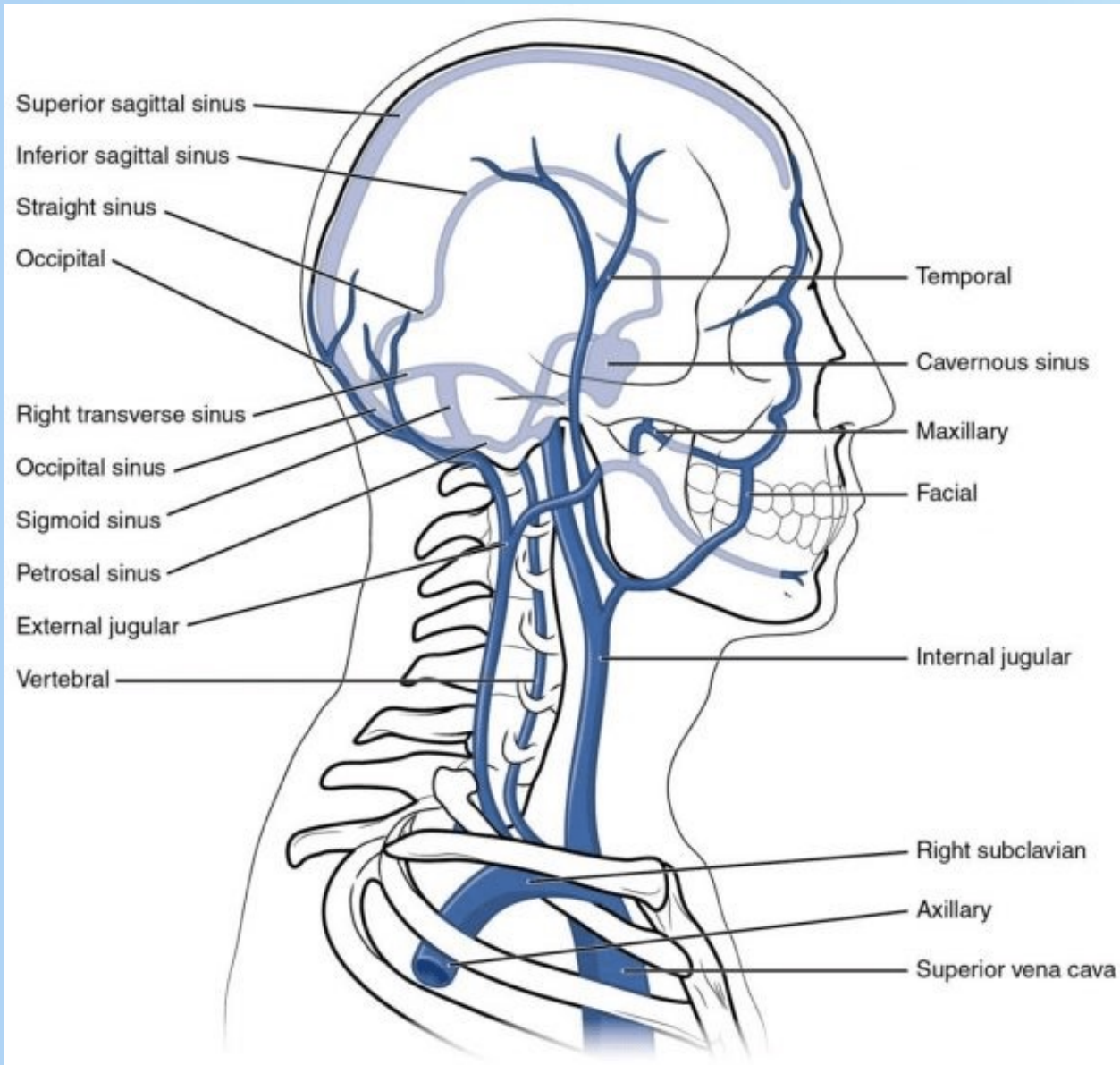


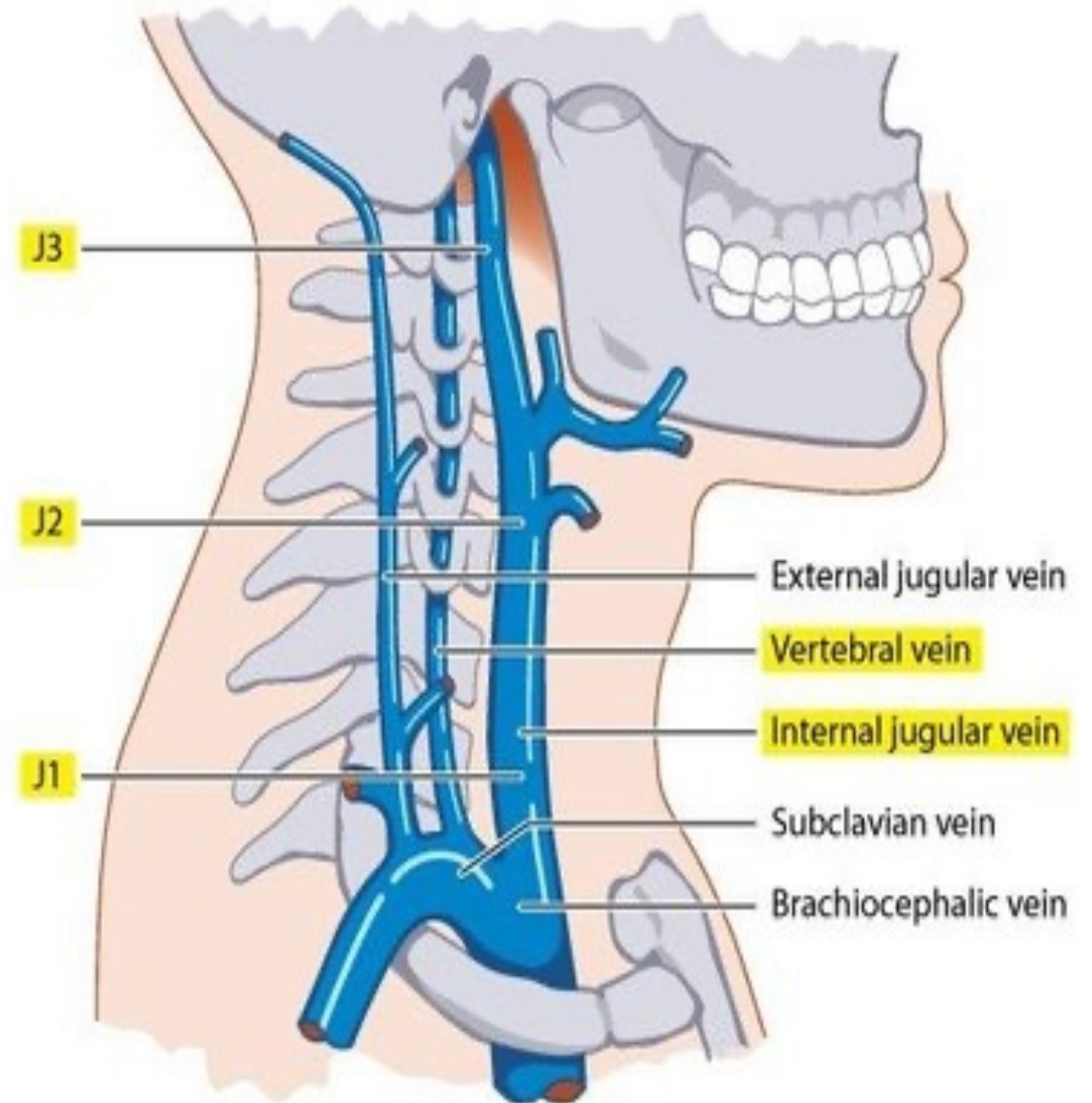
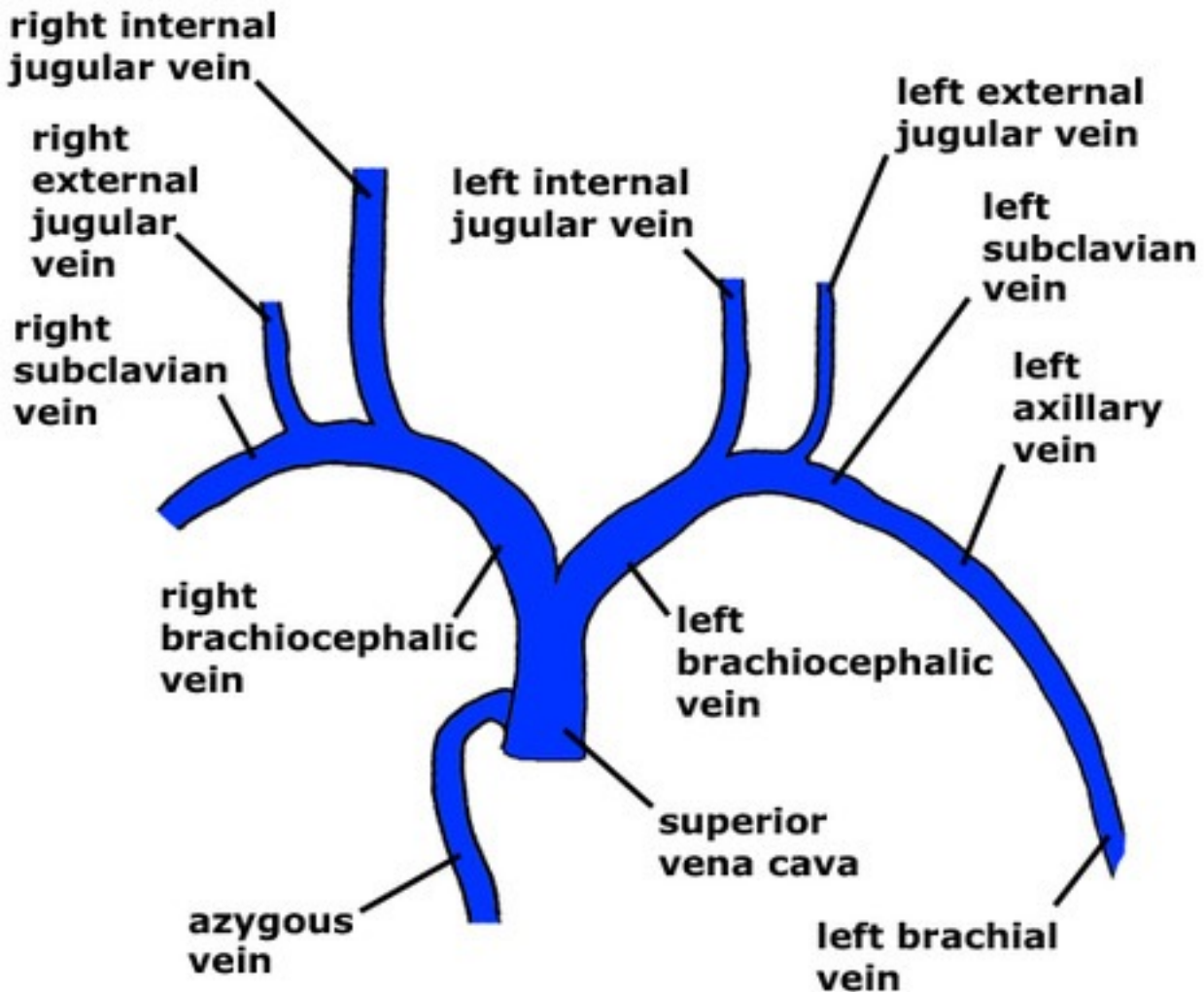
Lymphatic and venous drainage of head and neck

