasal secretions when crying</small>
ethmoidal bulla (middle)	middle ethmoidal
hiatus Semilunaris (middle)	ant → ant. ethmoidal / mid → Maxillary
ethmoidal infundibulum (middle)	frontal (by frontonasal duct) <small>↪ against gravity</small>

MUCOUS MEMBRANES

* fxn: heating & moisturizing air (large vein plexus) + filtering air

• most nasal cavity & respiratory tract → pseudostratified ciliated columnar epithelium with goblet cells

• Submucosa has vein plexus & seromucous glands

• Vestibule → modified stratified squamous with hair follicles (vibrissae)

• roof of nasal cavity → olfactory mucosa (pseudostratified ciliated columnar epithelium with bipolar cells & olfactory N endings)

* rhinitis → enlargement of V plexus in concha → congestion & hard breath

BLOOD, NERVE, LYMPH OF NASAL CAVITY

- Categories: → vessels of Septum
↳ vessels of lat. wall (Ant. sup. / post. sup. / ant. inf. / post. inf.)

* Arterial blood supply

• 4 main As:

- ① sphenopalatine (maxillary)
- ② palatine (maxillary)
- ③ ethmoidal (ophthalmic)
- ④ facial A branches
 - ↳ Sup. labial
 - ↳ lat. Nasal
 - ↳ alar

- Ophthalmic A → branch of ICA
- Maxillary A → branch of ECA

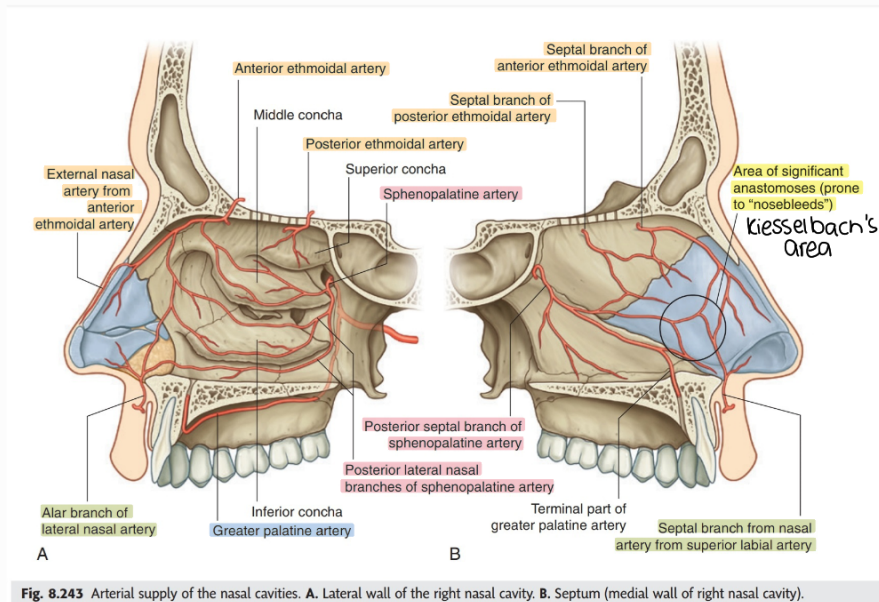


Fig. 8.243 Arterial supply of the nasal cavities. A. Lateral wall of the right nasal cavity. B. Septum (medial wall of right nasal cavity).

long sphenopalatine

- (post. septal nasal branch)
- main supply to septum & supplies some of lat. wall
- passes over the roof & onto septum
- 1st cause of epistaxis

Sphenopalatine A (nasopalatine)

Short Sphenopalatine

- (post. lat. nasal branches)
- supplies large part of lat. side of nose (post. sup. $\frac{1}{4}$)

in pterygo palatine fossa enters nasal cavity medially through foramen

Greater palatine

- Pterygopalatine fossa → greater palatine foramen of hard palate → incisive canal to nasal cavity
- supply ant. regions of med. wall & adjacent floor of nasal cavity (post. inf. & ant. inf.)

Palatine A

lesser palatine

- supplies soft palate

Ant. ethmoidal

- descending with N through slit like foramen lat. to Crista Galli
- supplies medial & lat. ant. sup. $\frac{1}{4}$ then continues to ext. nose

ethmoidal A

post. ethmoidal

- descends to cavity through cribriform plate
- supplies upper med. & lat. walls & some air sinuses

facial A branches (ant. lat. & med. wall)

Sup labial

alar branch

- Supply nasal vestibule

Septal branch

- Supply ant. regions of septum

lat. nasal

- Supplies ext. nose.

