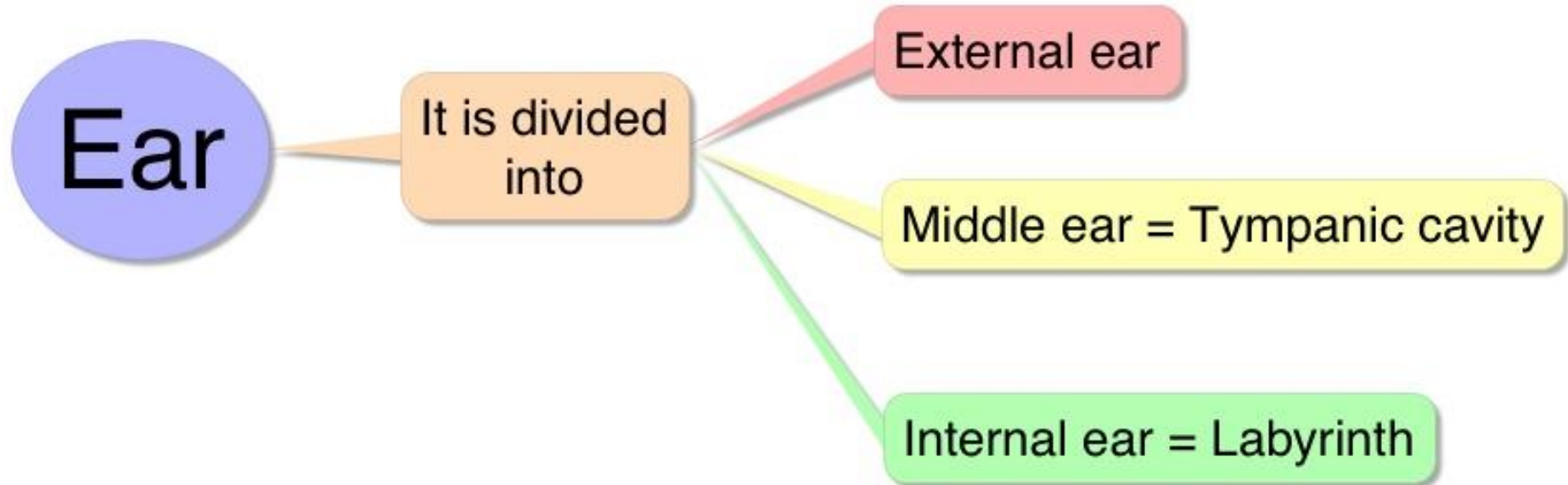


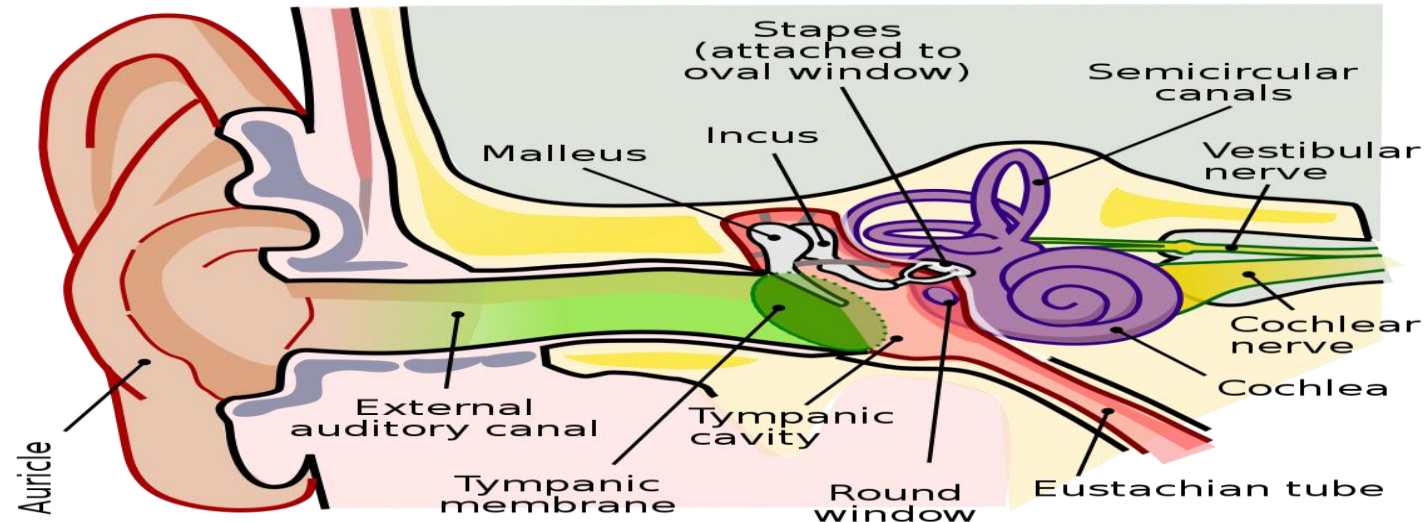
Anatomy of middle ear

Dept. of Shalakya Tantra



Middle ear

- The middle ear is a narrow air filled space situated in the petrous part of temporal bone b/w ext. ear & the int. ear .
- Also called tympanic cavity /tympanum.