Ola Amland

Venous drainage



Major veins superior to the heart



What does it
drain?

Where does it
drain into?

Venous drainage

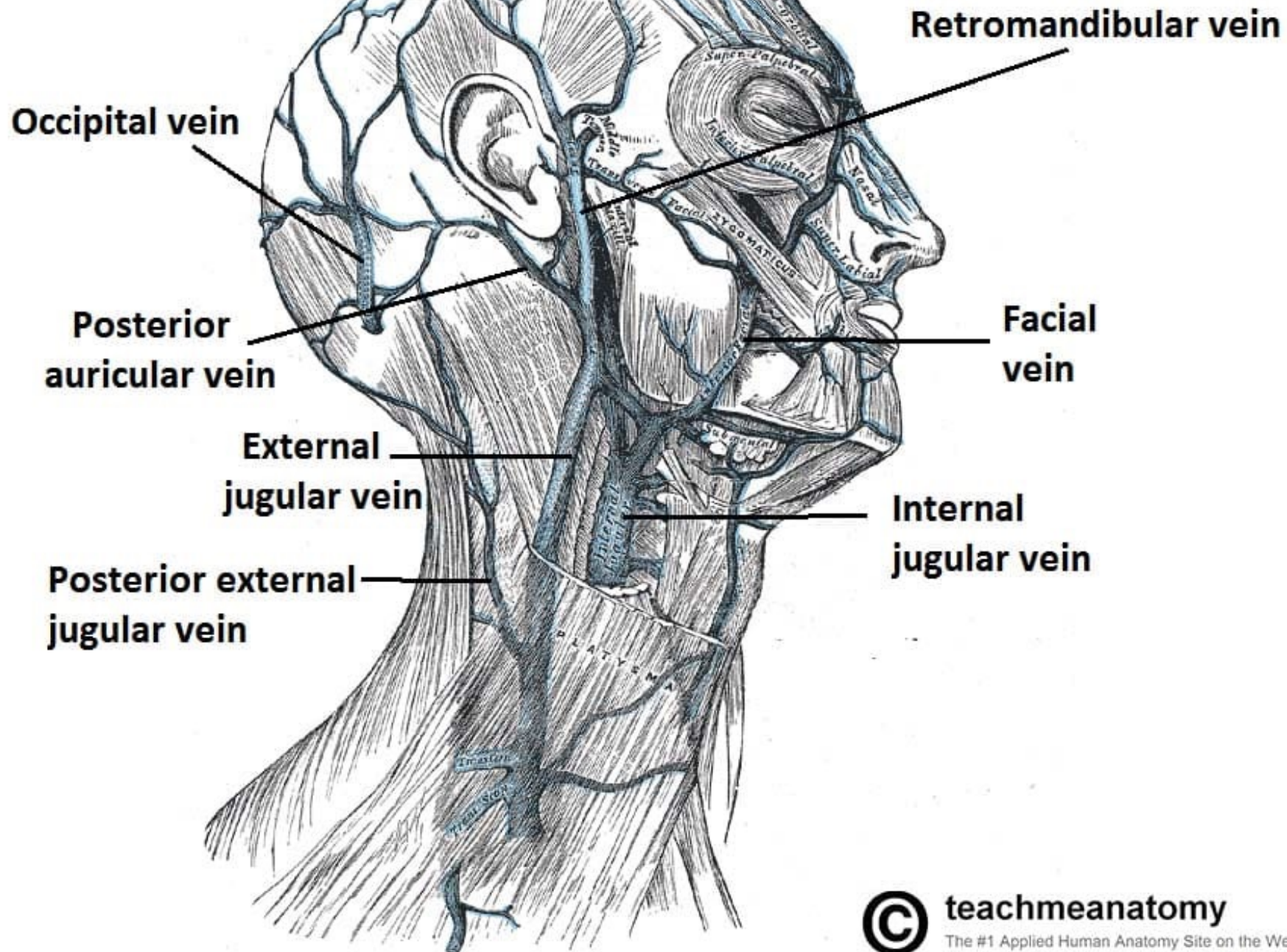
Superficial
venous
drainage

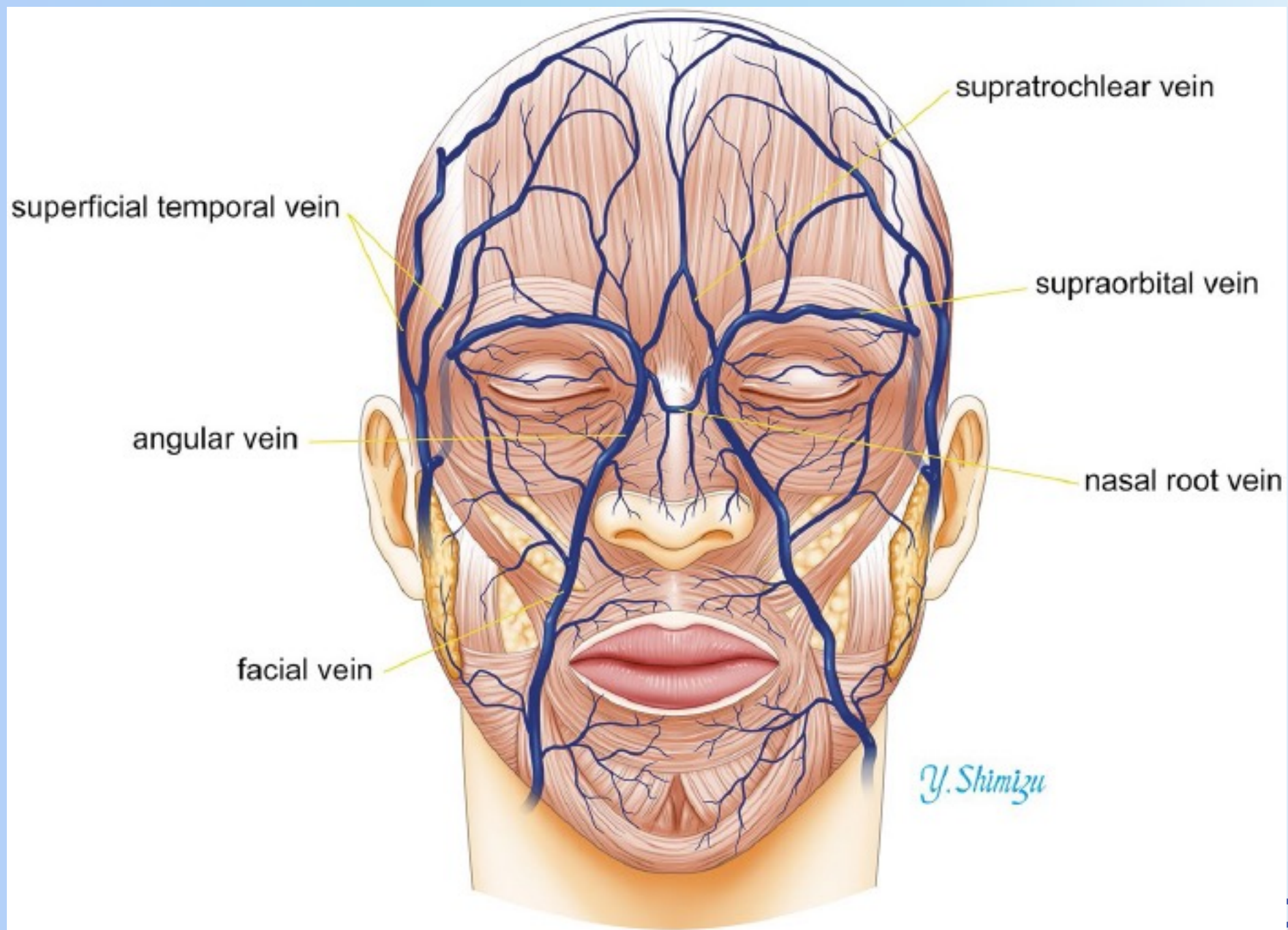
Deep
venous
drainage

Dural
venous
sinuses

Superficial veins

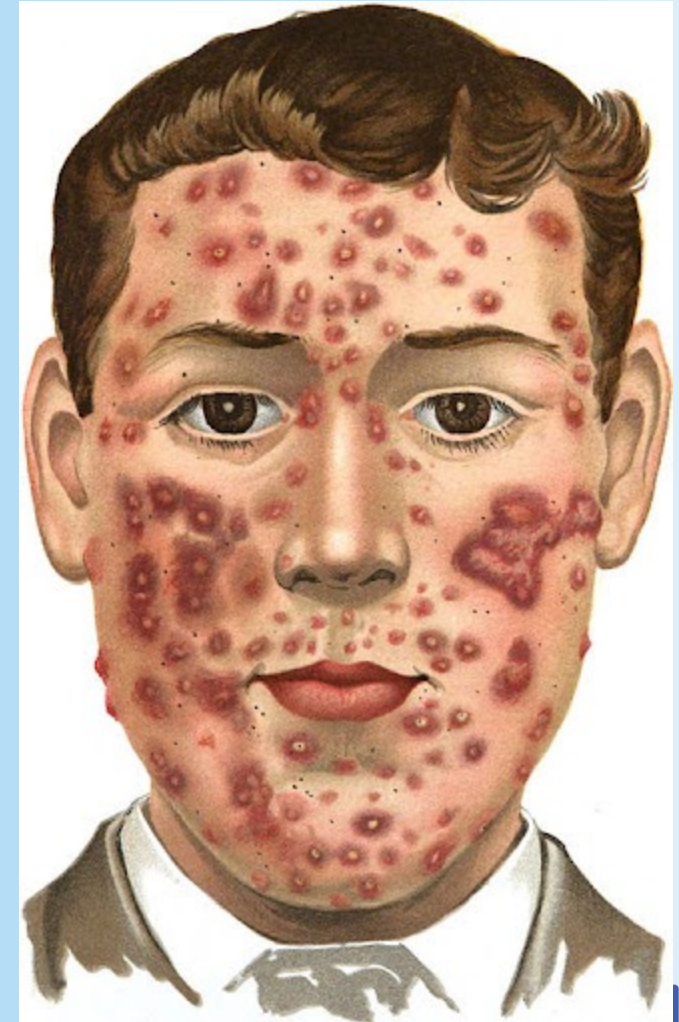
Vein	What It Drains	Where It Drains Into	Notes / Pearls
Facial vein	Anterior face (eyelids, lips, nose, cheeks)	Internal jugular vein (IJV)	Connects to cavernous sinus — danger triangle of face (risk of brain infection)
Retromandibular vein	Scalp and lateral face (from superficial temporal and maxillary veins)	Anterior division → Facial vein; Posterior division → External jugular vein	Key connection between superficial and deep systems
