

NASAL ANATOMY

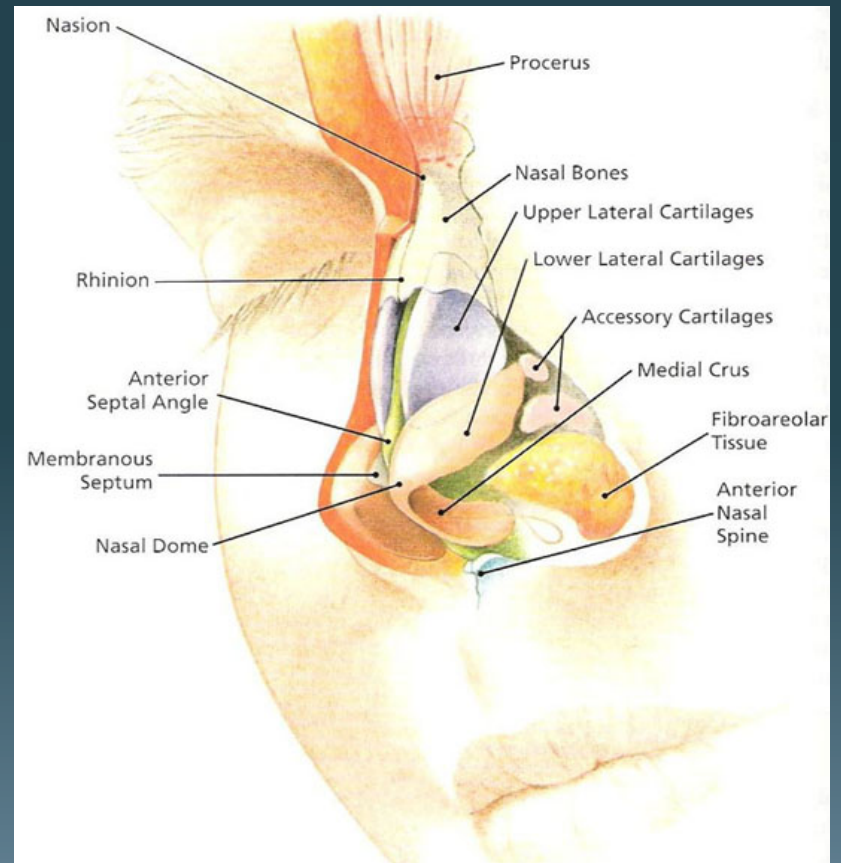
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R1 ORL HUSE

NASAL ANATOMY

The nose is a highly contoured pyramidal structure situated centrally in the face and it is composed by:

- ✓ Skin
- ✓ Mucosa
- ✓ Bone
- ✓ Cartilage
- ✓ Supporting tissue



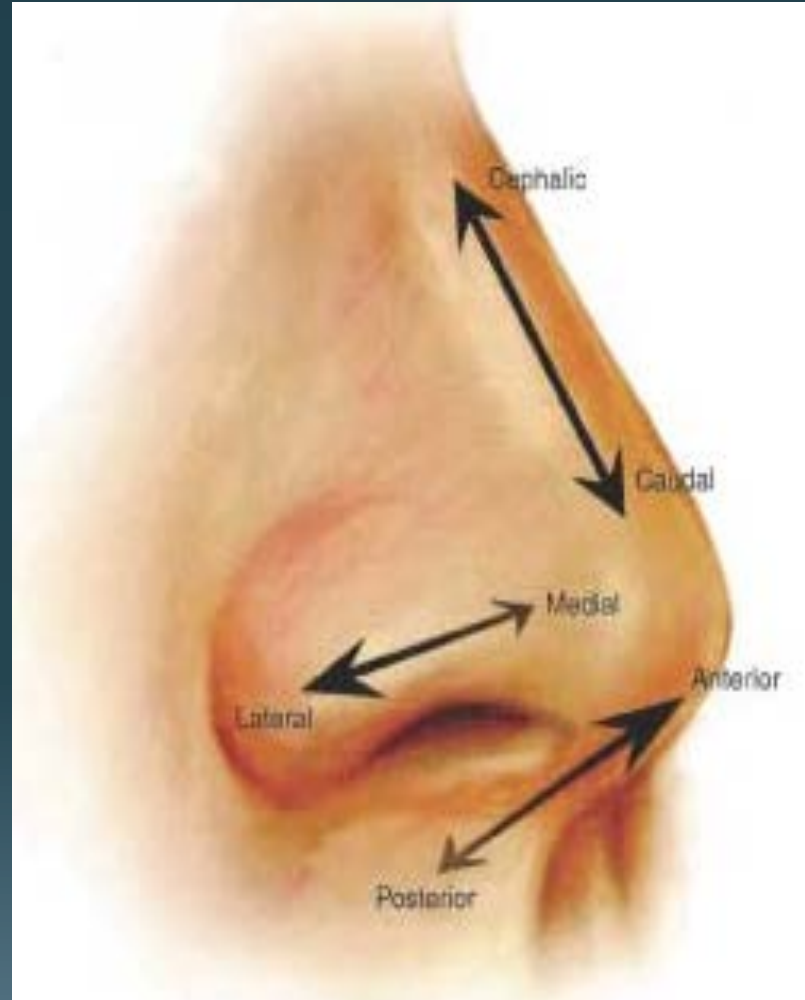
Topographic analysis



1. EXTERNAL NASAL ANATOMY

- Skin
- Soft tissue
- Muscles
- Blood vessels
- Nerves

- ✧ Understanding variations in skin thickness is an essential aspect of reconstructive nasal surgery.
- ✧ Familiarity with blood supply → local flaps.

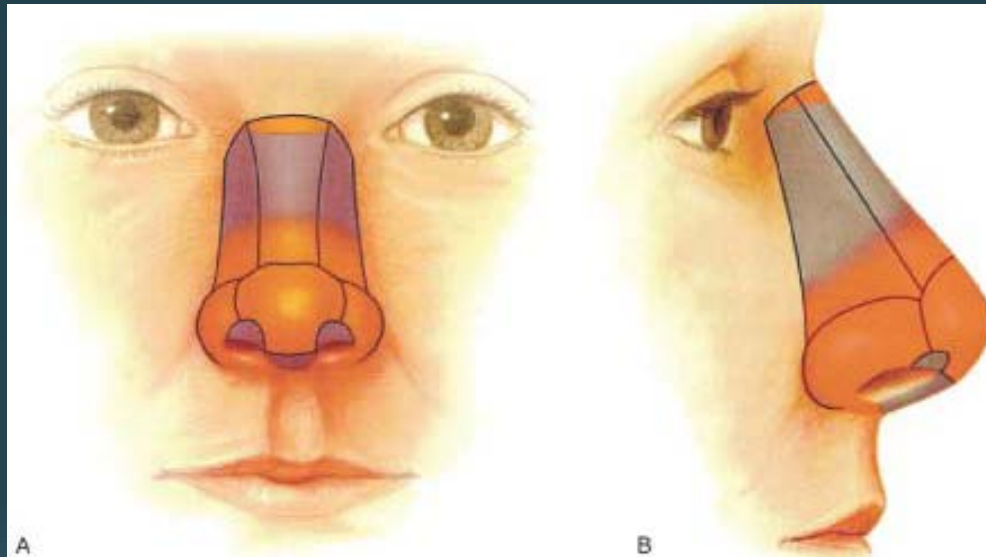


SKIN

Individuality

Aesthetic regions

Thinner



Thicker

- Dorsum
- Nostril margins
- Columella

- Radix
- Nasal tip
- Alae

Surgical implications

Surgical elevation of the nasal skin should be done in the plane just superficial to the underlying bony and cartilaginous nasal skeleton to prevent injury to the blood supply and to the nasal muscles. Excessive damage to the nasal muscles causes unwanted immobility of the nose during facial expression, so called mummified nose.

SUBCUTANEOUS LAYER

- Superficial fatty panniculus

Adipose tissue and vertical fibres between deep dermis and fibromuscular layer.

- Fibromuscular layer

Nasal musculature and nasal SMAS

- Deep fatty layer

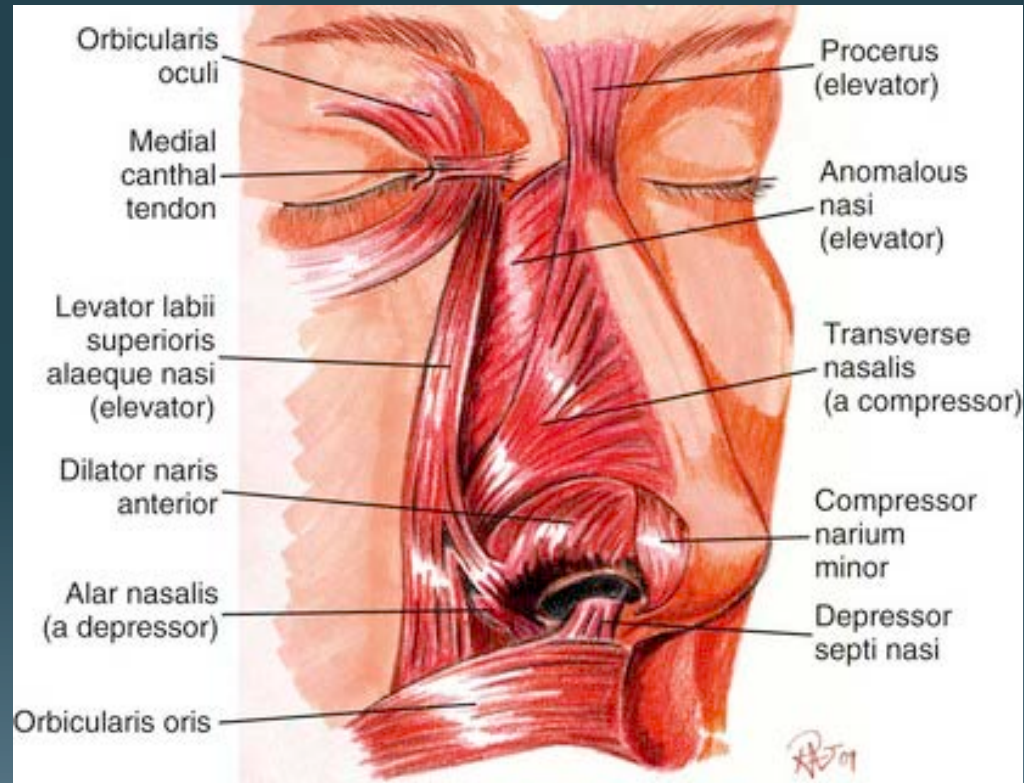
Contains the major superficial blood vessels and nerves. No fibrous fibres.