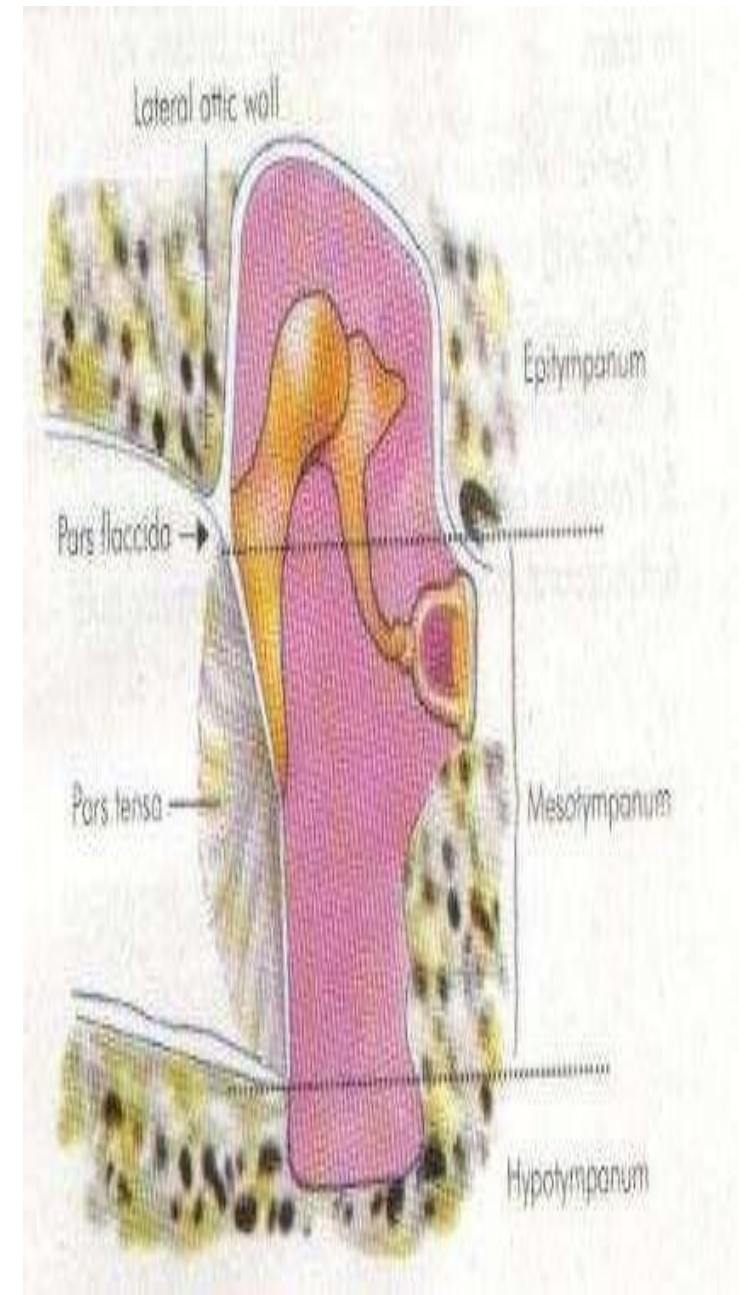
Middle ear

□ Tympanic cavity — six sided cavity

1. **Epitympanum** - above malleolar folds of TM

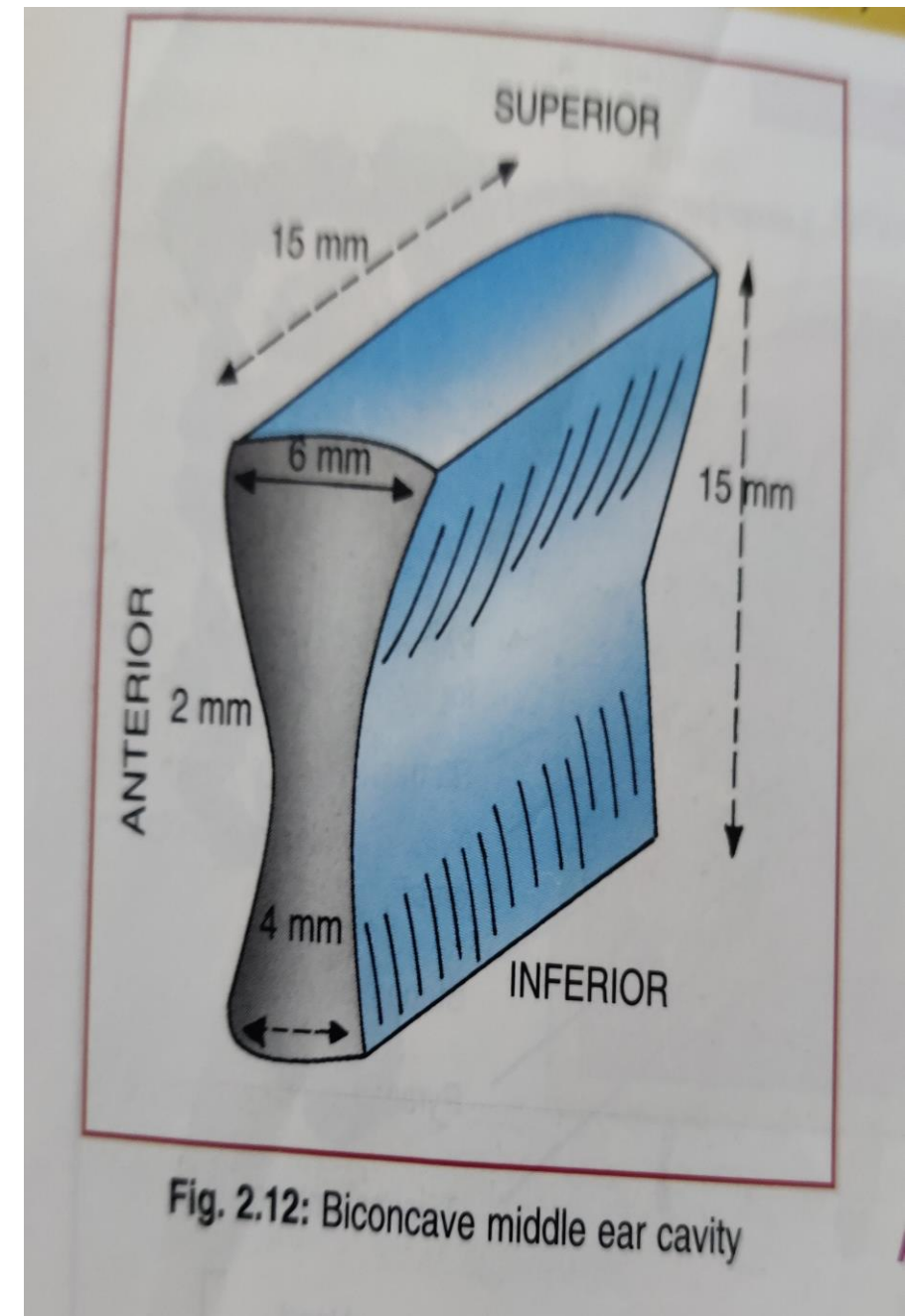
2. **Mesotympanum**- medial to pars tensa of TM

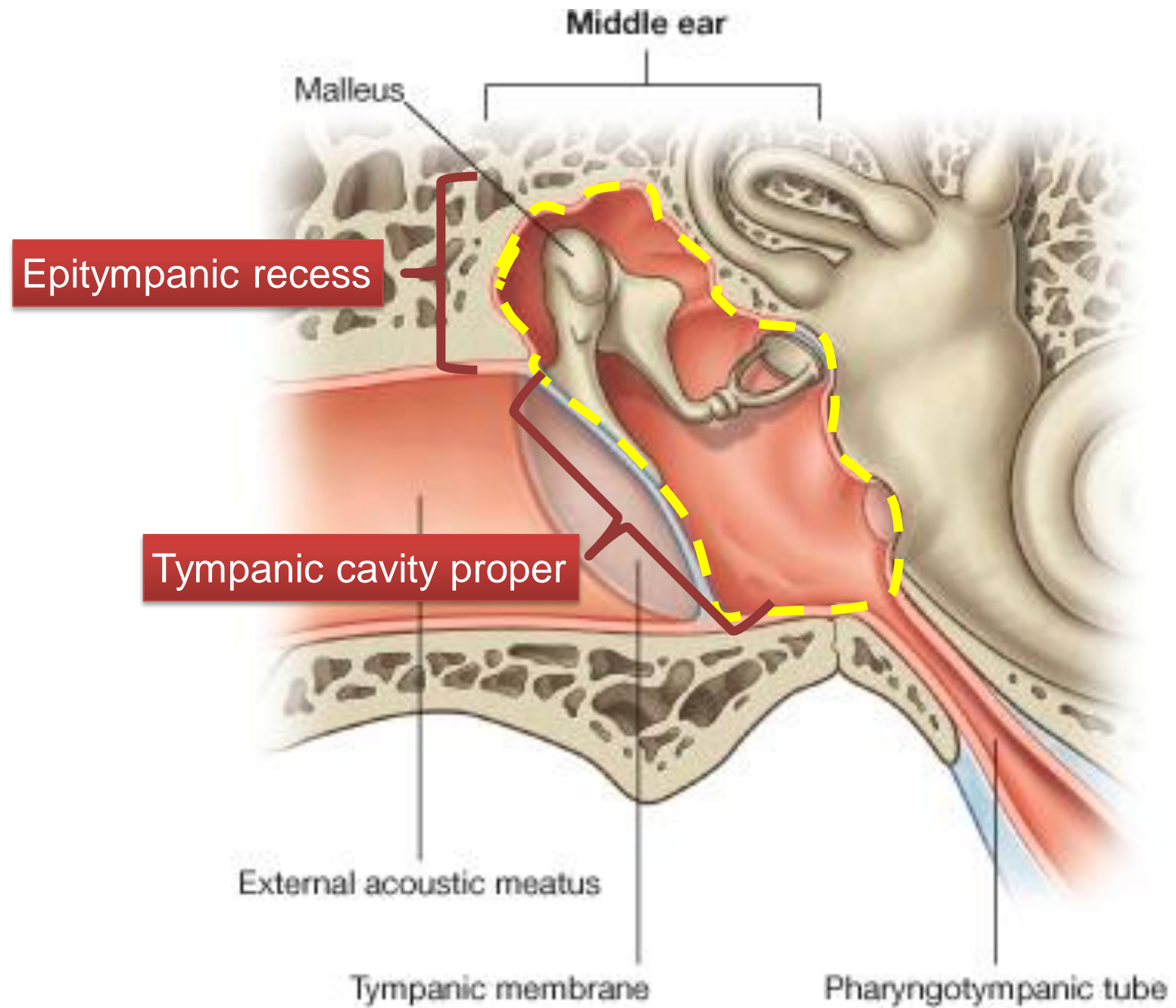
3. **Hypotympanum**- below the level of TM