External jugular vein	Posterior scalp, superficial lateral face	Subclavian vein	Prominent in neck; visible in heart failure (jugular venous distension)
Posterior auricular vein	Scalp behind the ear	External jugular vein	Drains back of scalp and external ear





Mr. pimple popper

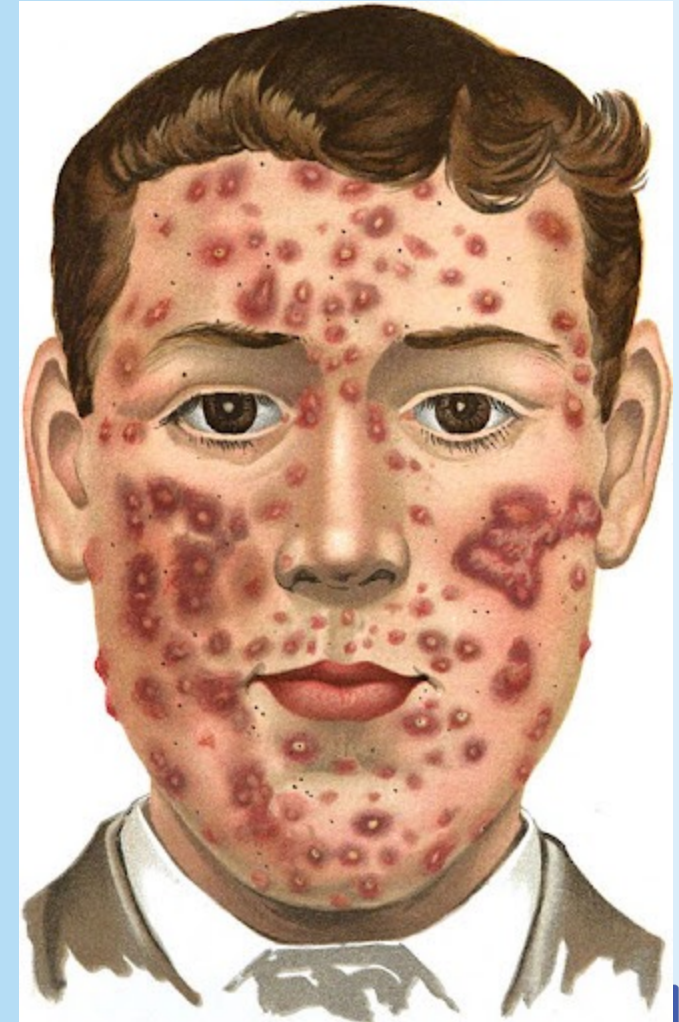
- A 22-year-old man presents to the emergency department with:
- 2-day history of fever, severe headache, right eye swelling
- Recently popped a pimple on the side of his nose
- Now has painful eye movements and protrusion of the right eye (proptosis)



Mr. pimple popper

- Physical exam:
- Fever (39° C)
- Right eye swollen and red
- Limited eye movement (ophthalmoplegia)
- Mild papilledema on fundoscopy

How did a pimple cause all this?