- Periosteum/ perichondrium

Provide nutrient blood flow to the nasal bones and cartilage

MUSCLES

- Greatest concentration of muscles → junction of upper lateral and alar cartilages (muscular dilation and stenting of nasal valve).
- Innervation: zygomaticotemporal branch of the facial nerve
- Elevator muscles
- Depressor muscles
- Compressor muscles



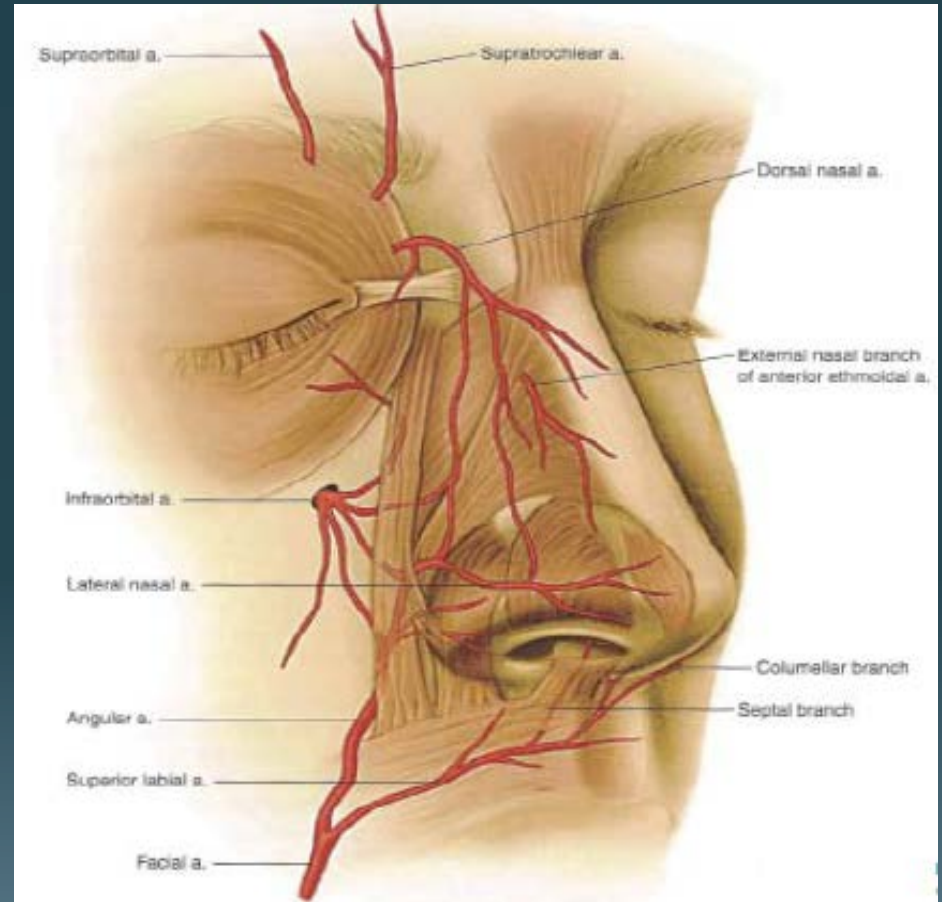
SUPERFICIAL ARTERIAL BLOOD SUPPLY

Facial artery

- Angular artery → Lateral nasal artery
- Superior labial artery (columella and nostrils)

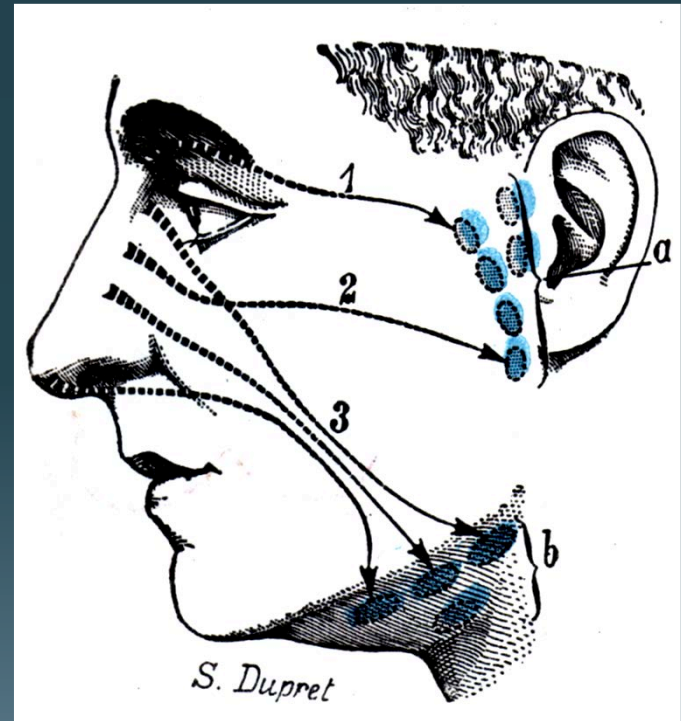
Ophthalmic artery

- Dorsal nasal artery (dorsal nasal skin).
- External nasal branch of anterior ethmoidal artery (nasal tip)



VENOUS AND LYMPHATIC DRAINAGE

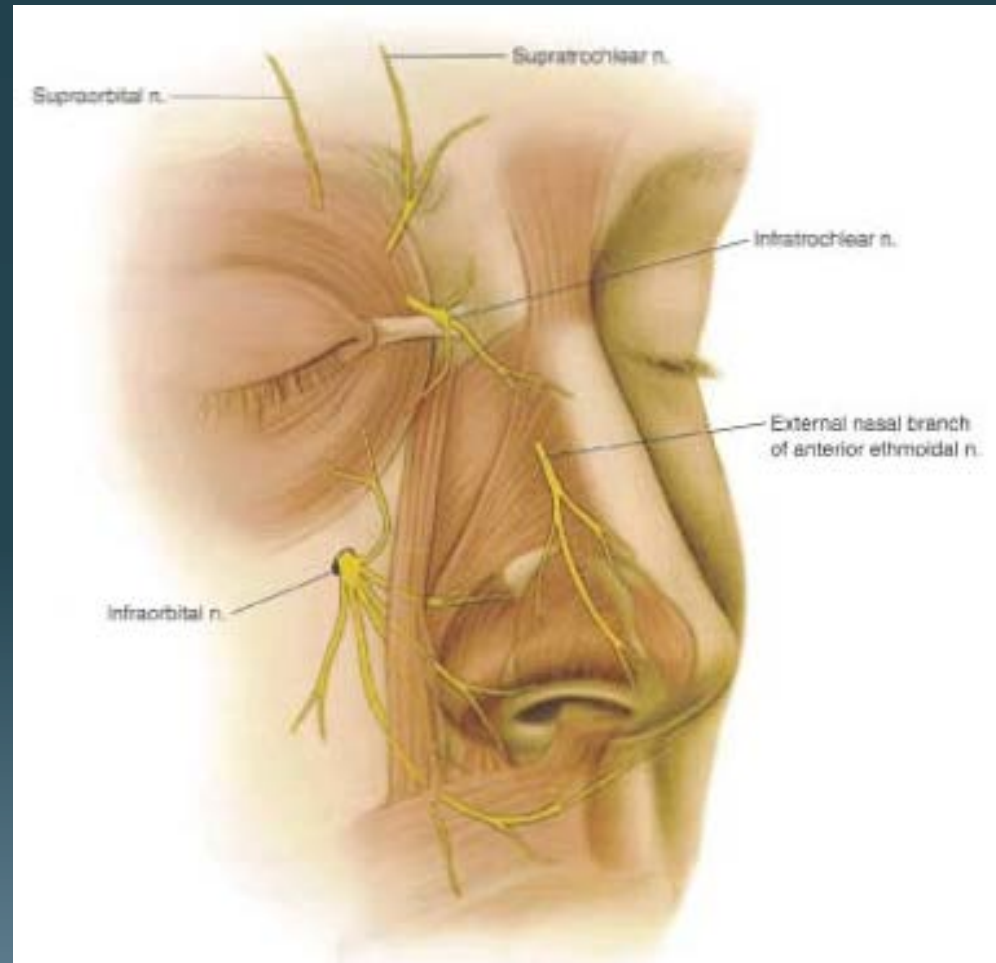
- Angular vein
- Ophthalmic vein
- Parotid lymph nodes
- Submaxillary lymph nodes