- Supplies lat. wall
- Anastomose with long sphenopalatine
- 2nd important A of epistaxis

* **epistaxis**: nose bleeding (after hit/children)

- Cause: rupture of long sphenopalatine or sup. labial at the site of anastomosis (bet. upper 2/3 & lower 1/3 of septum)
- Control bleeding: don't lay down but sit & enter a piece of gauze through vestibule & **press to stop bleeding at site of anastomosis**
- Uncontrolled → **stop their origin** or by **Silver Nitrate**

Summary of blood supply

1. Septum (medial wall)

- Long sphenopalatine (main supplying artery)
- Greater palatine artery (supplies anterior region)
- Anterior ethmoidal artery
- Posterior ethmoidal (supplies upper part)
- Superior labial (supplies anterior region via septal branch)

2. Lateral Wall

blood supply according to its quadrants

- short sphenopalatine (supplies posterior superior quadrant)
- Greater palatine artery (supplies anterior & posterior inferior quadrant)
- Anterior ethmoidal artery (supplies anterior superior quadrant)
- Posterior ethmoidal (supplies upper part)
- Superior labial

* Venous drainage

- ① ant. 1/3 nasal cavity → **facial V** → IJV
- ② post 2/3 nasal cavity → **lat. pterygoid venous plexus** (around pterygoid M) → maxillary V → maxillary joins sup. temporal at parotid & form retromandibular V

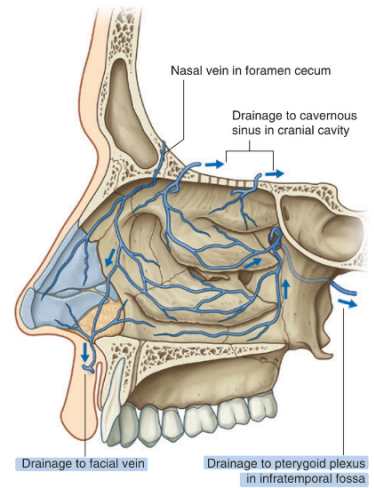


Fig. 8.244 Venous drainage of the nasal cavities.

* Lymphatic drainage

- ① Ant. part passes around margins of nares → **submandibular lymph node**
- ② upper & post. parts drain into **retropharyngeal lymph node** (upper deep cervical) → into deep cervical lymph node (around IJV)

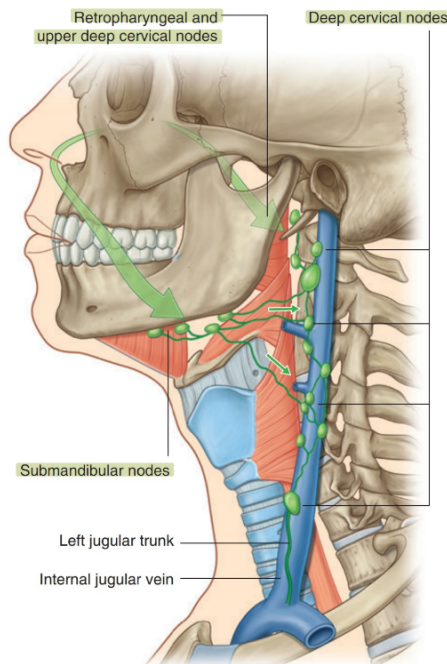


Fig. 8.246 Lymphatic drainage of the nasal cavities.