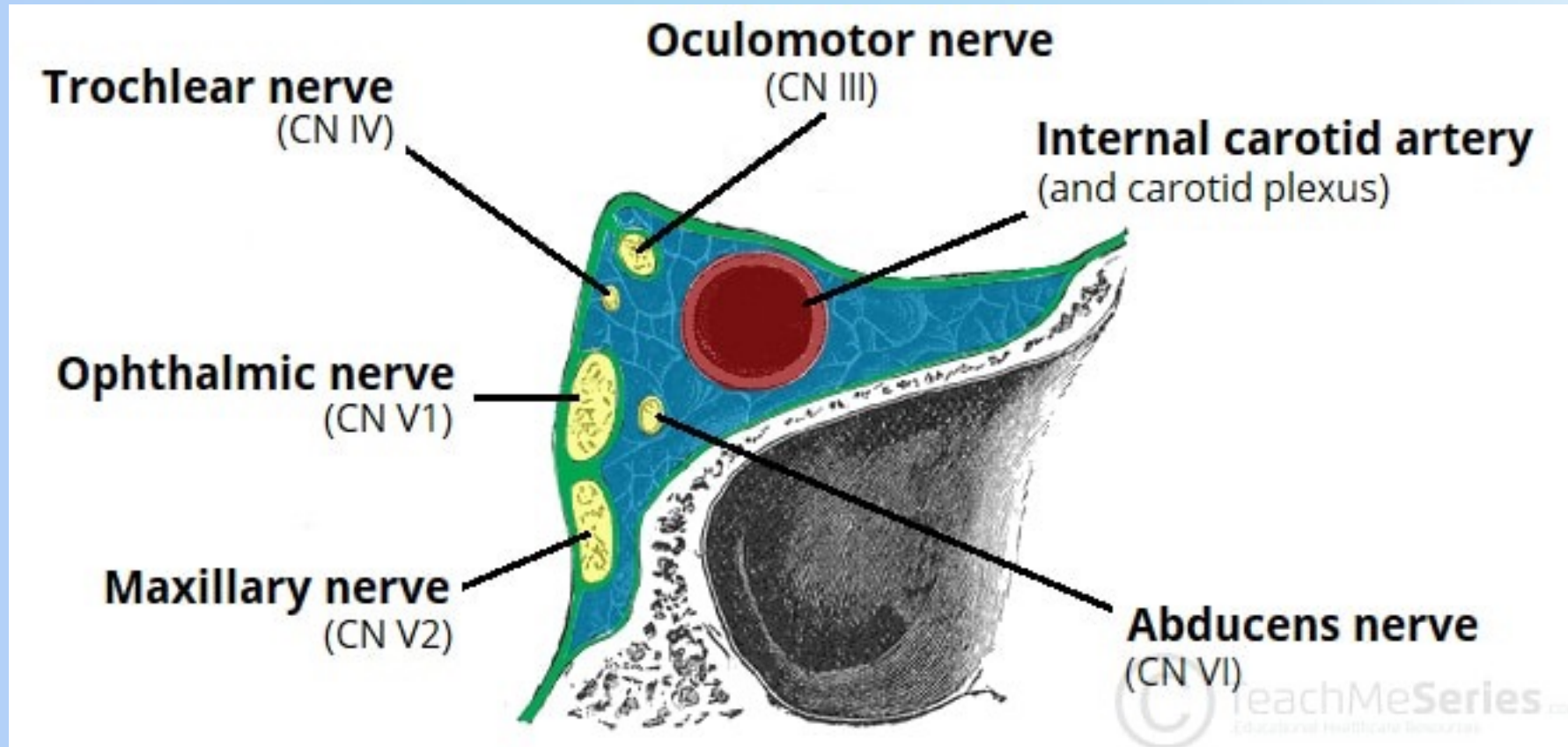


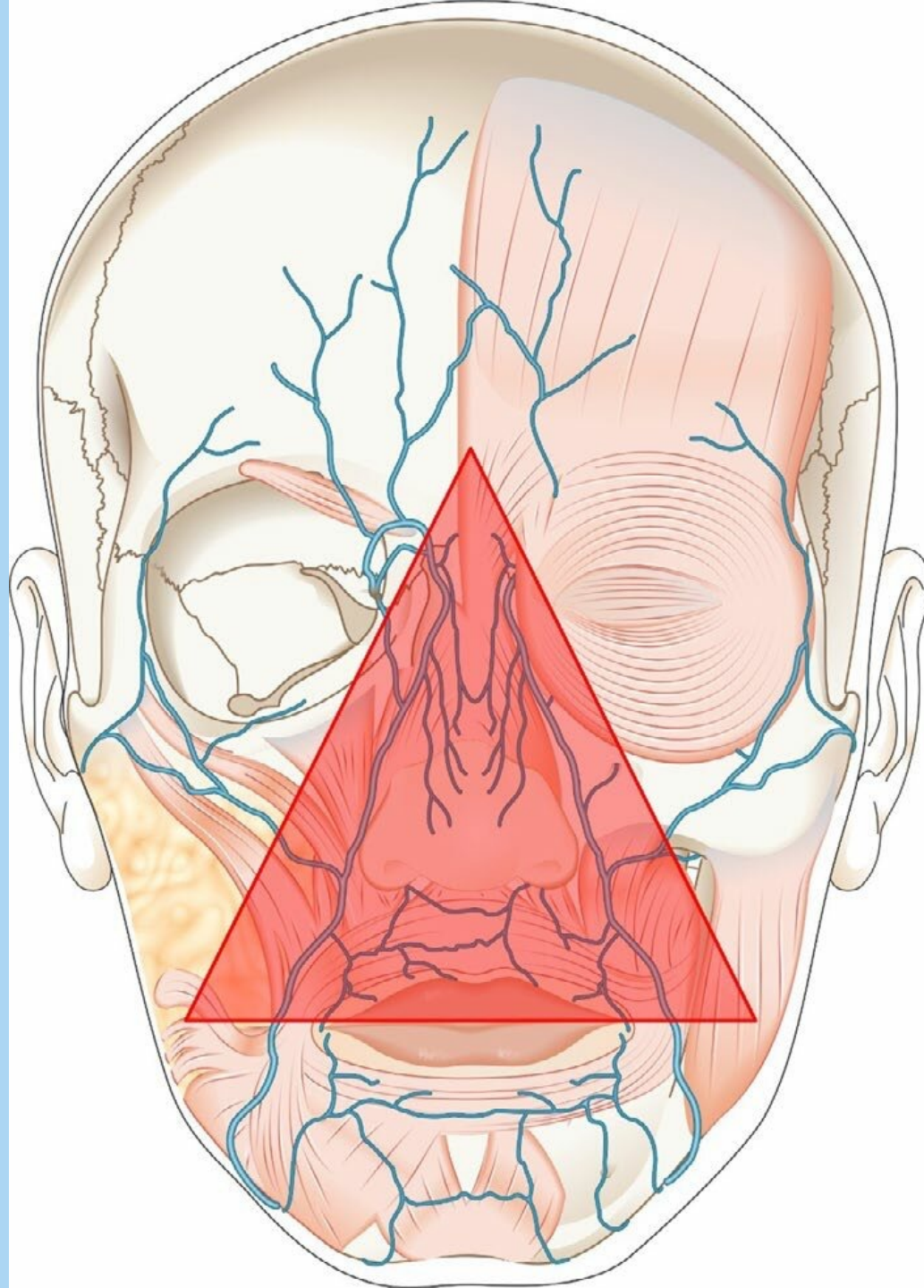
Cavernous sinus thrombosis secondary to facial infection

- Facial vein is valveless — allows retrograde spread of infection.
- Infection spread from the **danger triangle of the face** via the **facial vein** to the **cavernous sinus**.
- Cranial nerves III, IV, V1, V2, VI are affected → causes ophthalmoplegia, sensory loss.
- Immediate IV antibiotics are life-saving!



Cavernous sinus!





Your next patient



Jugular vein distension

Usually most visible at 45° elevation

Visible clue of elevated right atrial pressure - usually in heart failure



Another one!

- A 19-year-old university student presents to the emergency department with:
- 5-day history of sore throat and fever
- New onset of right-sided neck pain and swelling
- Increasing shortness of breath and pleuritic chest pain

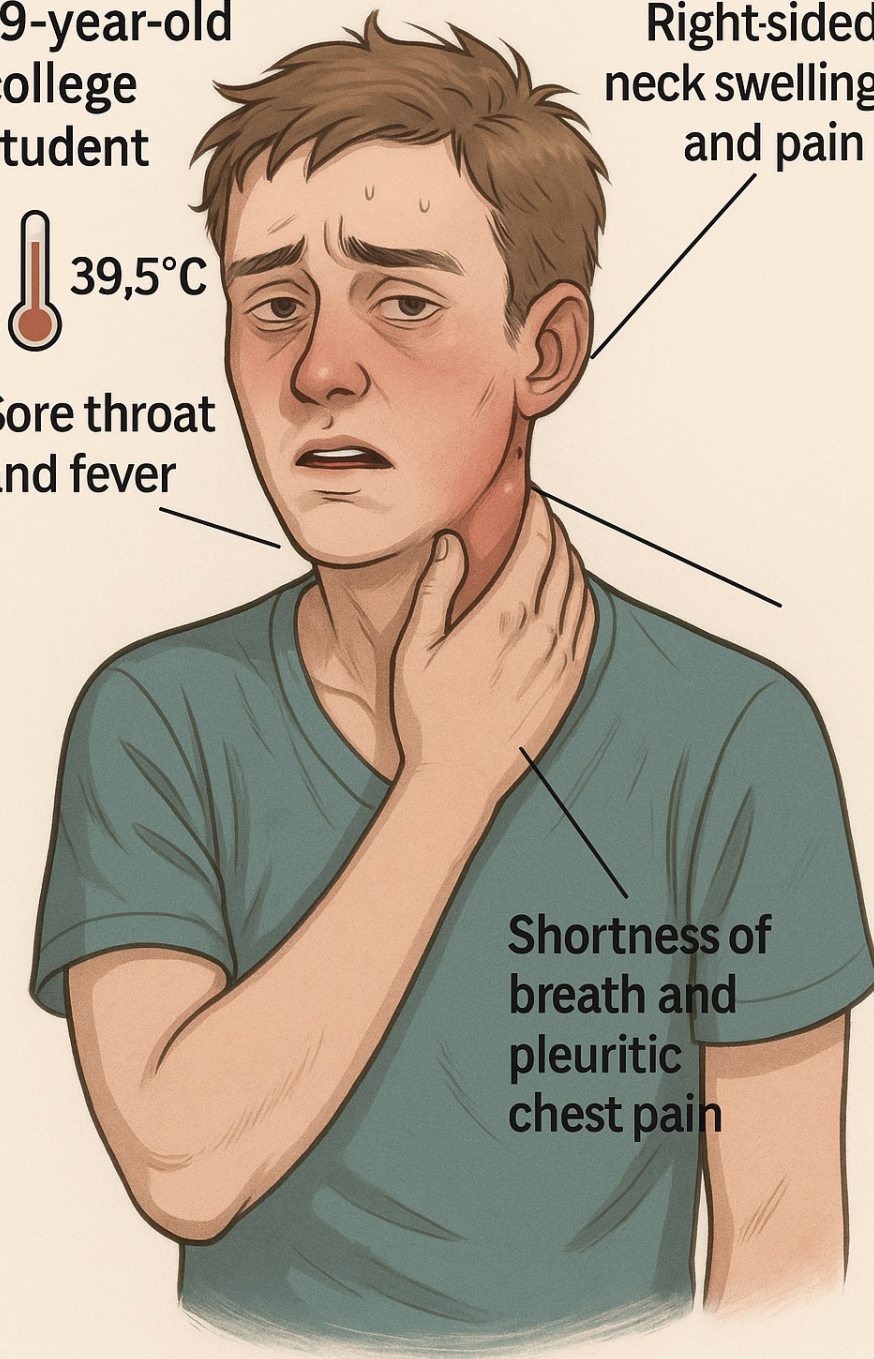
19-year-old college student



39,5°C

Sore throat and fever

Right-sided neck swelling and pain



Shortness of breath and pleuritic chest pain

Tests?