EXTERNAL SENSORY NERVE SUPPLY

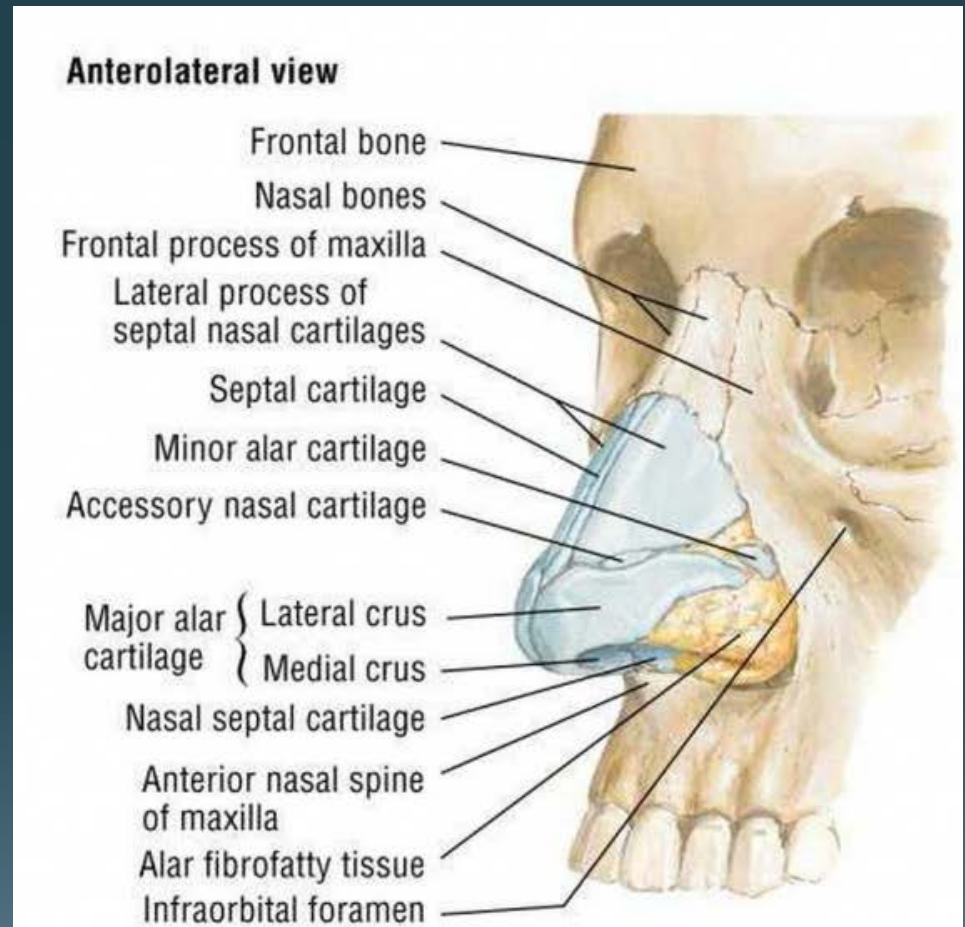
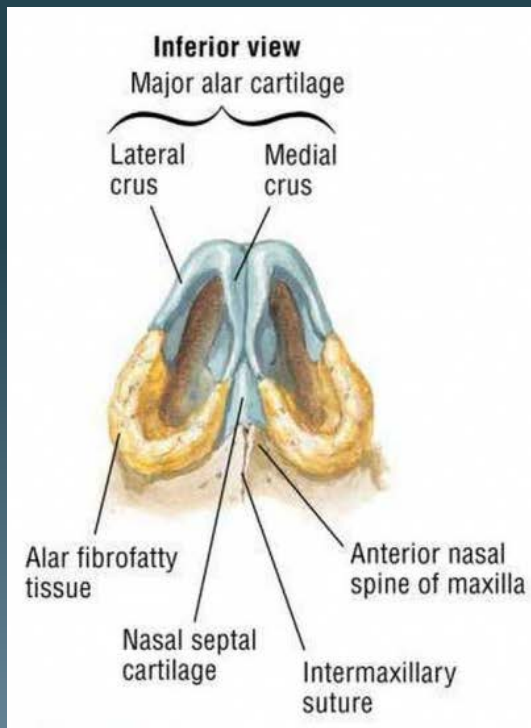
Fifth cranial nerve (I and II branches)

- Supratrochlear nerve
- Infratrochlear nerve
 - Radix, rhinion, cephalic portion
- External branch of anterior ethmoidal nerve
 - Half caudal portion
- Infraorbital nerve
 - Lateral wall



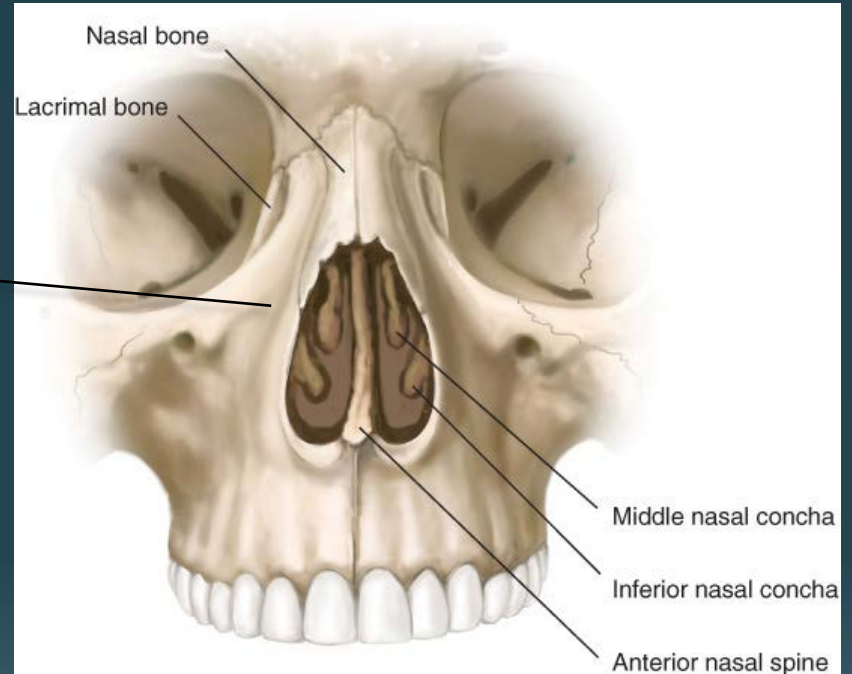
2. NASAL SKELETAL ANATOMY

- a) Bony dorsum
- b) Cartilaginous dorsum
- c) Nasal tip



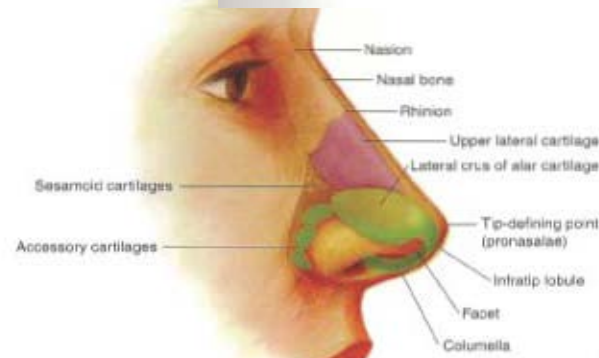
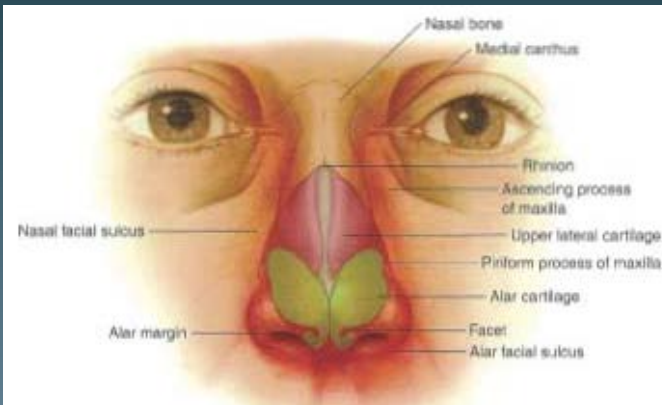
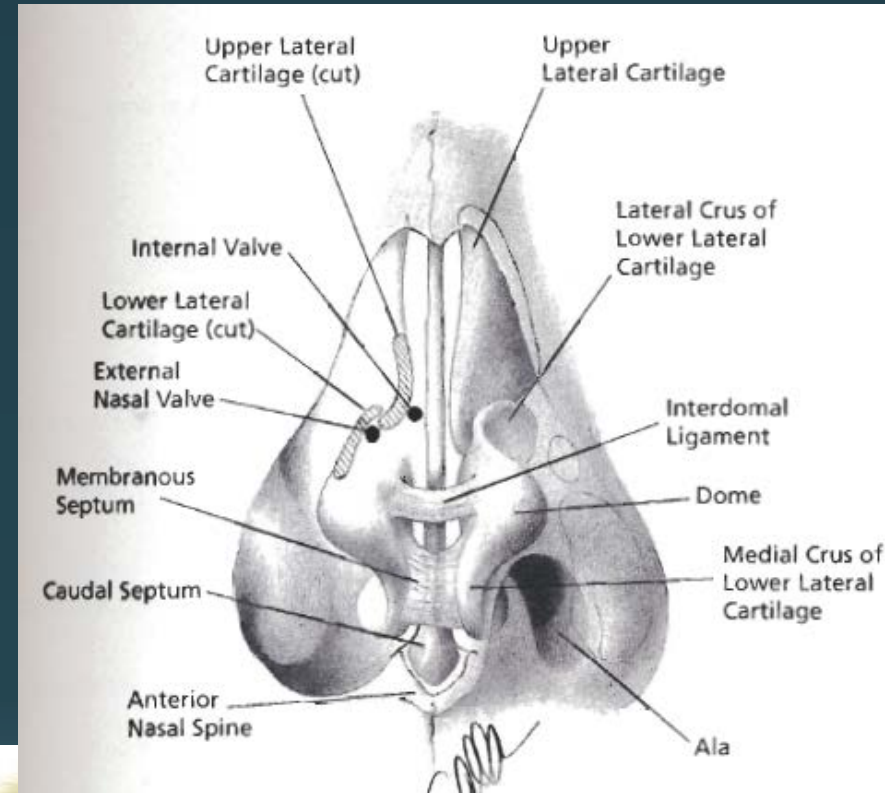
BONY DORSUM