TYMPANIC CAVITY

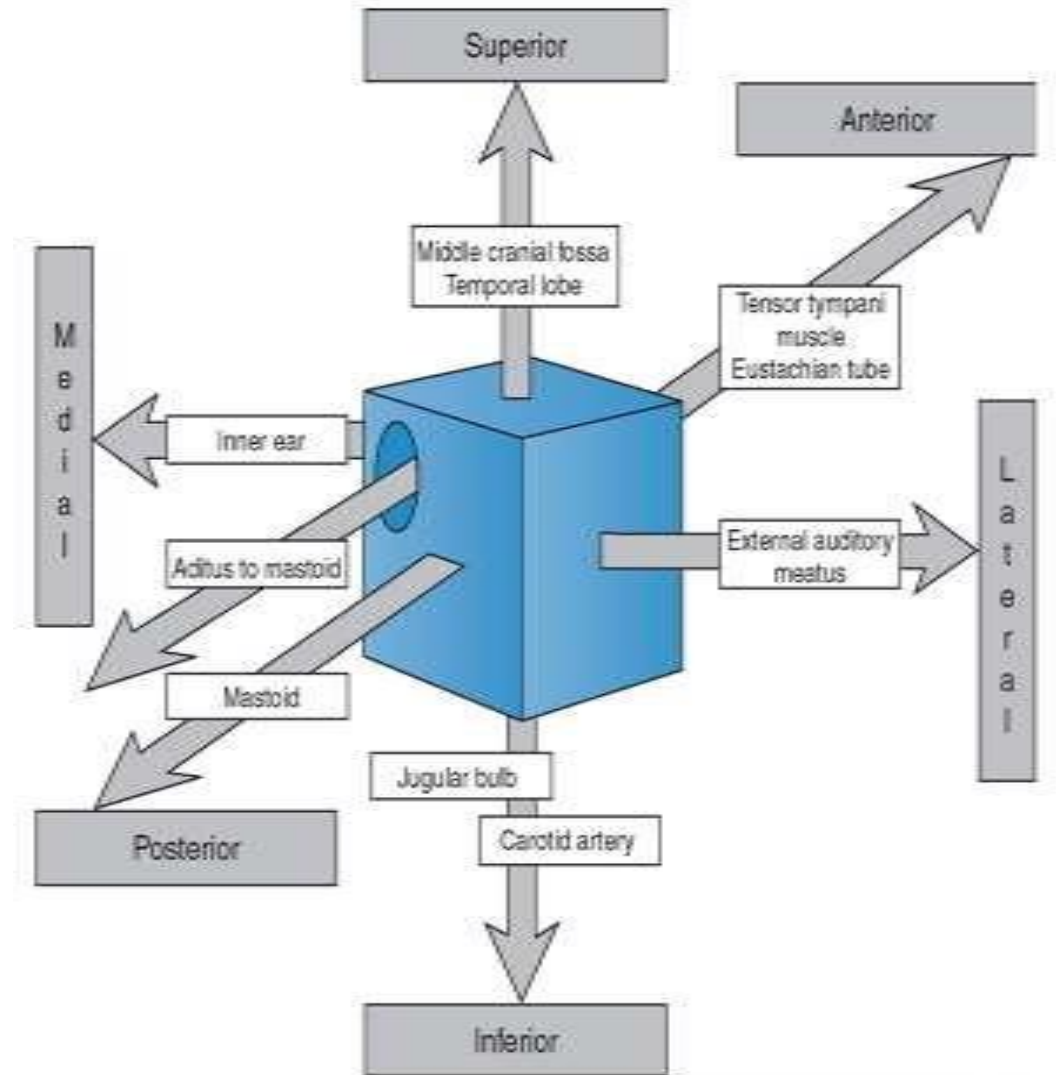
- Lies between the external and inner ear
- Shaped like a biconcave disc.
- Vertical and anteroposterior diameters are 15mm.
- Transverse diameter:
 - 6mm at the upper part.
 - 2mm at the centre.
 - 4mm at the lower part