* nerve supply

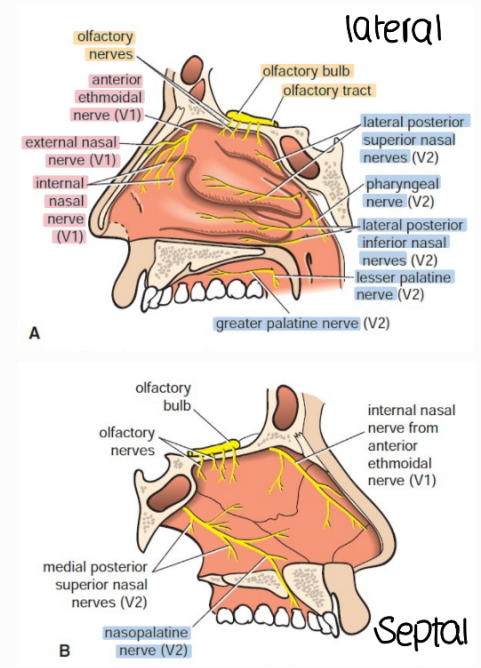
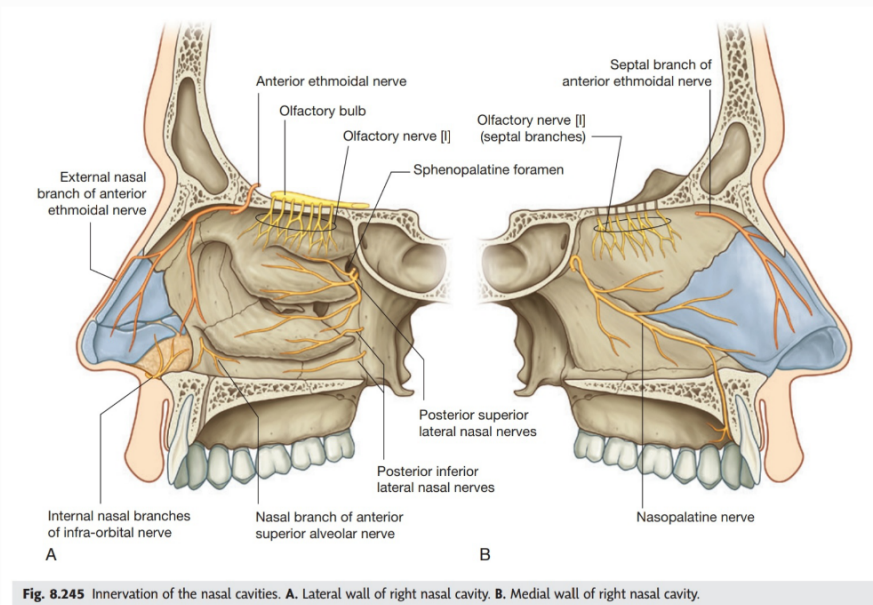
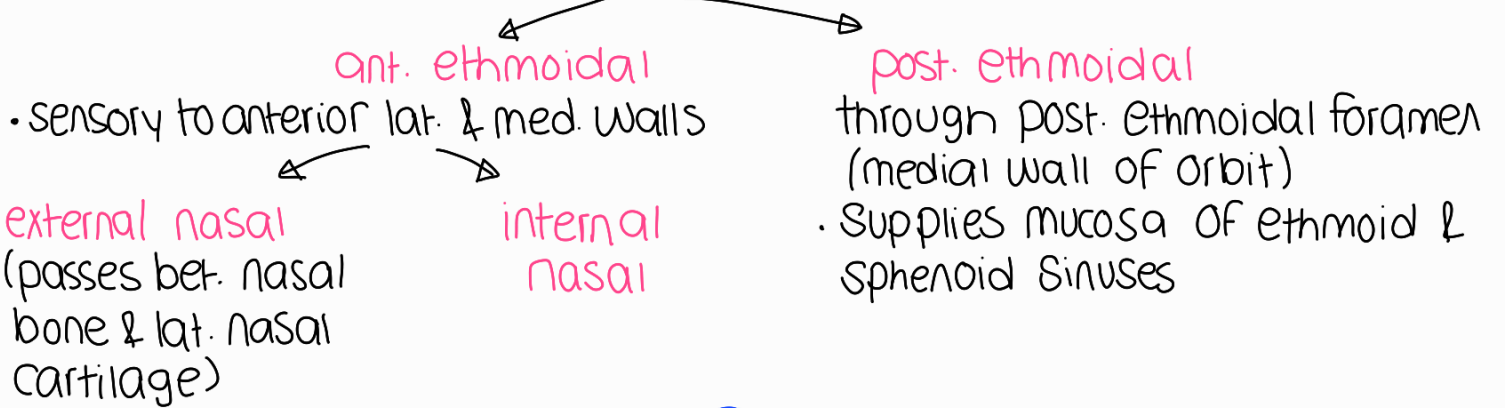


Fig. 8.245 Innervation of the nasal cavities. A. Lateral wall of right nasal cavity. B. Medial wall of right nasal cavity.