- Paired nasal bones
- Paired ascending processes of maxillary bones
- Crest of nasal bones
- Intercanthal line



CARTILAGINOUS DORSUM

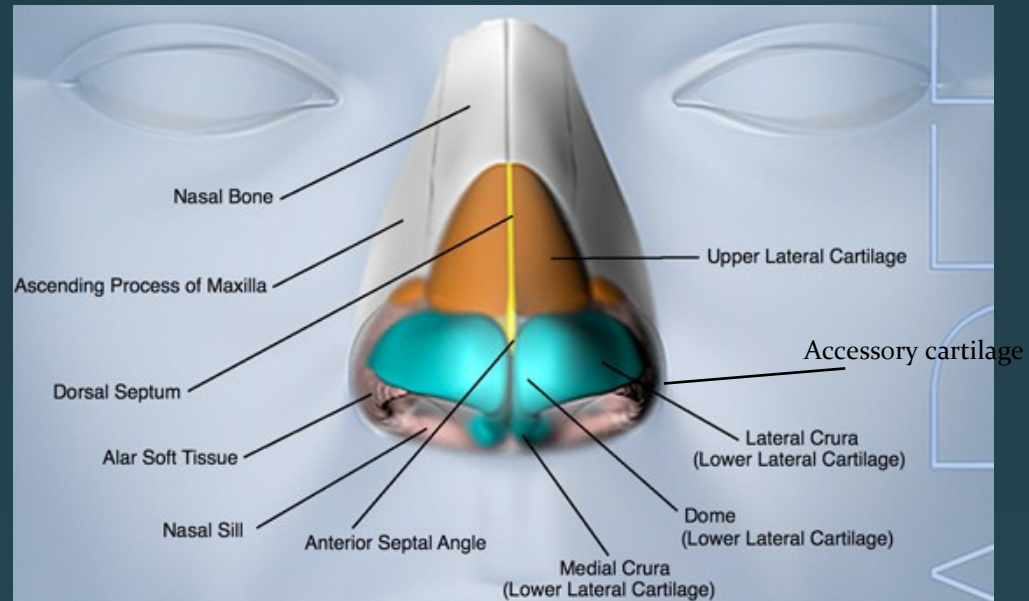
1. Paired upper lateral cartilages
 2. Cartilaginous septum
- External lateral triangle. It's important in physiology of nasal respiration, because its support only consists of fibrous tissue that can collapse during the inspiration.



NASAL TIP

Consists of:

- Lobule
- Columella
- Vestibules
- Alae



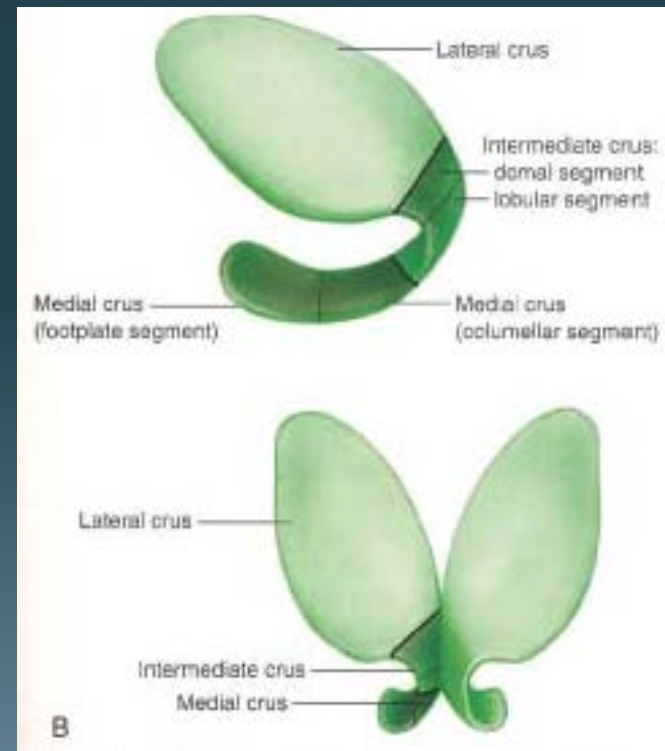
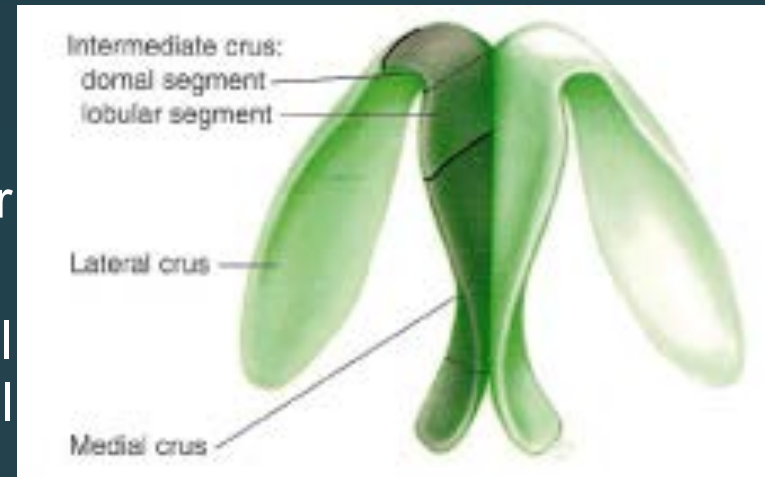
Structurally supported by:

- Alar cartilages → attached to the upper lateral cart. And the septum
- Caudal septum
- Accessory cartilages
- Fibrous fatty connective tissue

Alar cartilages

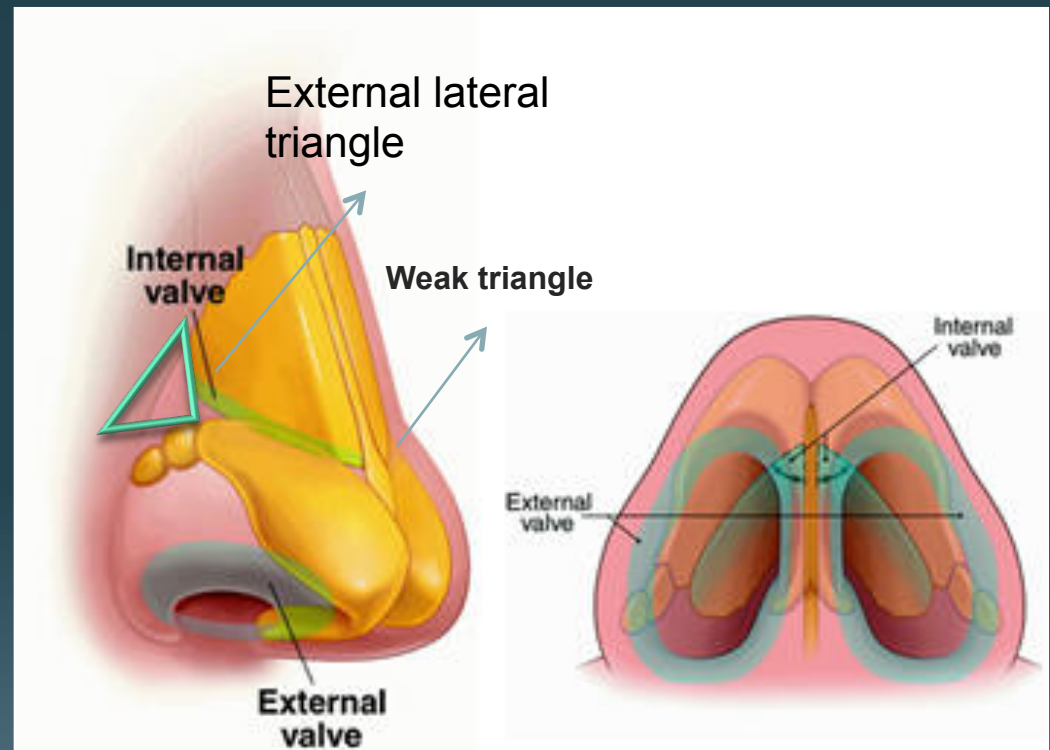
- **Medial** crus: footplate and columellar segments.
- **Intermediate** crus: lobular and dogmal segments. Bound by the interdomal ligament.
- **Lateral** crus: largest component.

The appearance and projection of the columella are influenced by the configuration of medial crus as well as that of the septum. Soft tissue between the columellar segments may fill this space but in patients with thin skin , the columella may have a bifid appearance.



Fibrous skeleton

- External lateral triangle
- Important in the fisiology of nasal respiration.
- Weak triangle
- Importance of the distal point of attachment of the lateral cartilage → stability of the nose.
- Overlapping of the alar cartilages to the lateral cartilages.