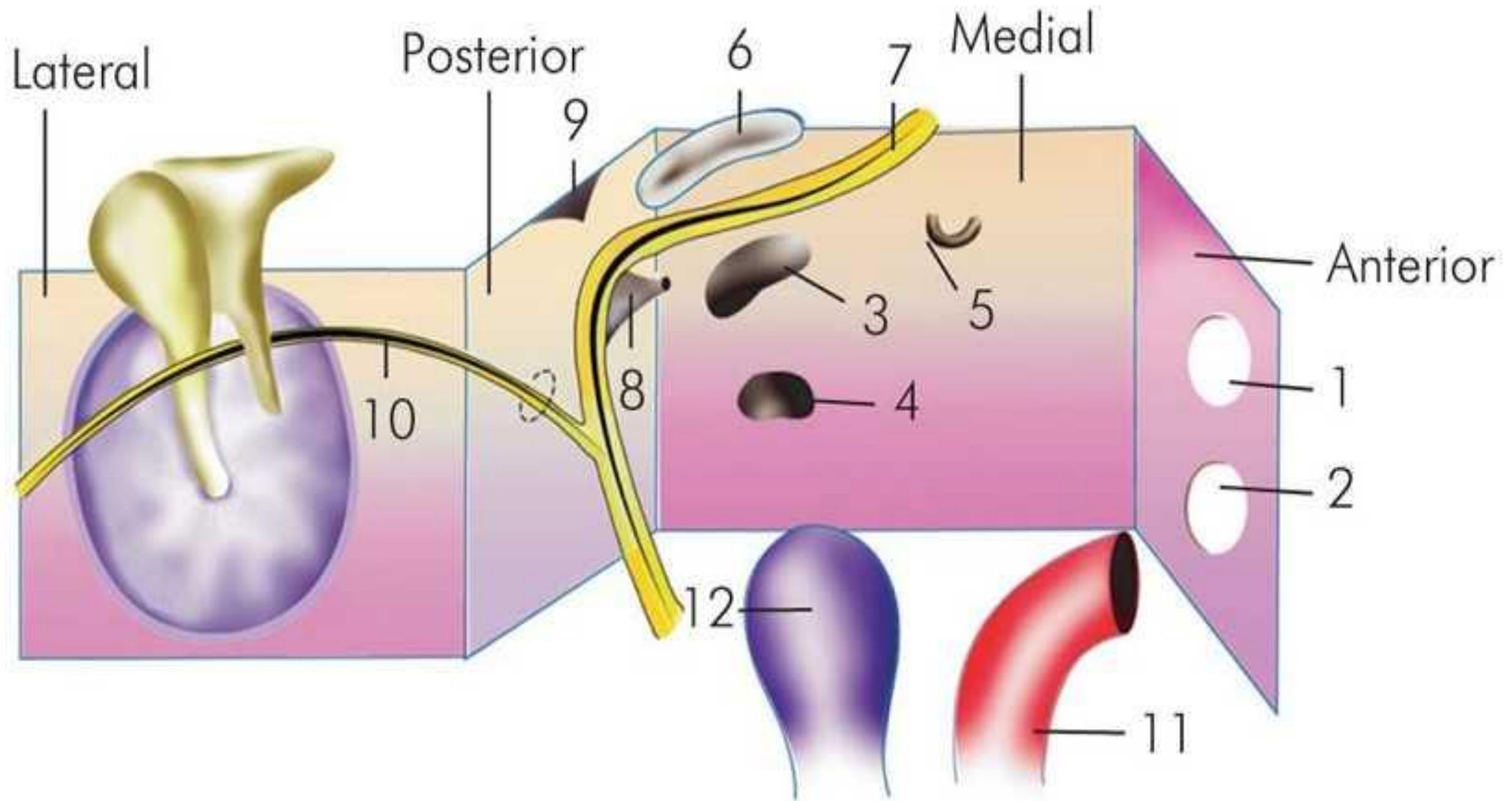




Six sided cavity

- Roof – separated from MCF by thin plate of bone – **tegmen tympani**
- Floor – separated from the bulb of IJV lodged in the jugular fossa – **thin plate of bone**
- Anterior wall
- Posterior wall
- Medial wall
- Lateral wall





WALLS

The tympanic cavity resembles like a match box having 6 walls.

1.LATERAL WALL OR MEMBRANOUS WALL-

- . It is formed mainly by the ear drum.
- . This wall separates the middle ear from external ear

2. MEDIAL WALL OR LABYRINTHINE WALL

It separates the middle ear from the inner ear

3. ANTERIOR WALL OR CAROTID WALL-

It separates middle ear cavity from internal carotid artery

4.POSTERIOR WALL OR MASTOID WALL-

Additus to antrum connects the epitympanum with the mastoid antrum

5.FLOOR-

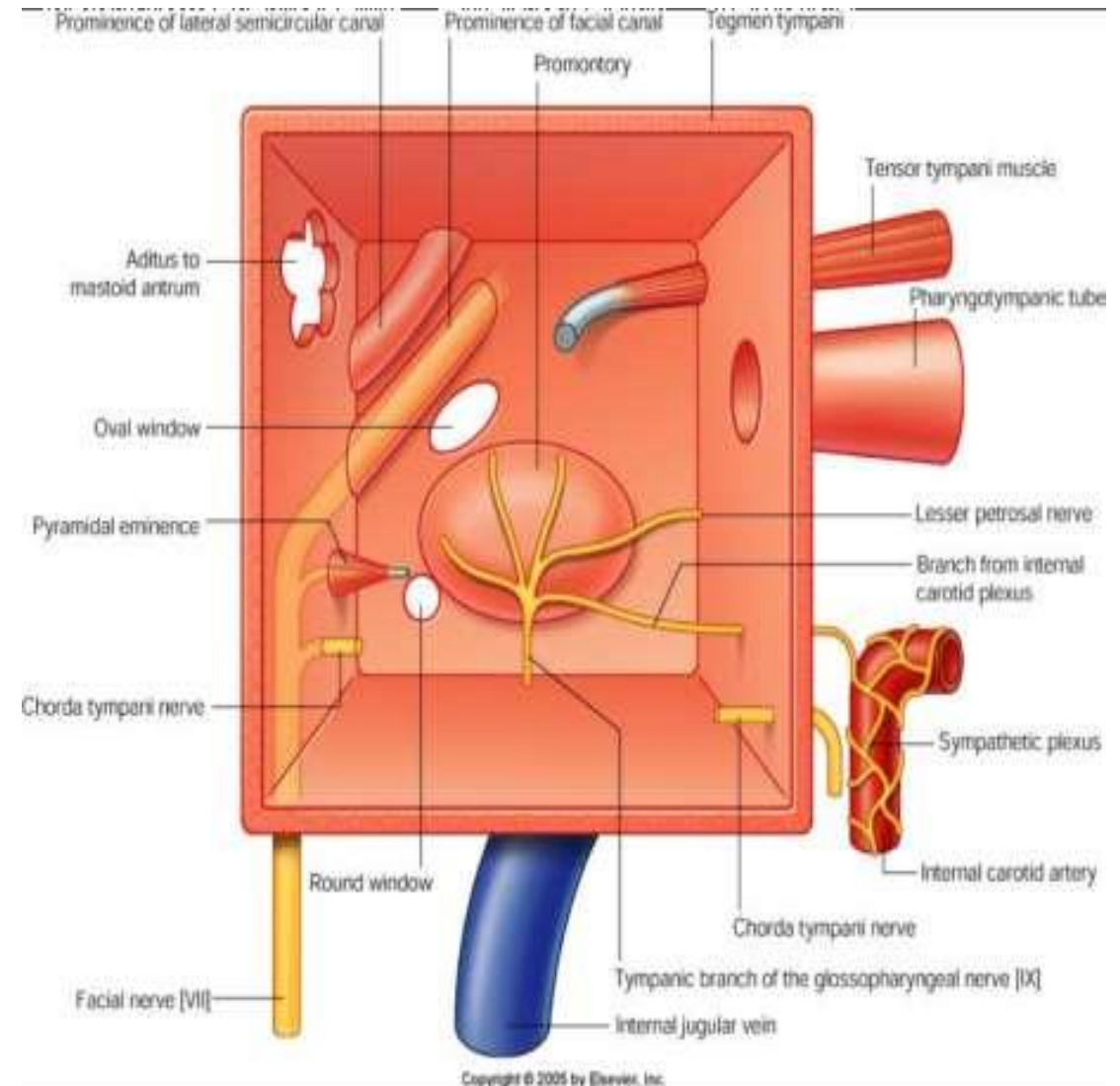
It separated from the Juglar bulb by a thin plate of bone