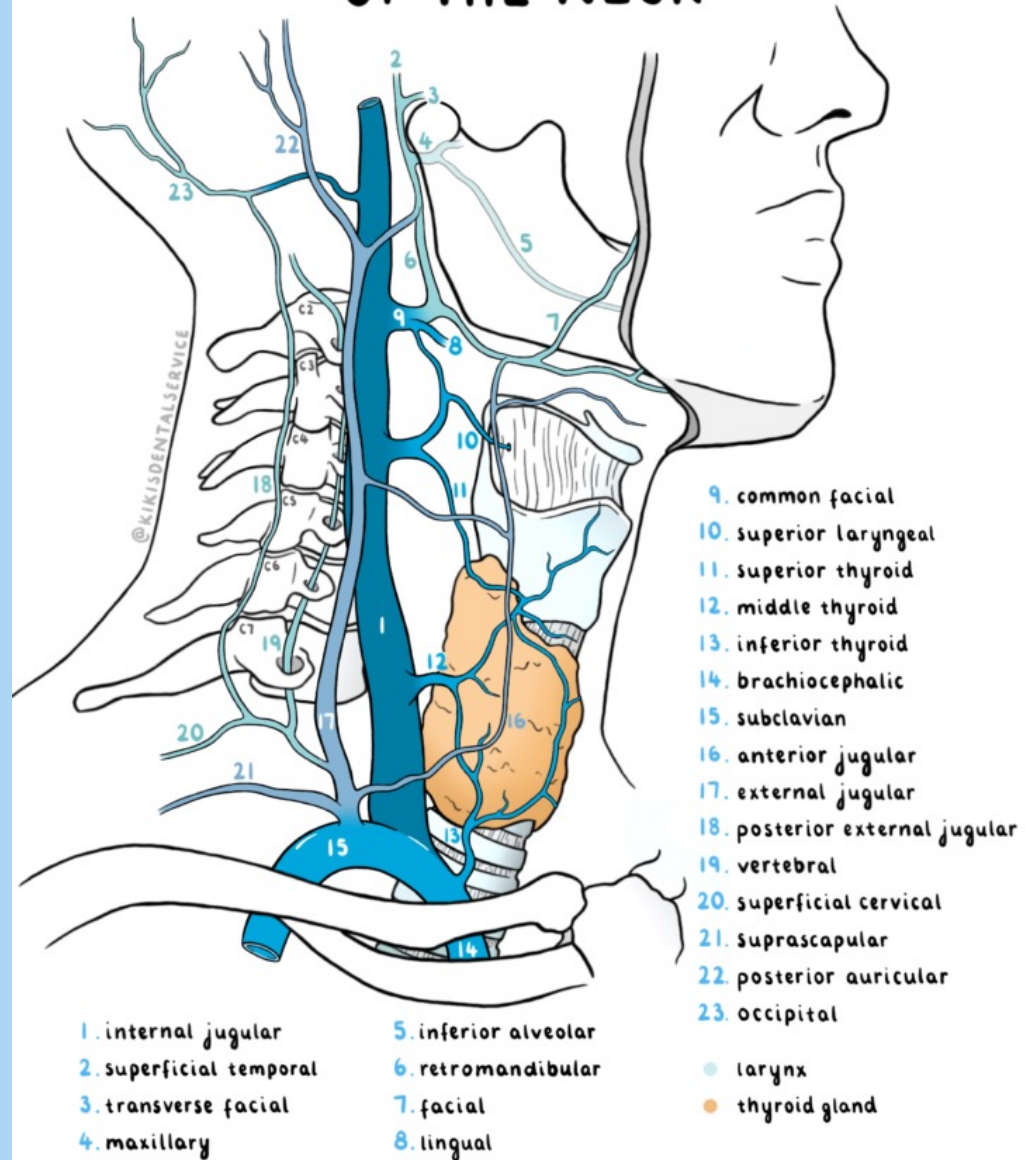
- Blood cultures grow *Fusobacterium necrophorum*.
- CT neck with contrast shows thrombosis of the right internal jugular vein.

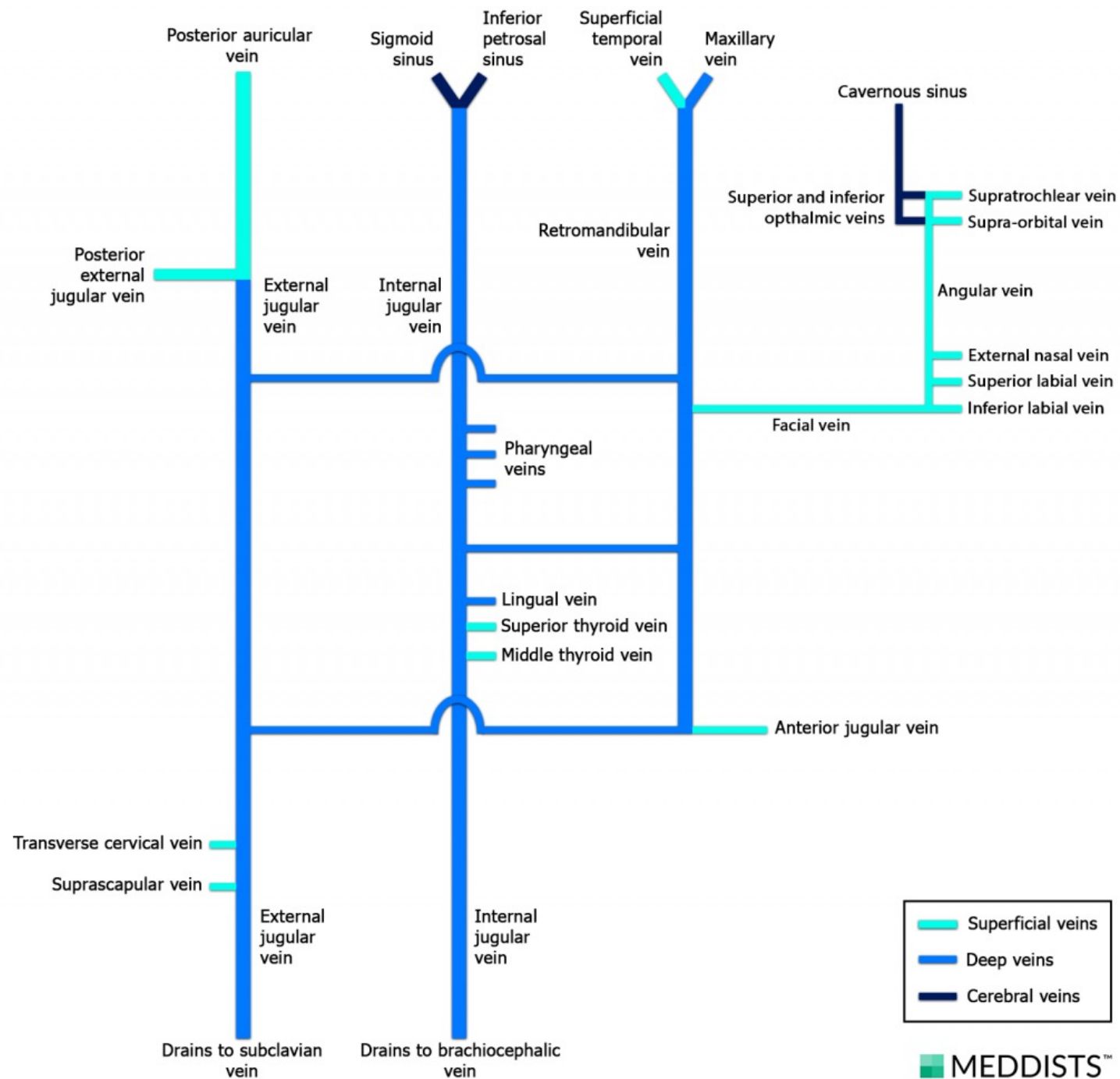
Lemierre syndrome: Throat infection causing septic thrombophlebitis of internal jugular vein