Surgical implications

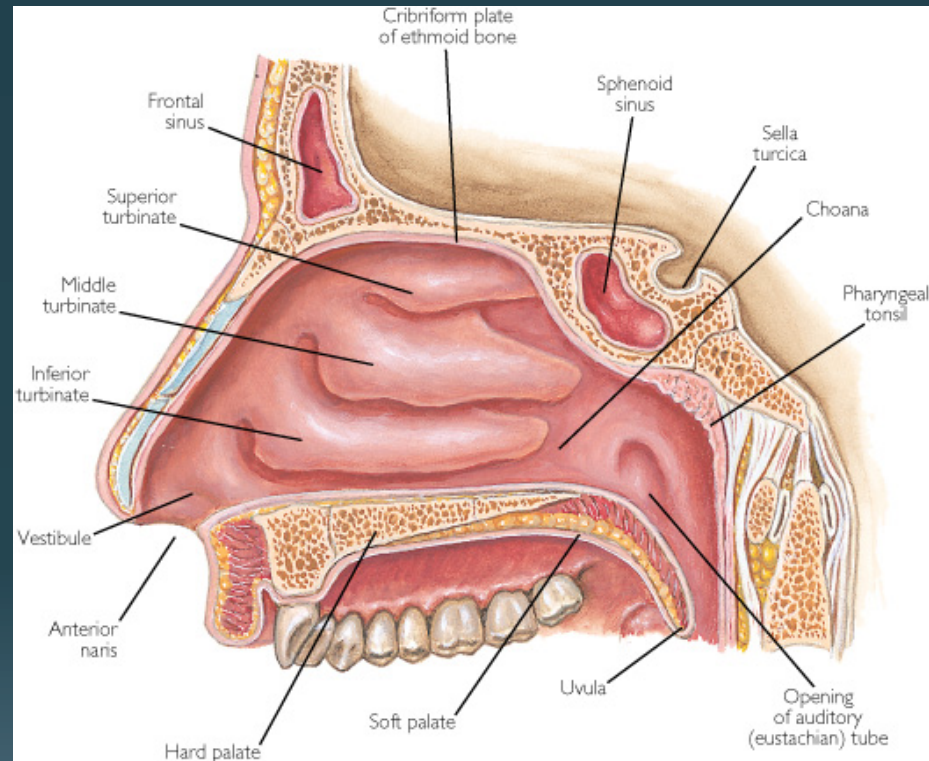
The angle between the septum and the upper lateral cartilage is important during respiration. Obstruction of this angle by scar tissue or trauma may produce symptoms of nasal obstruction.

The upper and the lower lateral cartilages are obviously of great importance both in achieving aesthetic results and in maintaining nasal physiology during rhinoplasty.

A surgeon should be conservative in trimming the alar cartilage, especially at its inferior extremity.

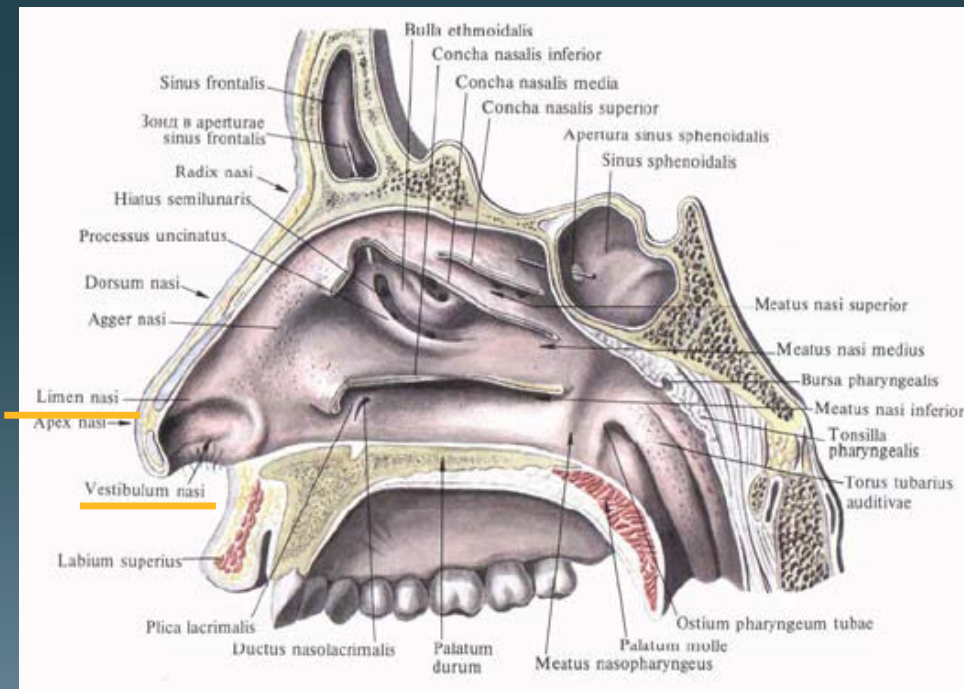
3. INTERNAL NASAL ANATOMY

- Vestible
- Nasal cavity
- Septum
- Lateral wall



VESTIBULE

- Squamous epithelium
- *Limen nasi*
- Nasal cavity: ciliated columnar epithelium
- Nasal valves → controls airflow direction.
- Septo-turbinal valve (posterior, between the septum and the mucosa of the inferior turbinate) → nasal resistance



Septum



Inferior turbinate

NASAL SEPTUM

- **Bony portion:** perpendicular plate of the ethmoid above, and the vomer below.
- **Cartilaginous portion:** -septal cartilage
-medial crus of alar cartilage
- **Nasal crests** of the maxillary and palatine bones

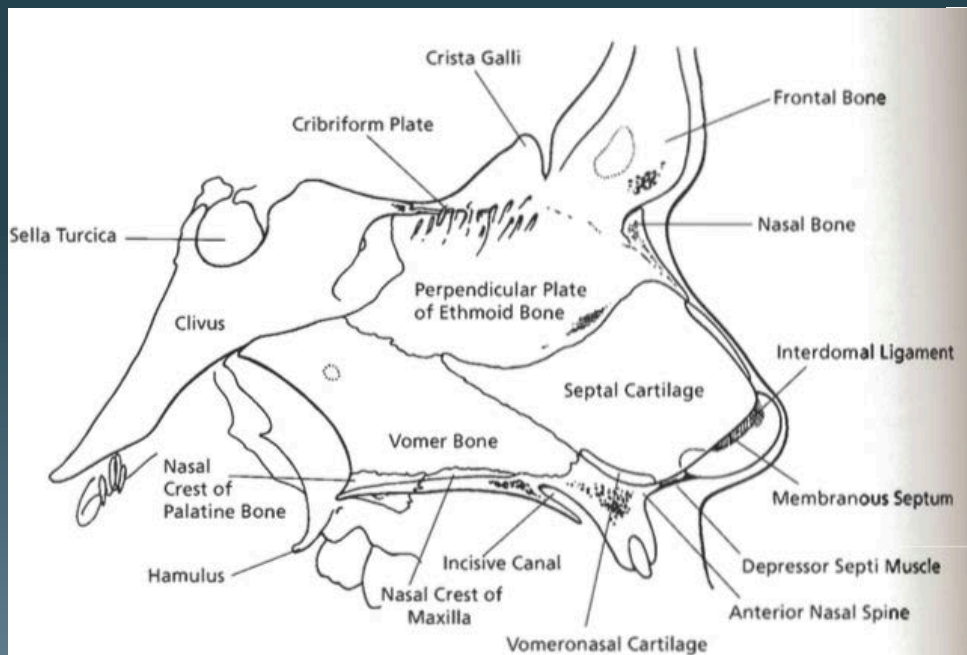
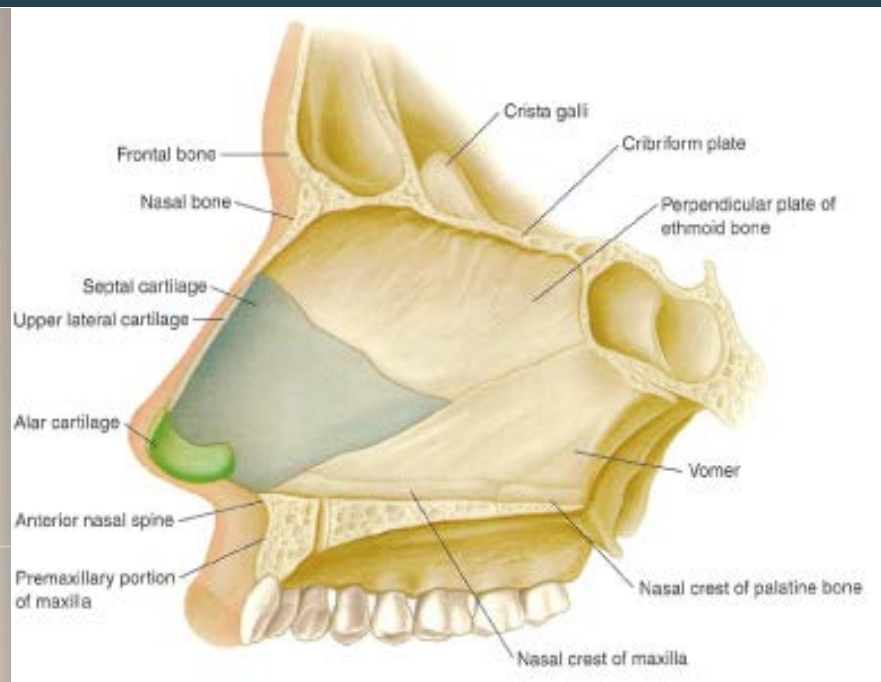


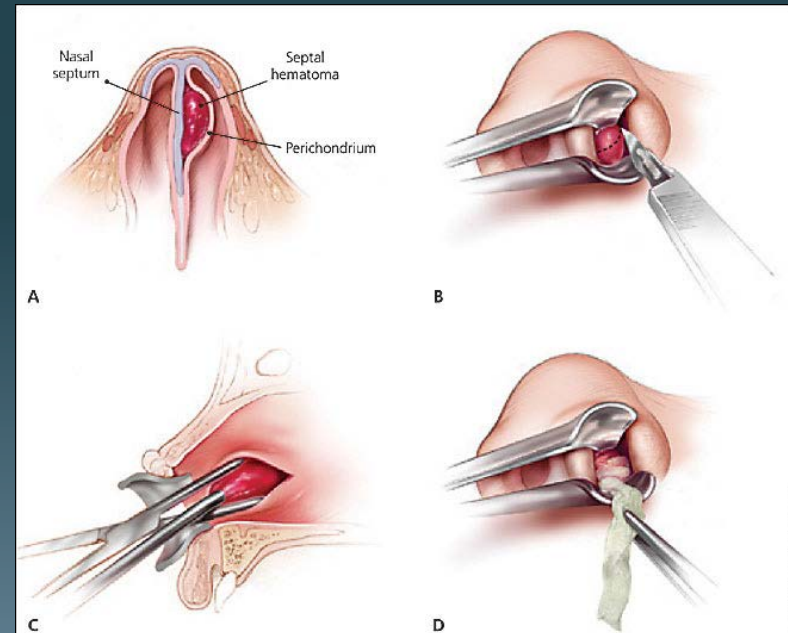
FIG. 5.3. Nasal septum.