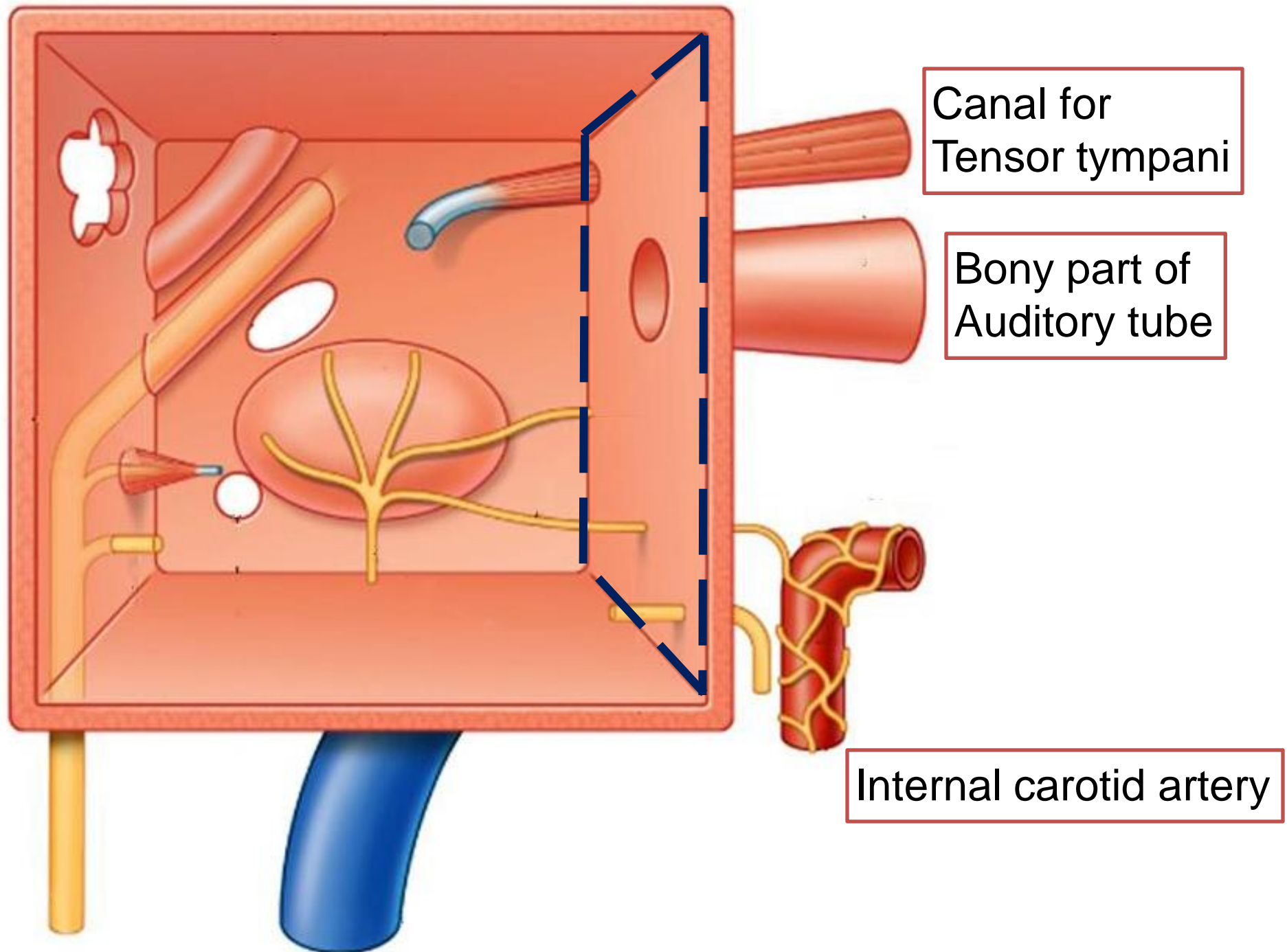
6.ROOF-

Tegmen tympani separates the tympanum from the middle cranial fossa.

Anterior wall :

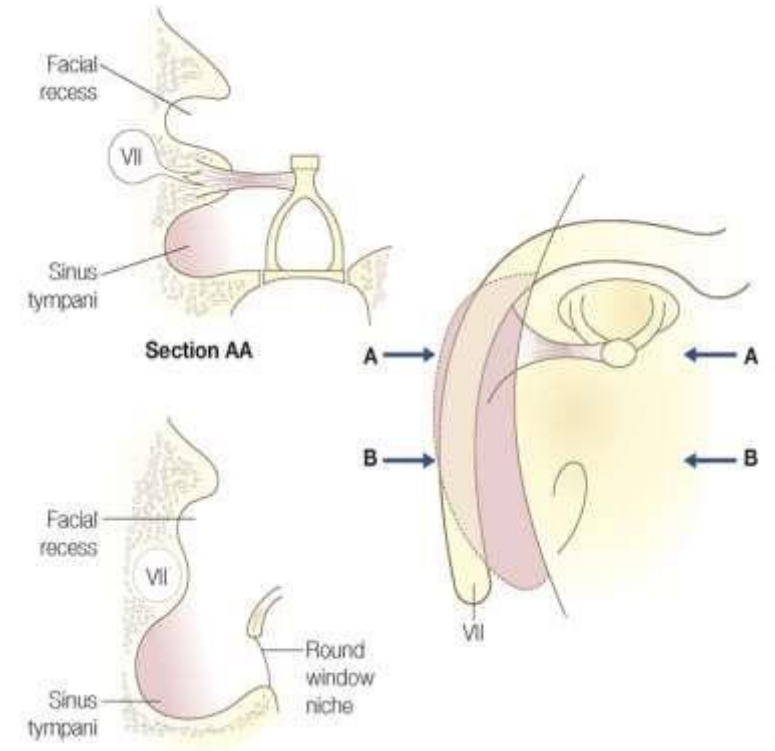
- Separates ME from ICA
- Structures passing are
 1. Canal for chorda tympani .N
 2. Canal for tensor tympani muscle
 3. Eustachian tube
 4. Ant. malleolar ligament
 5. Ant. tympanic artery