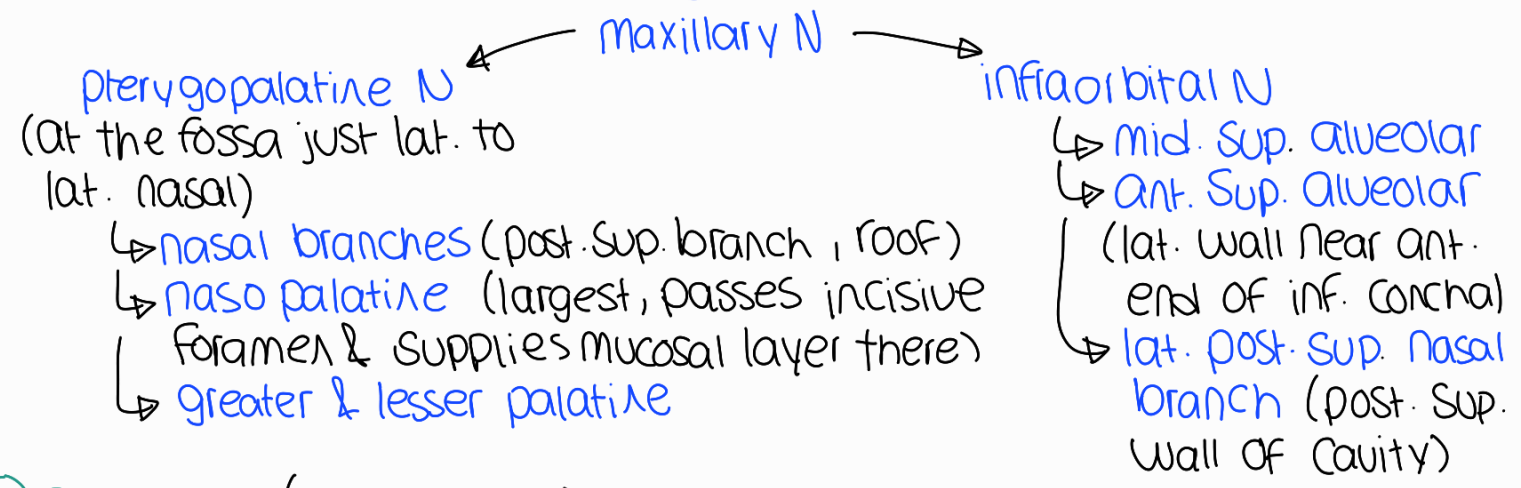
① olfactory N

bipolar cells in roof → Olfactory filaments → pass superiorly through cribriform & synapse in olfactory bulb → Olfactory tract → Smell Center in temporal lobe

② ophthalmic N → nasociliary N (in orbit)

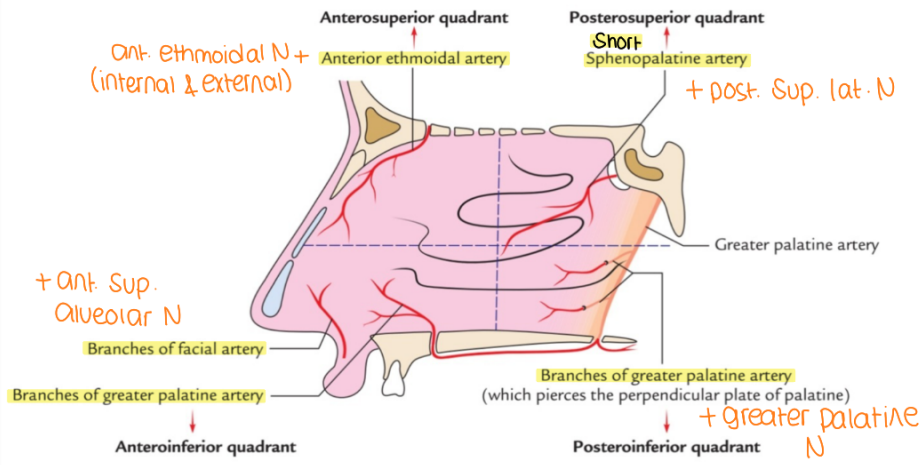


③



④ parasymp. (secretomotor) branch of facial N to nasal mucous glands

* blood & nerve supply to nasal quadrants & septum



Septum:

- lower post. part: long Sphenopalatine N
- Upper ant. part: branch of ant. ethmoidal N
- B supply for both: long Sphenopalatine A

* Sinuses Comparison

	description / relations	drainage	innervation
frontal	triangular (grows with bone after birth)	frontonasal duct → into infundibulum (in mid hiatus)	Supraorbital N (Ophthalmic) → passes foramen
ethmoidal	3 pairs in ant. cranial fossa ① mid ② ant ③ post.	① bulla ethmoidalis ② hiatus Semilunaris ③ sup. meatus	ant. & post. ethmoidal (nasociliary of ophthalmic)
maxillary	largest, apex (lat.) & base (in the wall of nasal cavity) Sup: orbit Inf: upper molars / pre lat: infratemporal fossa med: inf. part of cavity	goes up to hiatus Semilunaris posteriorly bad (against gravity, upper molar extraction infxn causes sinusitis)	maxillary branches ↳ infraorbital ↳ alveolar
sphenoid	Sup: pituitary gland in Sella turcica (pituitary tumor compresses sinus) lat: cavernous sinus Antero inferior: cavity	Sphenoethmoidal recess	post. ethmoidal N of Ophthalmic + orbital branches of maxillary