Surgical implications

A deviated septum often involves the perpendicular plate, the nasal crests of the maxilla and the palatine bone, and, rarely, the vomer.

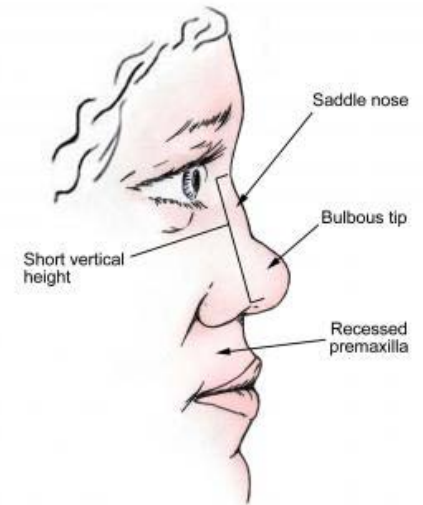
A fracture of the anterior nasal spine may be complicated by septal hematoma. A hematoma should be drained bilaterally; anteriorly in one nasal cavity and posteriorly in the opposite side. A rubber drain should be placed, as well as bilateral nasal packing to repose the perichondrium to the septum.



Surgical implications

A cartilaginous saddle nose, is due to depression of the dorsum of the nose. It may be caused by the following:

- ✧ Excessive removal of septal cartilage, which weakens the normal support in this area.
- ✧ Traumatic fracture of the septum.
- ✧ Septal hematoma or abscess, because the blood supply of septal cartilage is provided by the covering perichondrium.
- ✧ Tuberculosis, syphilis, relapsing polychondritis, Wegner's granuloma.



Blood supply

The cartilaginous septum is covered by a thin vascular layer of mucoperichondrium → blood supply.

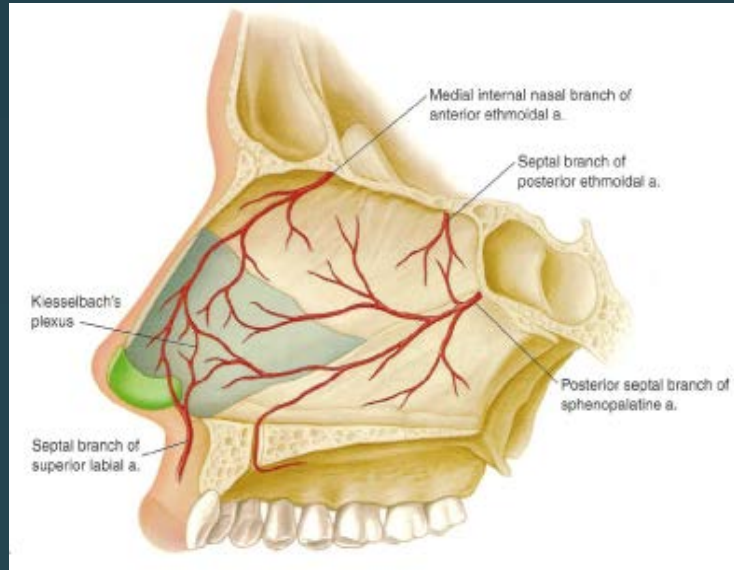
Internal carotid artery



Ophthalmic artery



Anterior and posterior ethmoidal arteries



External carotid artery



Internal maxillary artery



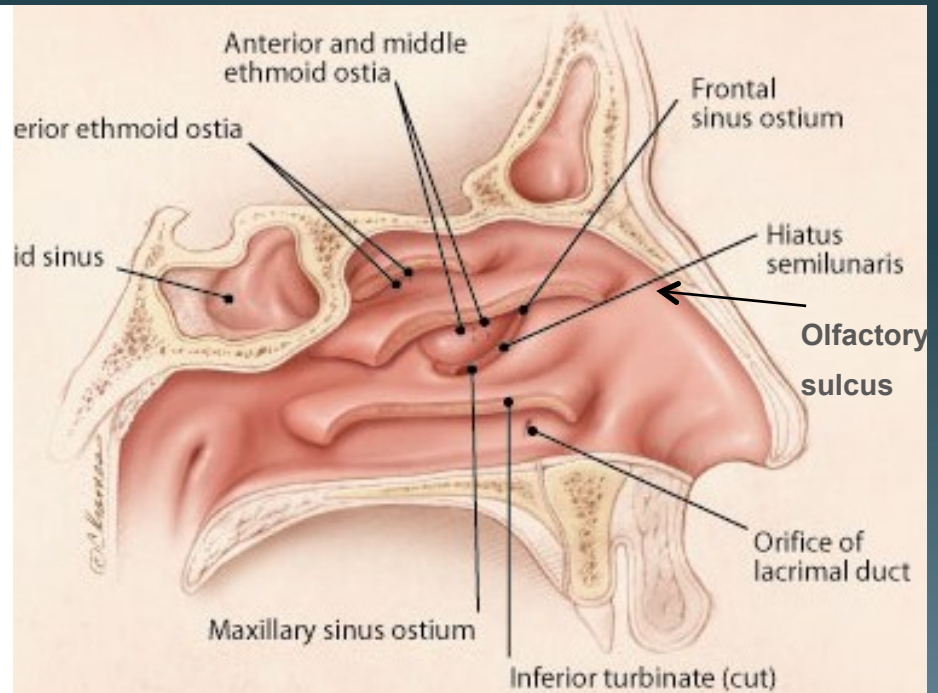
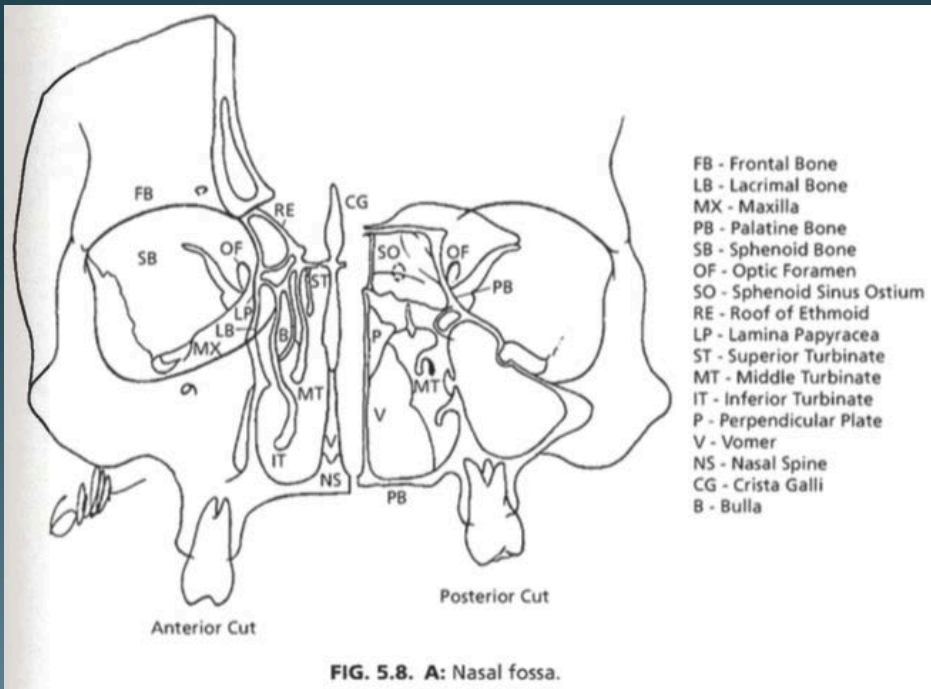
Sphenopalatine artery (posterior septal branch)

Kiesselbach's area

Great palatine artery
Sphenopalatine artery
Anterior ethmoidal artery
Superior labial artery

LATERAL WALL

- Three (or four) nasal **turbinates**: inferior, middle and superior.
- Ostia of the **nasal sinuses** (exception of that for the sphenoid sinus)
- Opening of the **nasolacrimal duct**