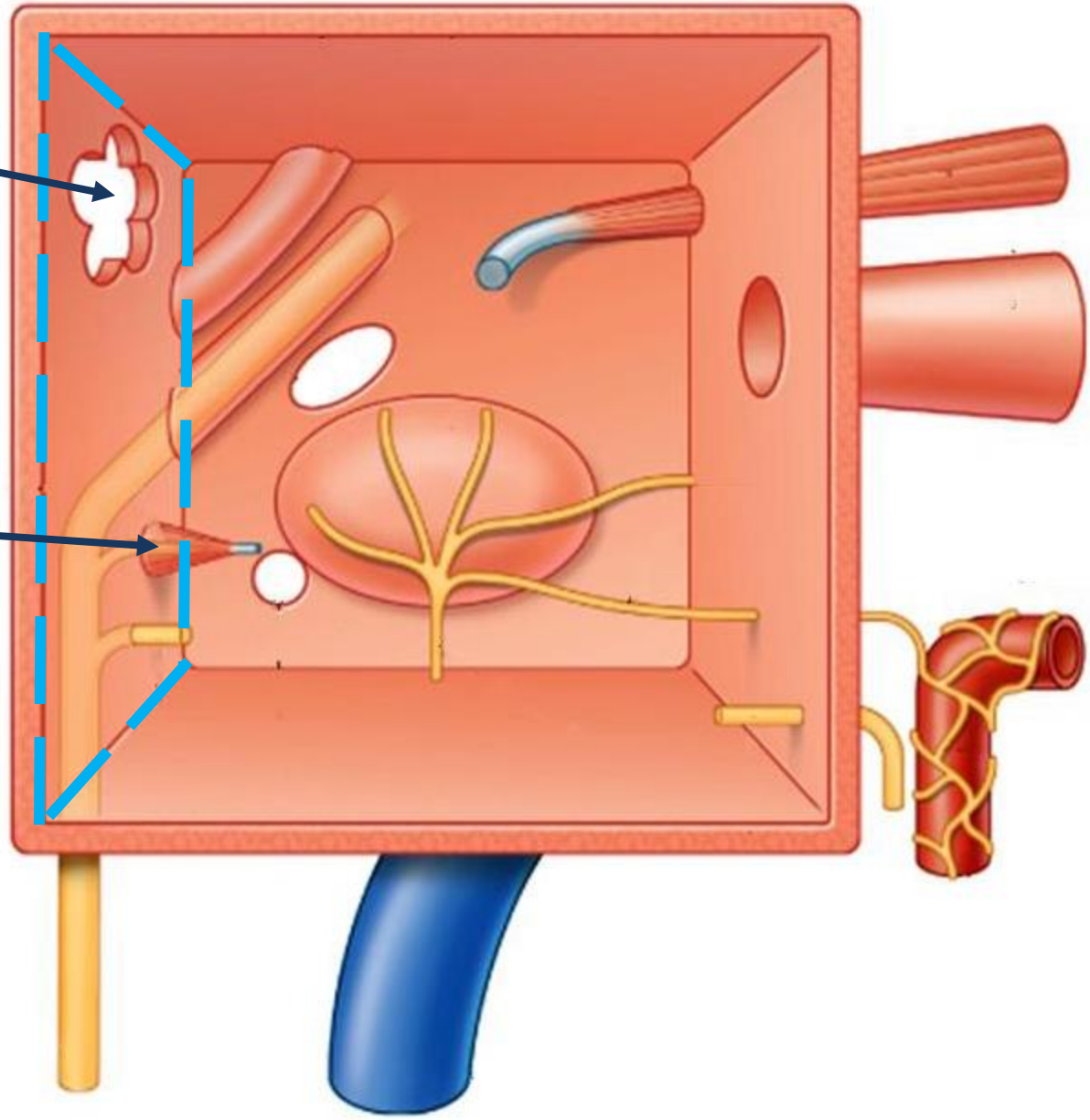
Posterior wall

- Upper part – **aditus** which leads to mastoid antrum
- Below aditus triangular projection **processus pyramidalis**
- **Facial recess** – supra pyramidal recess
- **Sinus tympani** – infra pyramidal recess