Deep venous drainage

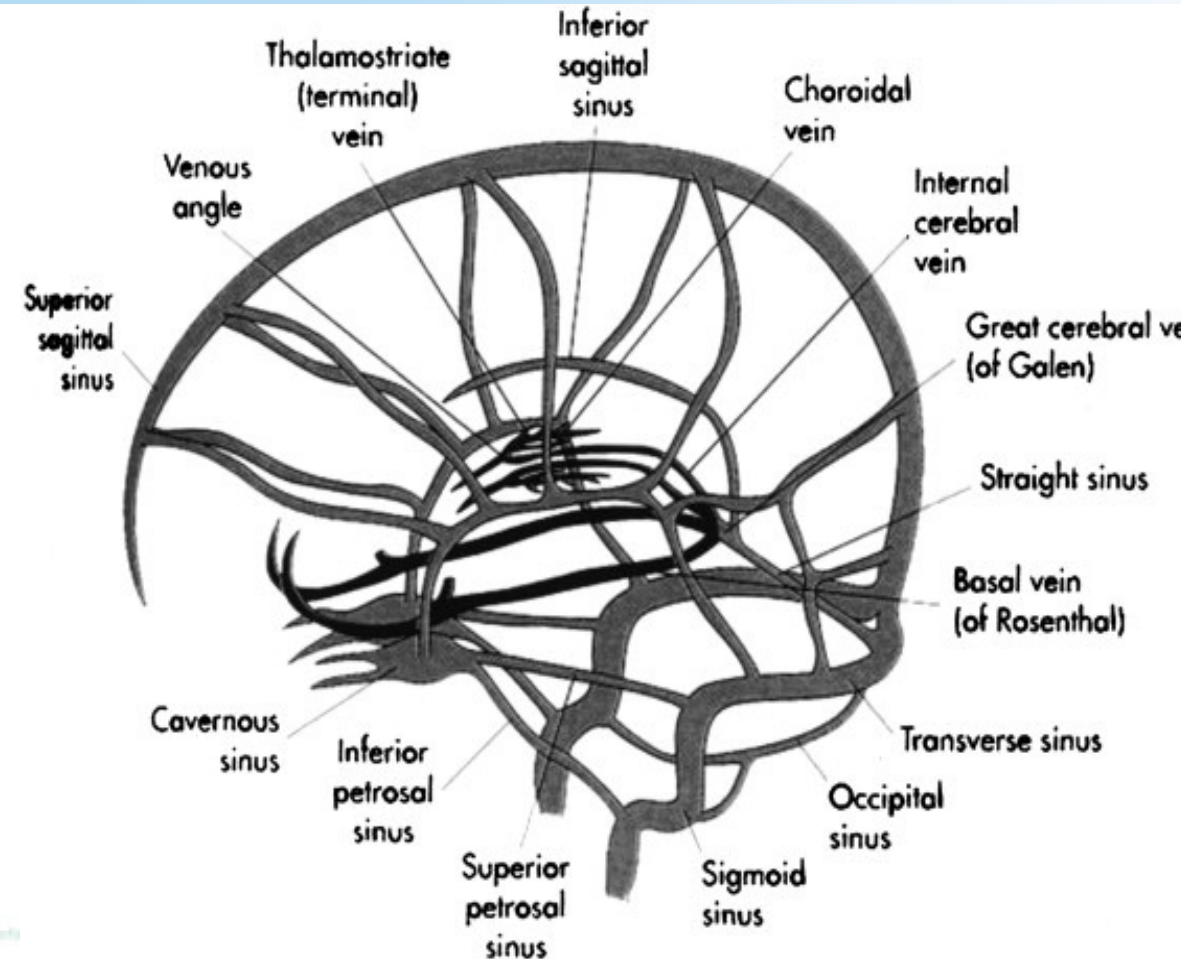
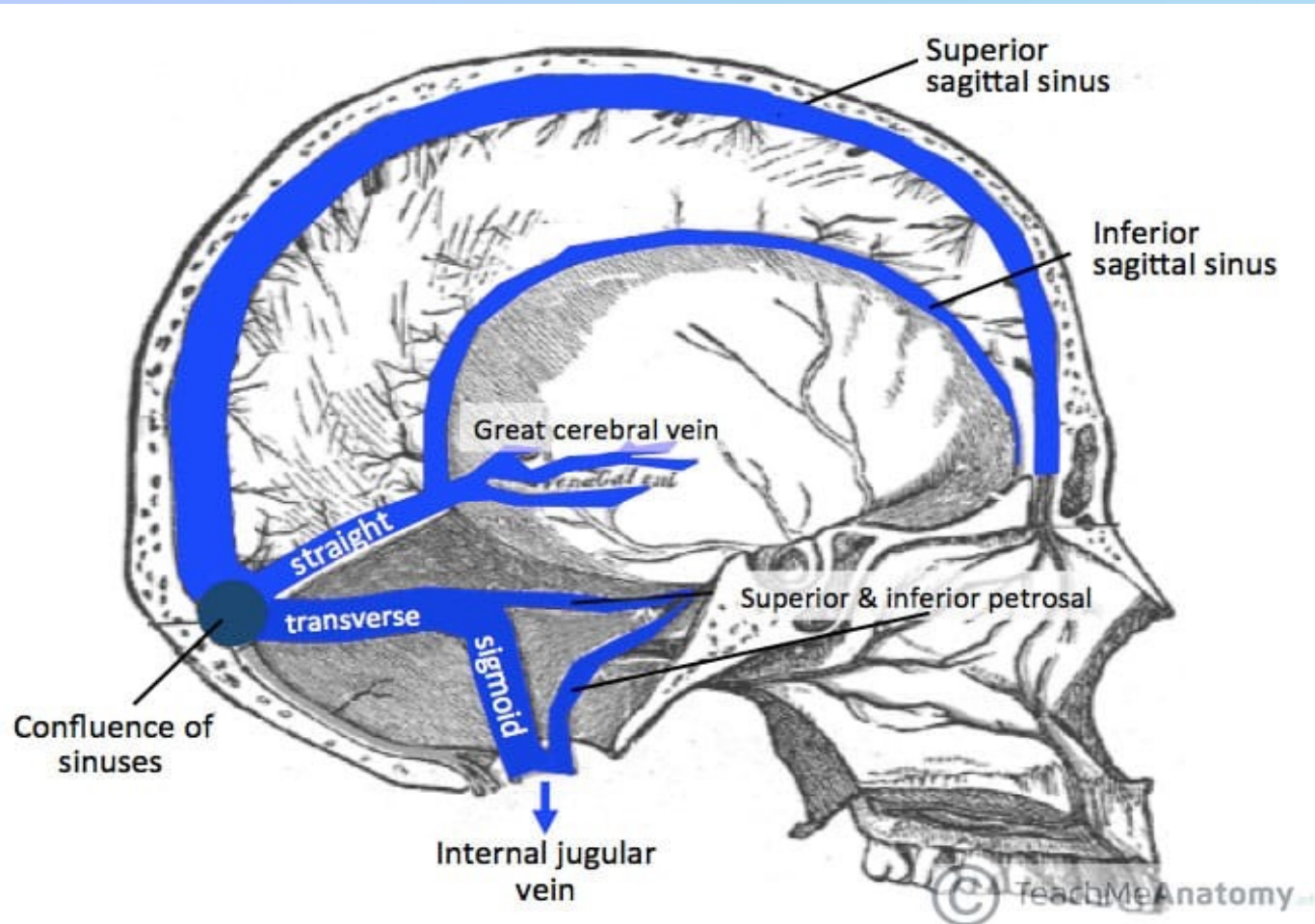
Vein	What It Drains	Where It Drains Into	Notes / Pearls
Internal jugular vein (IJV)	Brain, deep face, tongue, pharynx, larynx, thyroid	Brachiocephalic vein	Main drainage of brain and deep structures; runs in carotid sheath
Lingual vein	Tongue	Internal jugular vein	Important in tongue infections, cancers
Pharyngeal veins	Pharynx	Internal jugular vein	Spread of infections from pharynx to IJV (e.g., Lemierre's syndrome)
Superior thyroid vein	Upper thyroid, larynx	Internal jugular vein	
Middle thyroid vein	Lower thyroid	Internal jugular vein	
Vertebral vein	Posterior skull, cervical spine, deep neck muscles	Brachiocephalic vein	Important collateral drainage if IJV is blocked

VENOUS DRAINAGE OF THE NECK





Dural sinuses

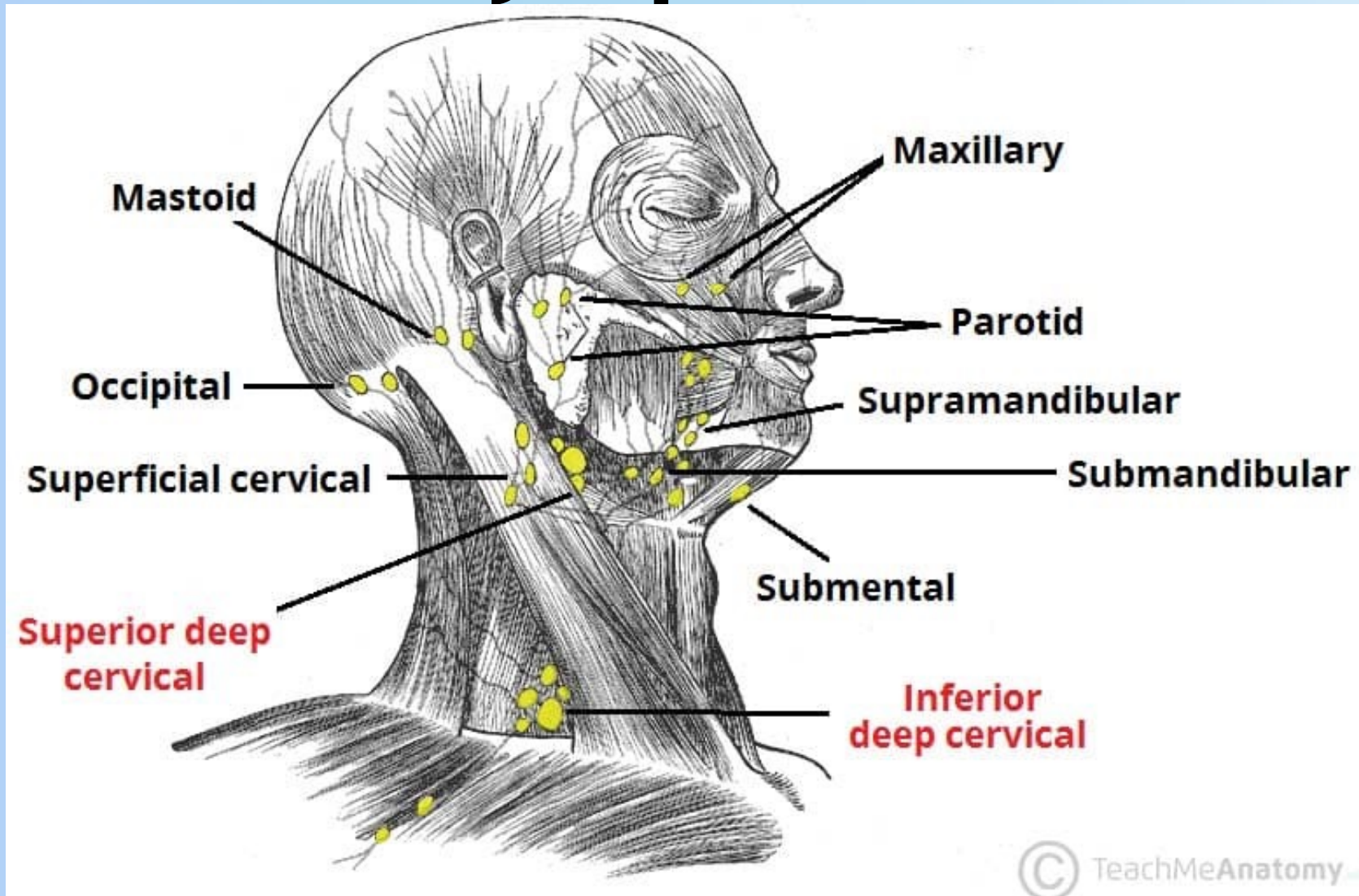


Dural venous sinuses (cranial drainage)