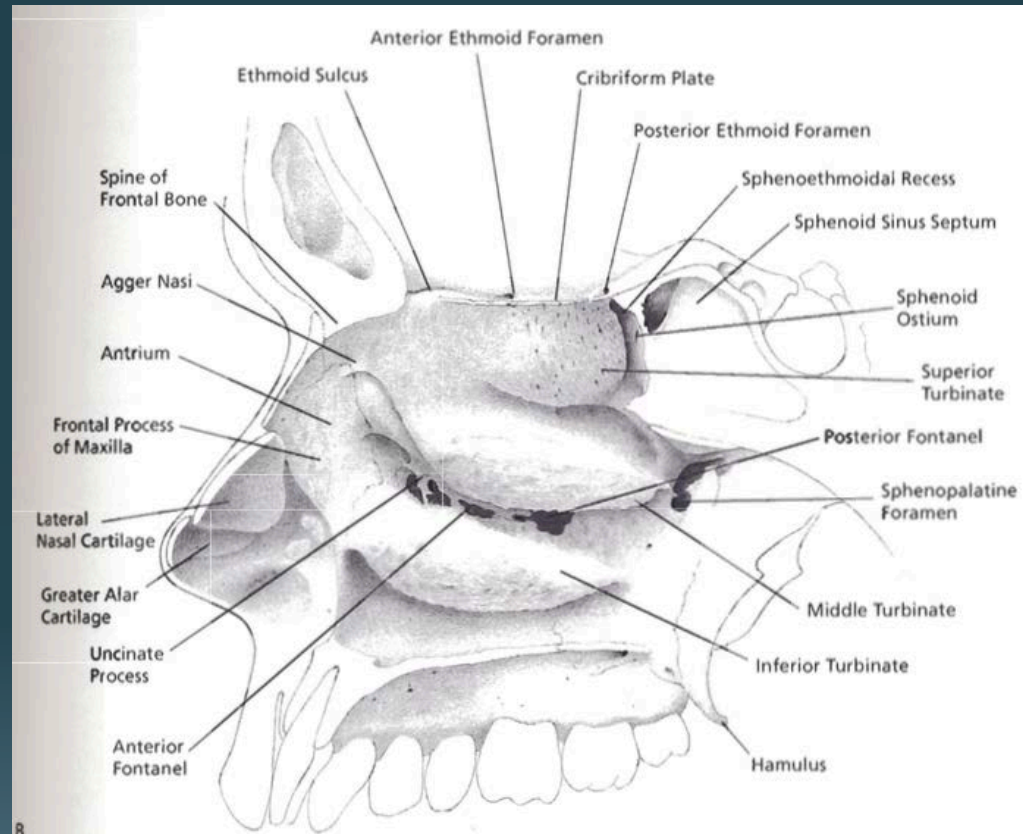
LATERAL WALL

■ Inferior nasal turbinate

- ✧ Is a separate bone covered by thick mucous membrane.

■ Middle turbinate

- ✧ Portion of the ethmoid bone.
- ✧ The *concha bullosa* is a pneumatized portion of the middle turbinate continuous with ethmoidal air cells.



LATERAL WALL

■ Superior turbinate

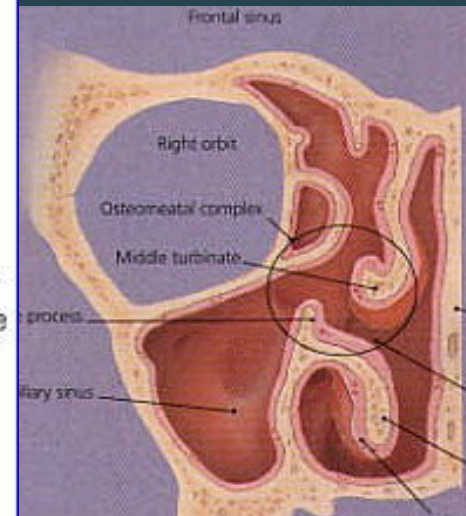
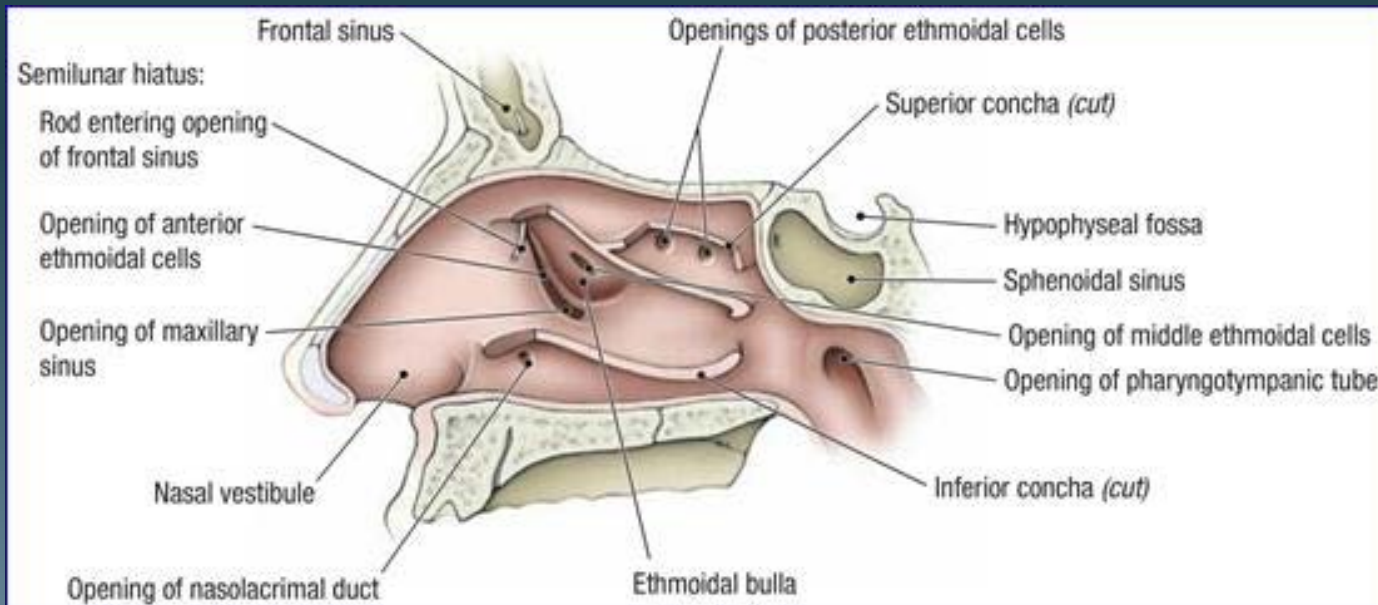
- ✧ Is approximately one-half the length of the middle turbinate.
- ✧ The sphenoethmoidal recess lies between the superior turbinate and the sphenoid bone.

■ Supreme turbinate and supreme meatus

- ✧ Are present unilaterally or bilaterally in 60% of individuals.
- ✧ The ostium of the posterior ethmoidal cells opens into the supreme meatus, when present, in about 75% of individuals.

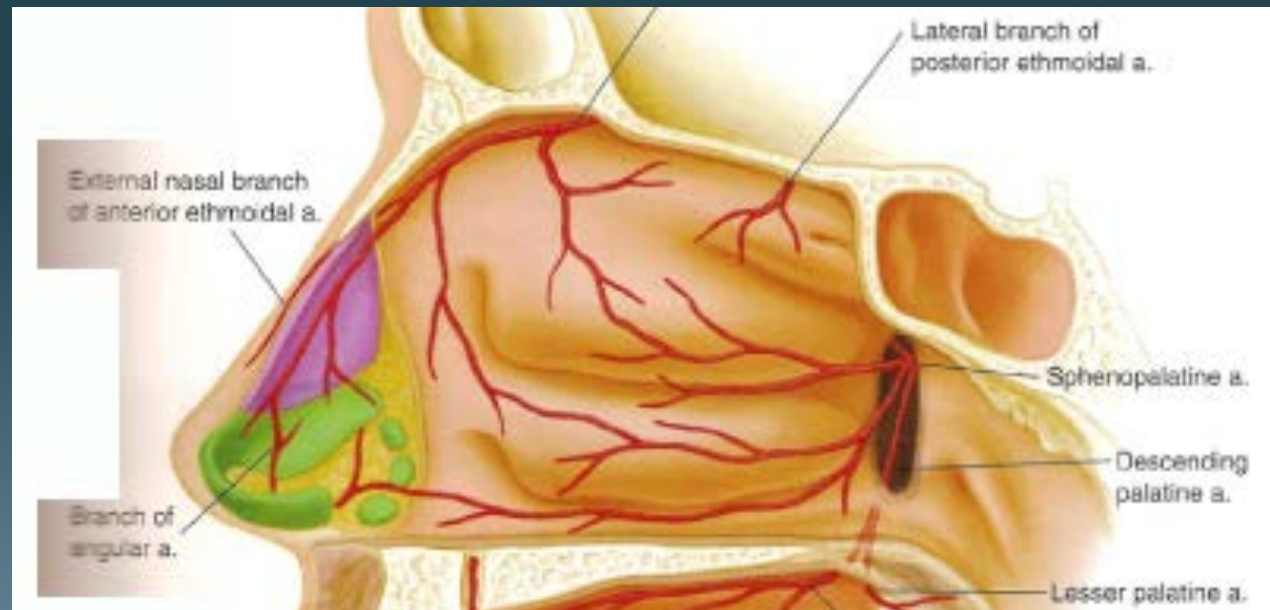
LATERAL WALL

- **Inferior meatus:** opening of the nasolacrimal duct.
- **Middle meatus**
 - Frontal recess: most superior portion. Opening of the frontal sinus and some anterior ethmoidal cells.
 - Ethmoidal bulla (one or more ethmoidal cells)
 - Semilunar (or ethmoidal) hiatus / ethmoidal infundibulum: anterior ethmoidal cells and maxillary sinus.
 - Uncinate process
- **Superior meatus:** olfactory epithelium and the opening of the posterior ethmoidal cells.