Aditus to
Mastoid antrum

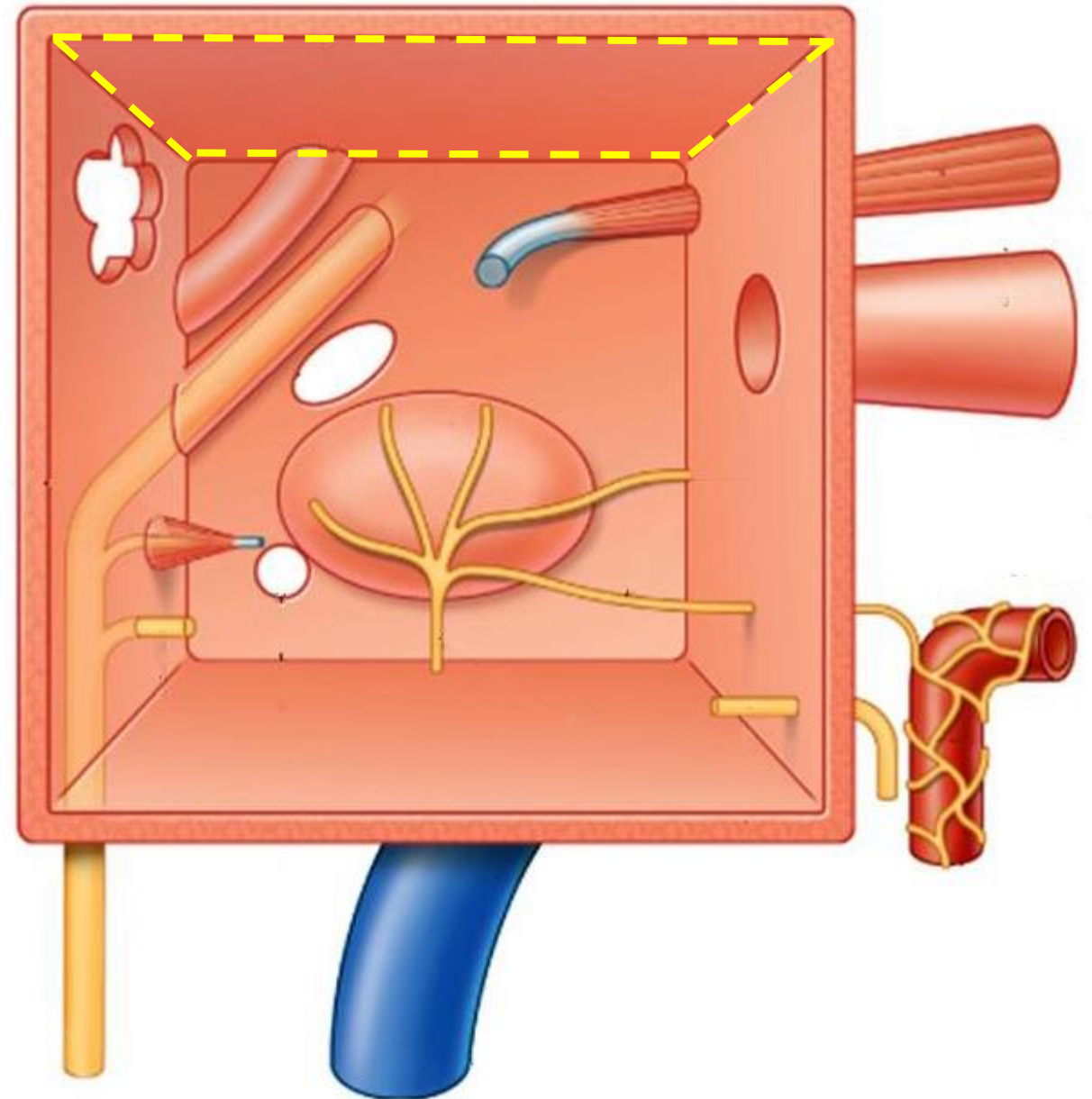
Pyramid



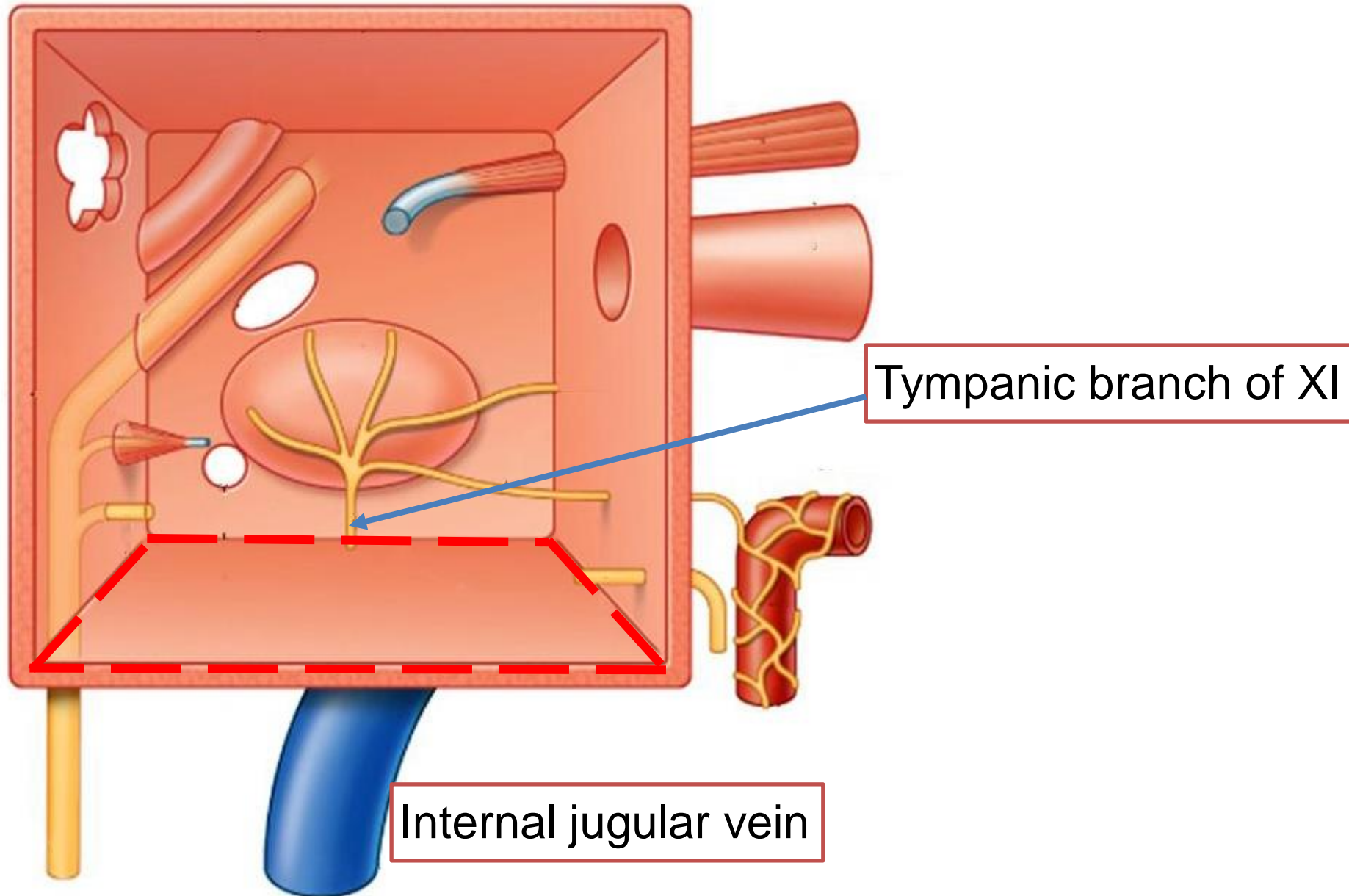
Roof (tegmental wall)

Separate middle
cranial fossa to
tympanic cavity

Tegmen tympani

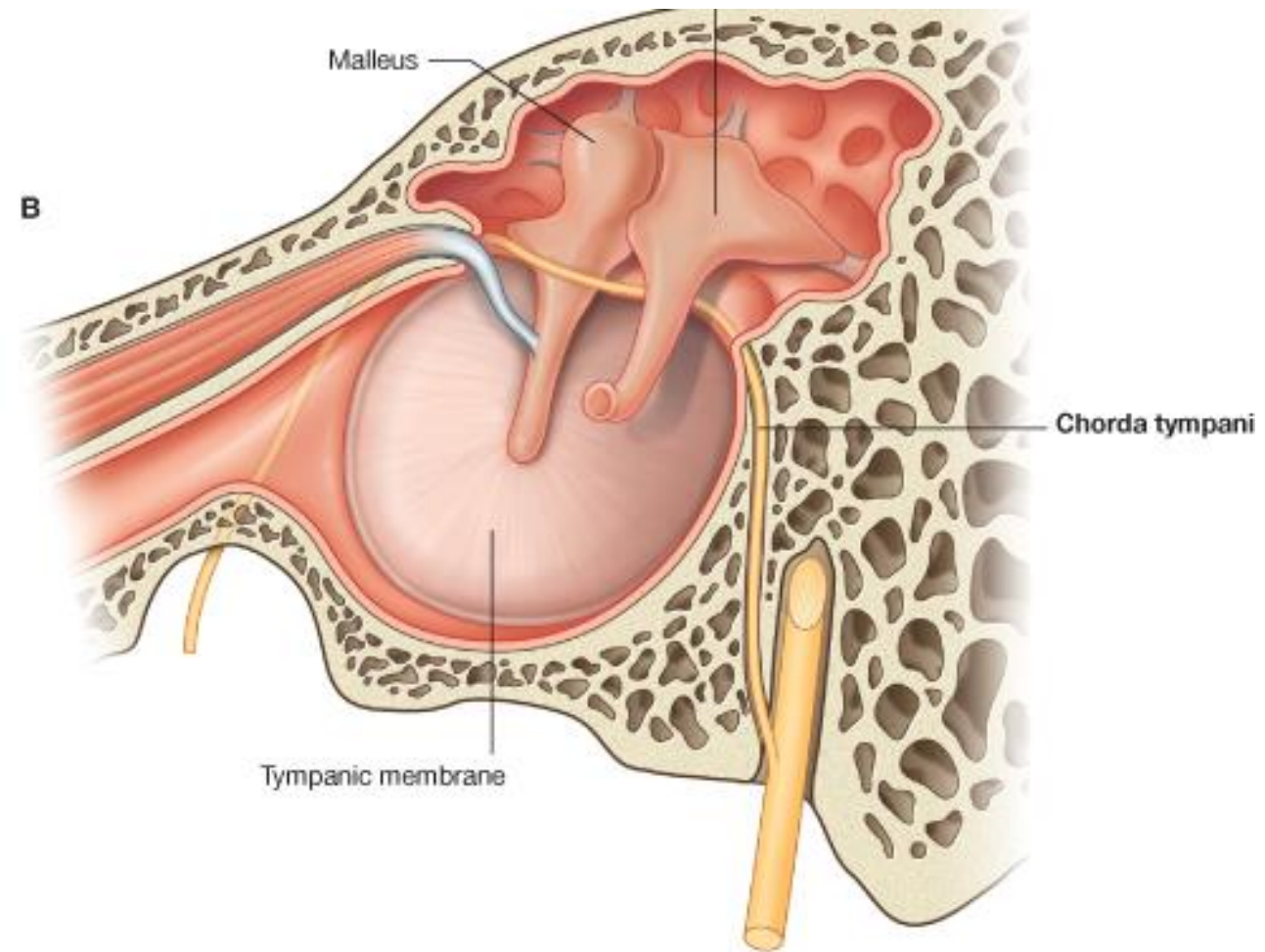


Floor (jugular wall)