Sinus	What It Drains	Where It Drains Into	Notes / Pearls
Superior sagittal sinus	Cerebral hemispheres	Transverse sinus	Midline superior sinus, seen on imaging
Transverse sinus	From superior sagittal sinus	Sigmoid sinus	Runs horizontally
Sigmoid sinus	Posterior cranial fossa venous drainage	Internal jugular vein	Direct continuation to IJV
Cavernous sinus	Orbit, face (via ophthalmic veins)	Superior/inferior petrosal sinuses → IJV	Infections can spread from face to brain (e.g., facial vein thrombosis)

Also does not have valves!

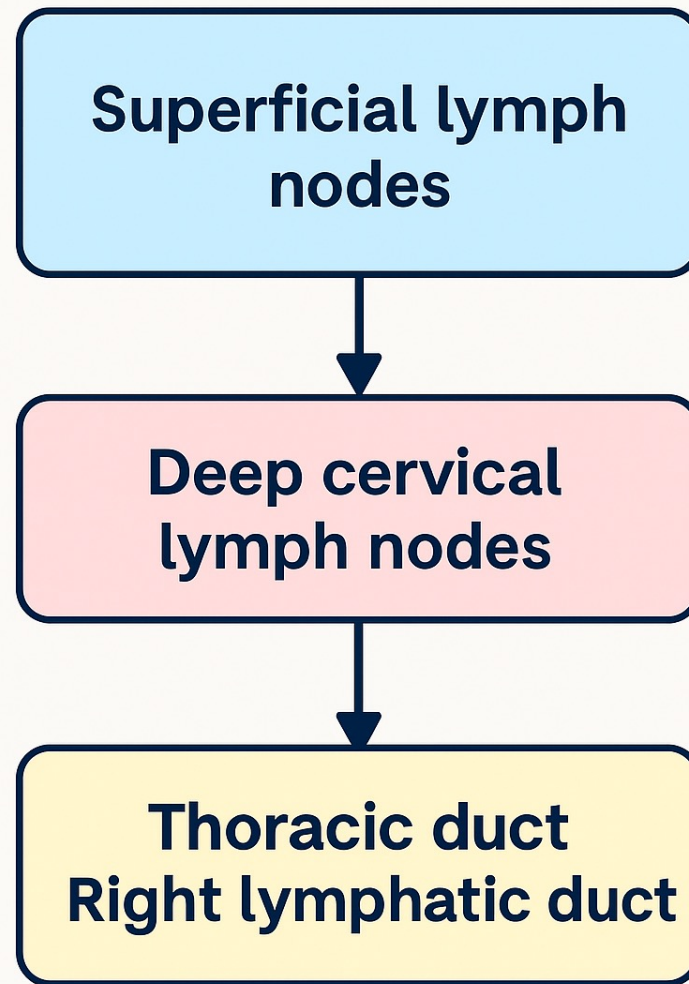
The lymph nodes



The most important?

What does it
drain?

Where does it
drain into?



The nodes and what they drain

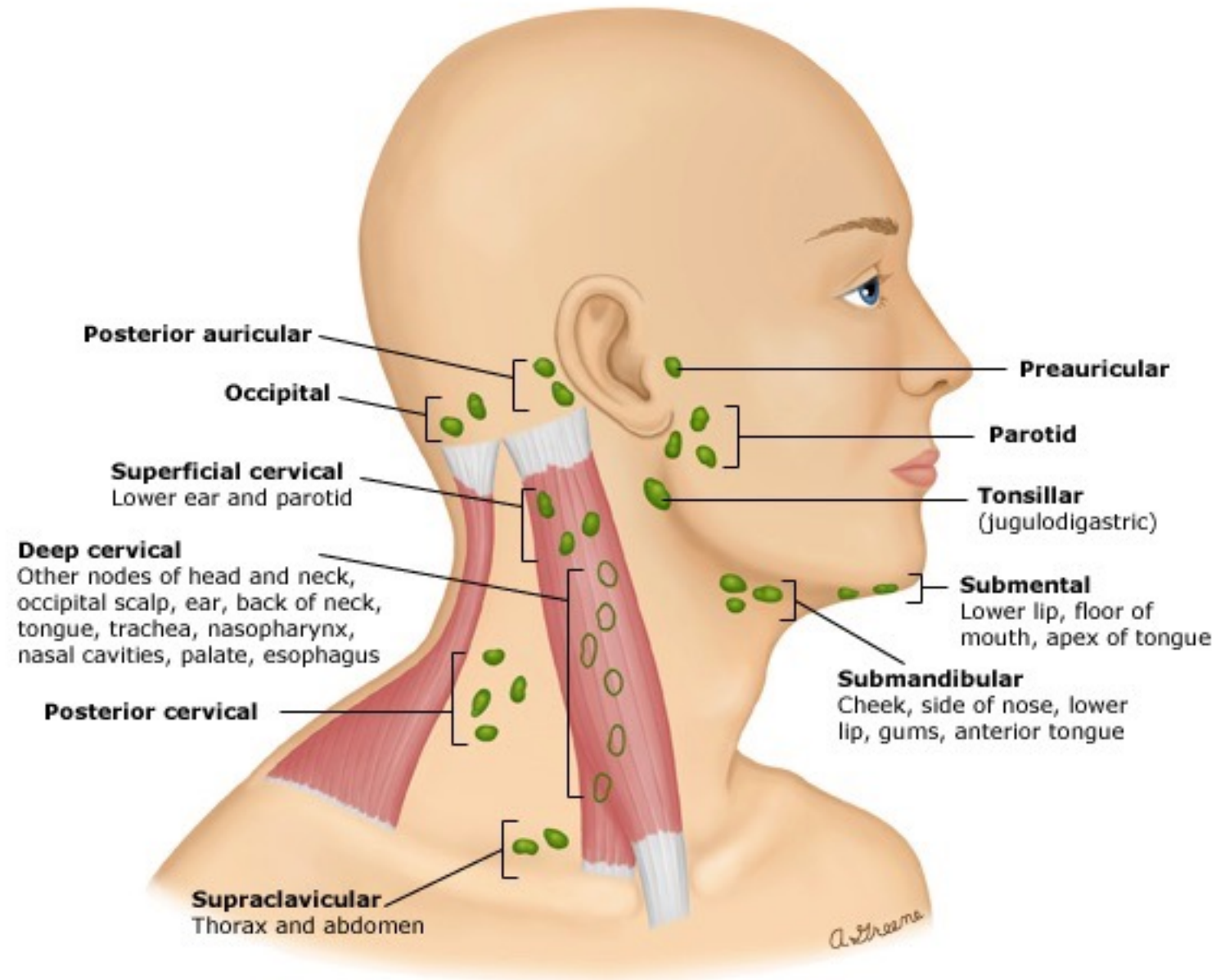
Node Group	Drains
Submental	Central lower lip, tip of tongue, floor of mouth
Submandibular	Lateral face, upper lip, anterior tongue
Parotid (preauricular)	Lateral eyelids, cheek, temple, scalp
Mastoid (retroauricular)	Posterior scalp, auricle
Occipital	Posterior scalp and neck
Superficial cervical	Skin over SCM, lower ear
Deep cervical (jugulodigastric & jugulo-omohyoid)	Tonsils, tongue, pharynx, larynx, thyroid, deeper structures
Supraclavicular	Thoracic/abdominal drainage — especially left side (Virchow's node)

Superficial lymph nodes

Node	Location	Drains
Submental	Under chin	Tip of tongue, central lower lip, floor of mouth
Submandibular	Under jaw	Lateral face, cheeks, upper lip, anterior tongue
Parotid (preauricular)	In front of ear	Lateral eyelids, external ear, scalp
Mastoid (postauricular)	Behind ear	Posterior scalp, ear
Occipital	At back of skull	Posterior scalp and neck
Superficial cervical	Along external jugular vein	Skin over neck and lower ear

Drain into the deep cervical lymph nodes!