Blood supply

- Lateral branch of **sphenopalatine artery**
 - Inferior and middle turbinates
- Lateral internal nasal branch of **anterior ethmoidal artery**
 - Anterior third of the lateral wall
- **Posterior ethmoidal artery**
 - Superior turbinate
- Branch of **angular artery**



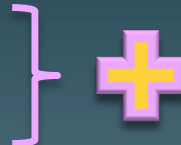
Veins and lymphatic drainage

■ Veins

- Pterygoid plexus - inferior turbinate, inferior meatus and posterior part of the septum.
- Ophthalmic vein – ethmoidal veins
- Facial vein – subcutaneous plexus of the skin covering the alar region

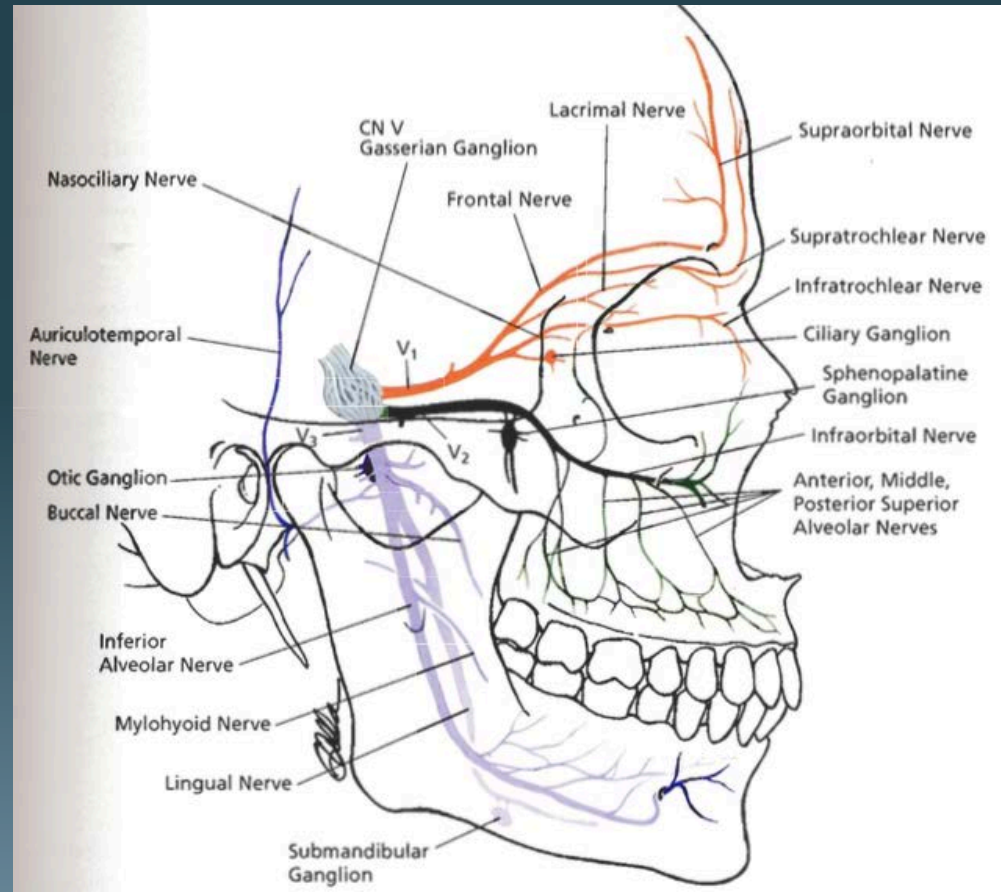
■ Lymphatics

- Lymphatic of the skin – anterior part of the nose.
- Deep cervical lymph nodes
- Retropharyngeal lymph nodes



General sensitivity

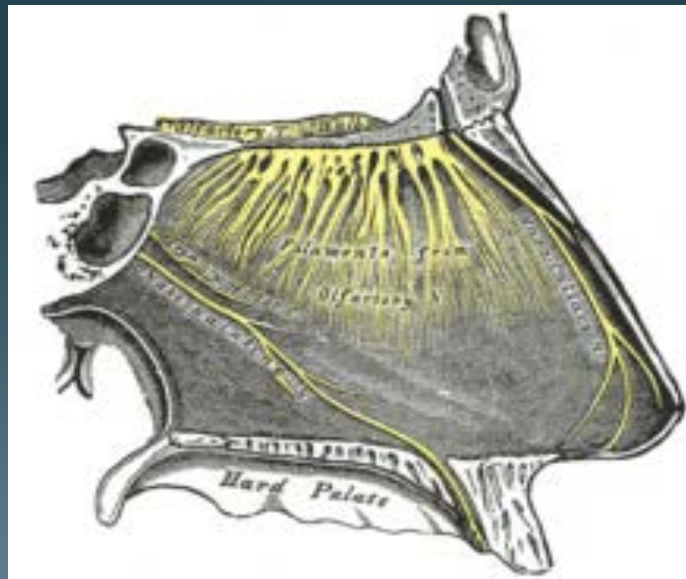
- **Nasociliary nerve**: branch of the **ophthalmic division** (Va) → anterior ethmoidal and infratrochlear nerves
- **Maxillary nerve** (Vb) → sphenopalatine nerve → sphenopalatine ganglion → Infraorbital nerve.
 - ✧ Lateral posterior superior nasal branches
 - ✧ Medial posterior superior nasal branches
 - ✧ Nasopalatine nerve
 - ✧ Greater palatine branches
- **Greater petrosal nerve**
 - ✧ Is derived from CN VII



Sensory innervation

Olfactory nerve

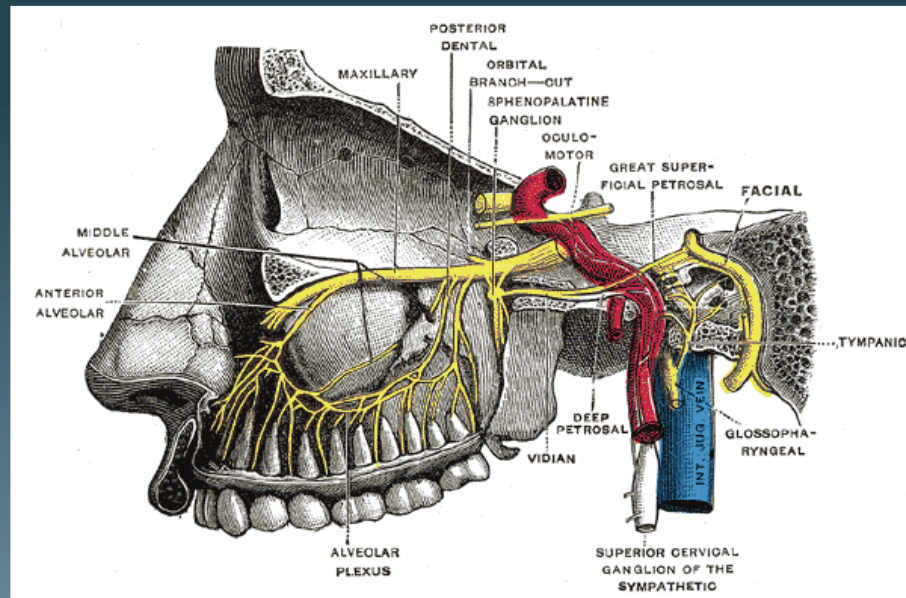
- Olfactory mucosa
- 2 groups of unmyelinated fibres: lateral and medial fibers.
- Cribiform plate of the ethmoid bone
- Olfactory bulbe



Autonomic innervation

Sympathetic fibres

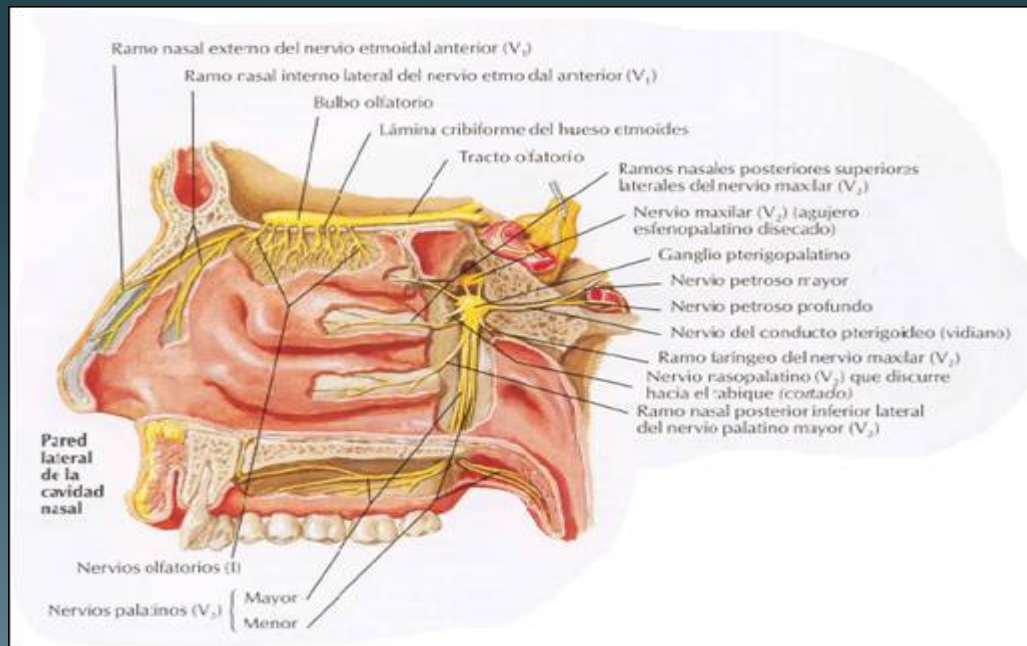
- Lateral horn of the spinal cord (D1-D3)→sympathetic ipsilateral chain.
- Are derived from the superior cervical ganglion. Run along the ICA.
- Post-ganglionic fibres→internal and external carotid plexus
- Internal plexus→ deep petrosal nerve+ great superficial petrosal nerve
→ vidian nerve. Runs through the sphenopalatine ganglion (without synapses)
- Posterior nasal nerves (of maxillary nerve).



Autonomic innervation

Parasympathetic fibres

- Derived from the facial nerve
- Geniculate ganglion
- Great superficial petrosal nerve + deep petrosal nerve → vidian nerve
- Sphenopalatine ganglion → synapses
- Post-ganglionic fibres → posterior nasal nerves



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Thank you 😊