Lymph nodes of the head and neck



Deep cervical lymph nodes

Node	Location	Drains
Jugulodigastric (tonsillar node)	Near angle of the mandible	Tonsils, pharynx, posterior oral cavity
Jugulo-omohyoid	Where internal jugular crosses omohyoid muscle	Tongue, thyroid, anterior oral cavity
Retropharyngeal	Behind pharynx, in retropharyngeal space	Nasal cavity, pharynx, middle ear
Paratracheal, Prelaryngeal, Pretracheal	Along trachea and larynx	Larynx, thyroid, trachea
Supraclavicular (inferior group)	Just above clavicle, near venous angle	Drains to thoracic duct (left) or right lymphatic duct

Right side drains into right lymphatic duct

Left side drains into thoracic duct -> Left subclavian vein

The deep cervical lymph nodes run along the internal jugular vein

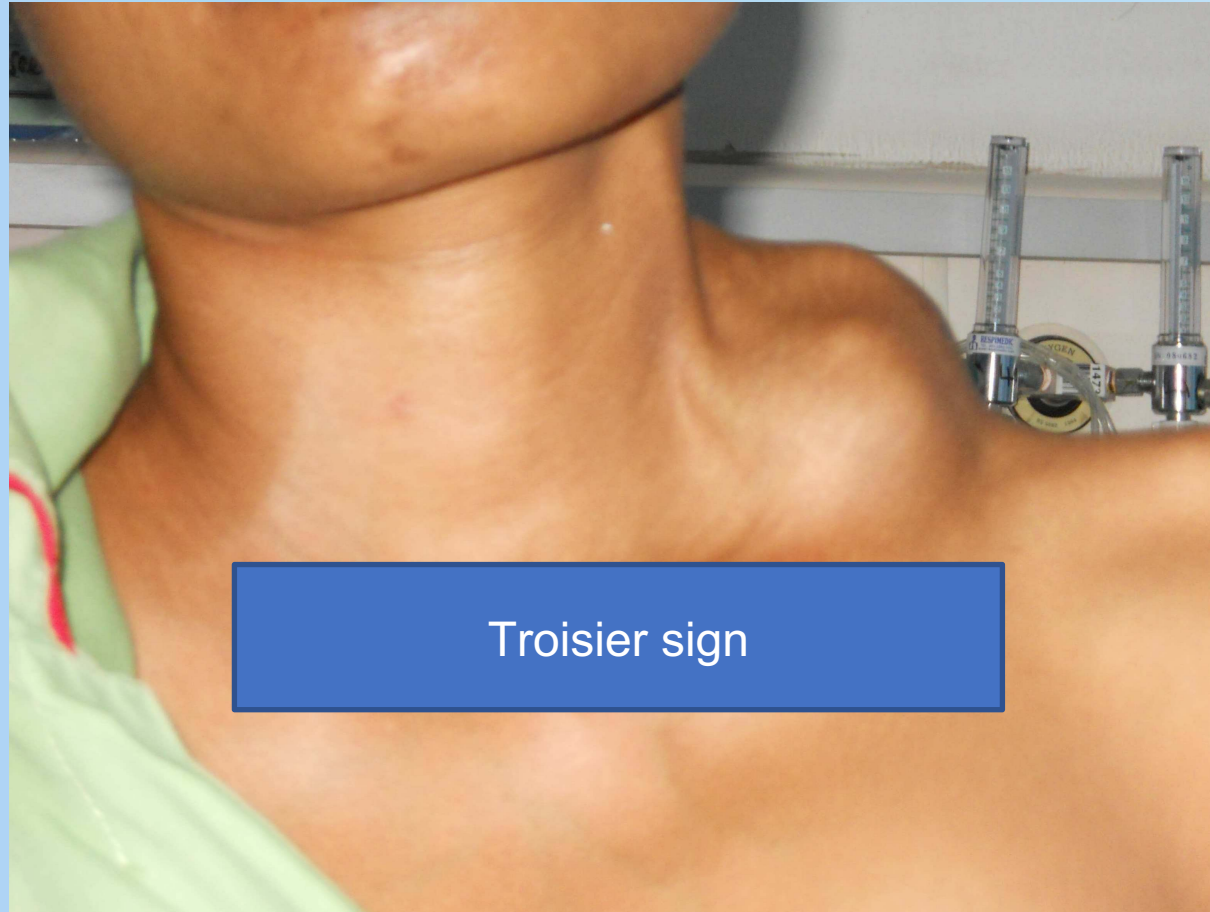
What causes enlarged lymph nodes?

Infections
Malignancies
Autoimmune
Misc.

Red flags?

*-Hard, fixed
Night sweats, weight loss,
persistent fever
-Enlarged >3 weeks*

Mr. Virchow



Troisier sign

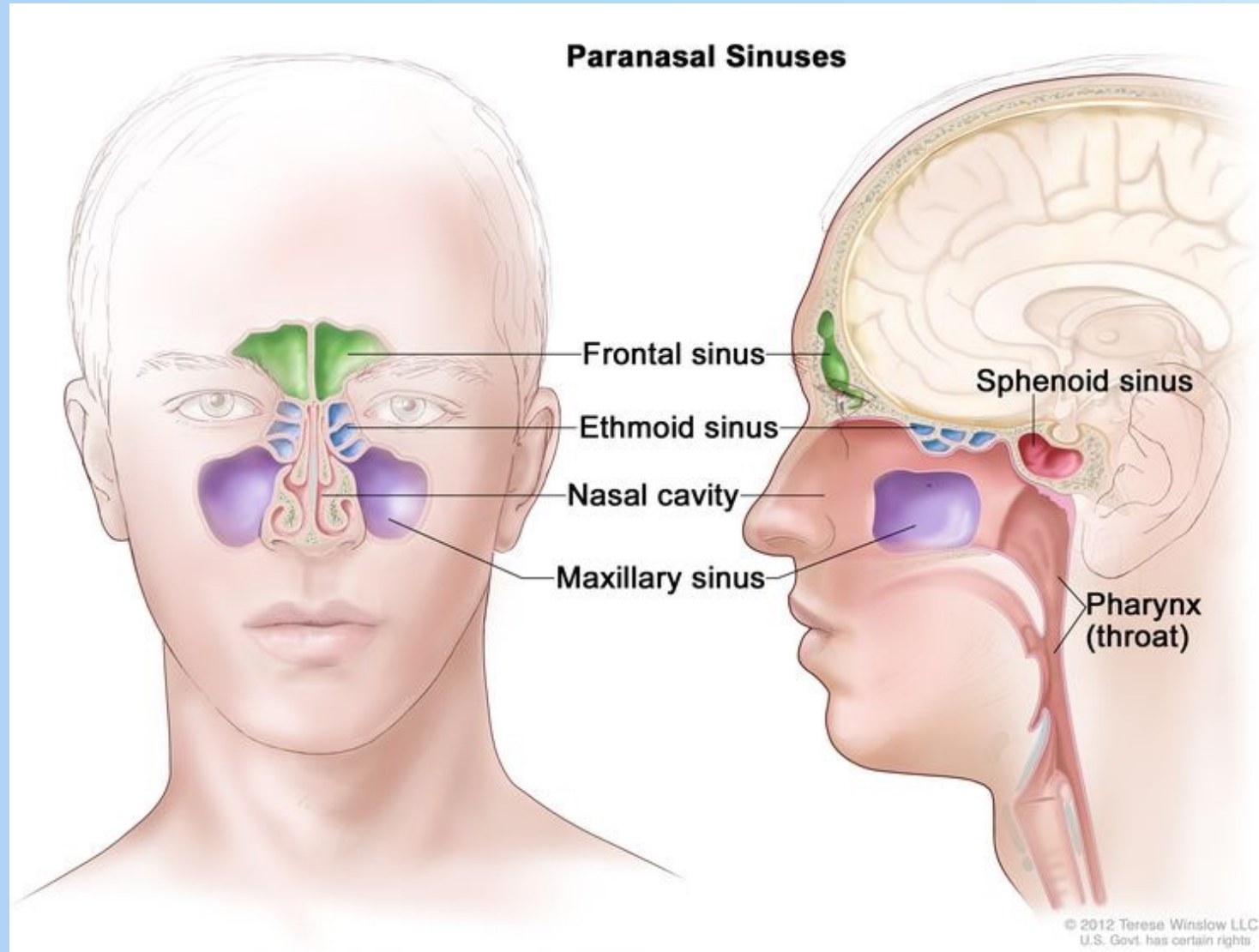
Virchow's node!

Left supraclavicular lymph node - if enlarged you have to rule out GI malignancy!

Drain thorax and abdominal cavity

Troisier sign - clinical finding of enlarged left supraclavicular lymph node (Virchow node) Considered a sign of metastatic abdominal malignancy

Sinuses



Drainage of sinuses

Sinus	Primary Lymphatic Drainage
Frontal sinus	Submandibular nodes
Maxillary sinus	Submandibular nodes
Ethmoid sinus	Deep cervical and retropharyngeal nodes
Sphenoid sinus	Retropharyngeal nodes

Lymphatic and venous drainage of nasal cavity

Region	Drains Into	Notes
Anterior part of nasal cavity (including anterior conchae)	Submandibular lymph nodes	Drains via vessels accompanying facial vein
Posterior part of nasal cavity (posterior conchae and posterior meatuses)	Retropharyngeal lymph nodes and deep cervical lymph nodes	Deeper drainage toward internal jugular vein system

Region	Drains Into	Notes
Anterior nasal cavity (anterior conchae)	Facial vein → Internal jugular vein	Via angular vein (danger triangle connection!)
Posterior nasal cavity (posterior conchae/meatuses)	Pterygoid venous plexus → Deep facial vein → Facial vein or maxillary vein	Deep venous connections to face and skull base
Superior part (roof of nasal cavity)	Superior ophthalmic vein → Cavernous sinus	Key in spread of infection (e.g., cavernous sinus thrombosis)

Other clinical relevant things

- Submandibular lymphadenopathy → dental infection
- Jugulodigastric node swelling → tonsillitis
- Posterior cervical lymphadenopathy → mononucleosis
- Virchow's node → possible gastric carcinoma
- Preauricular nodes → conjunctival infections