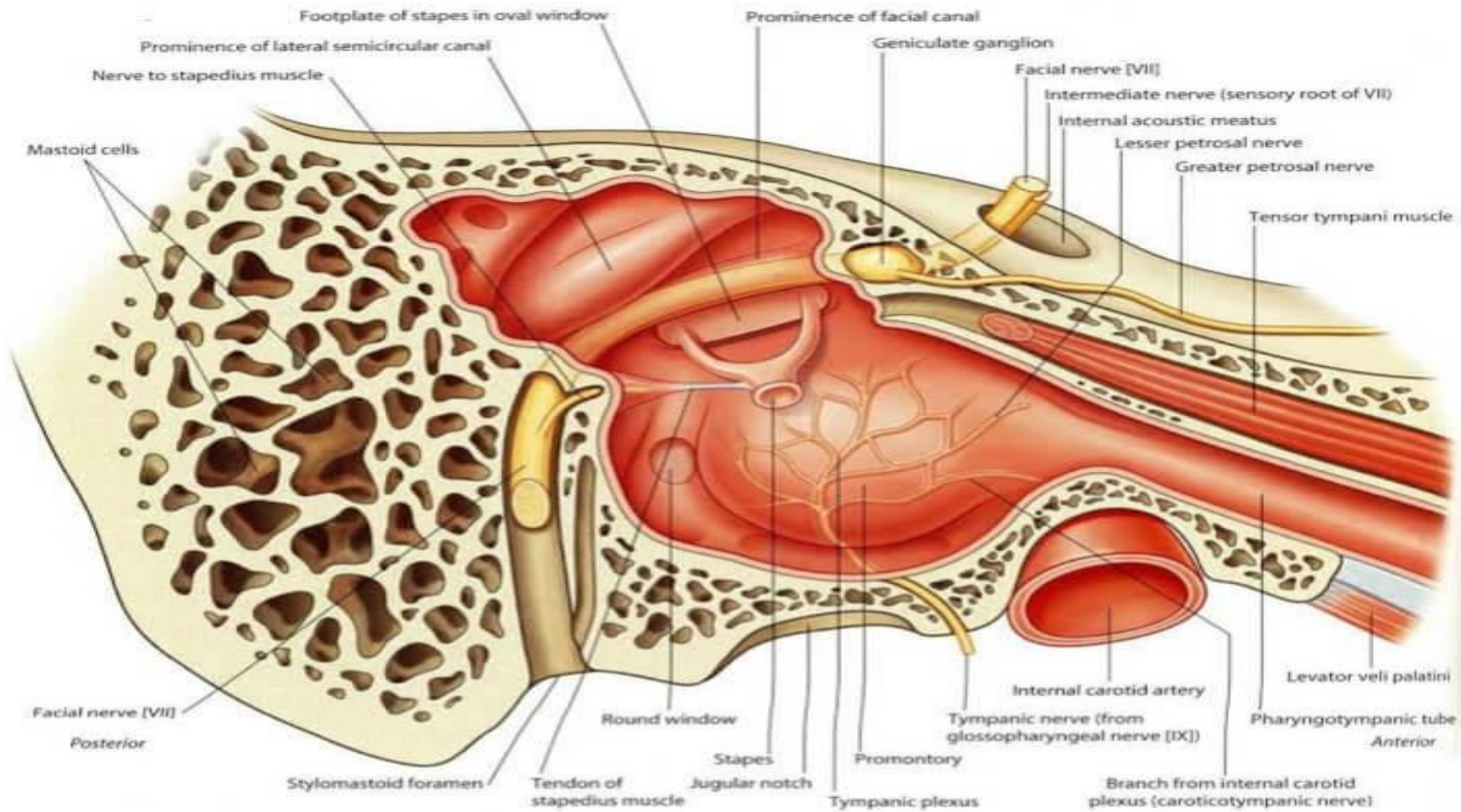
Lateral Wall

- Separates middle ear from external ear
- Formed by TM and squamous part of temporal bone.
- Scutum-upper part of epitympanum is formed by outer bony attic wall.



Medial wall(labyrinthine wall)

- Separates middle ear from inner ear
- Important structures:
 - ❑ Promontory-bony bulge,due to the basal coil of cochlea.
 - ❑ Bony lateral SCC
 - ❑ Oval window(fenestra vestibuli)- closed by footplate of stapes
 - ❑ Round window(fenestra cochleae): closed by secondary TM
 - ❑ Canal for Facial nerve
 - ❑ Processus cochleariformis: hook like projection which lie anterior to the oval window.



Right medial wall of the middle ear

Content of middle ear

- Ear ossicles

1. malleus (hammer)
2. incus (anvil)
3. stapes(stirrup)

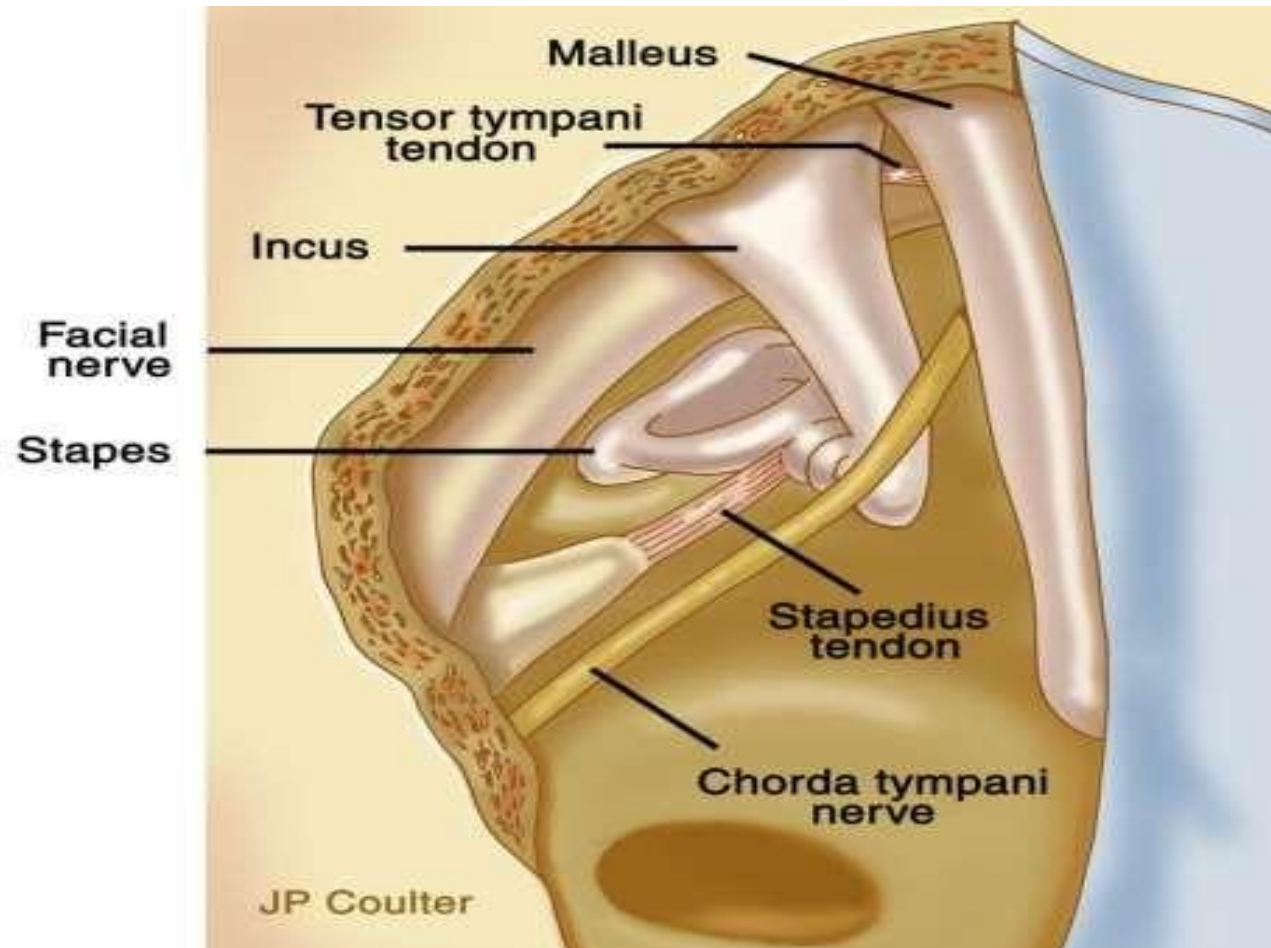
- Muscles

1. Tensor tympani
2. stapedius

- mucosal folds

- Nerves

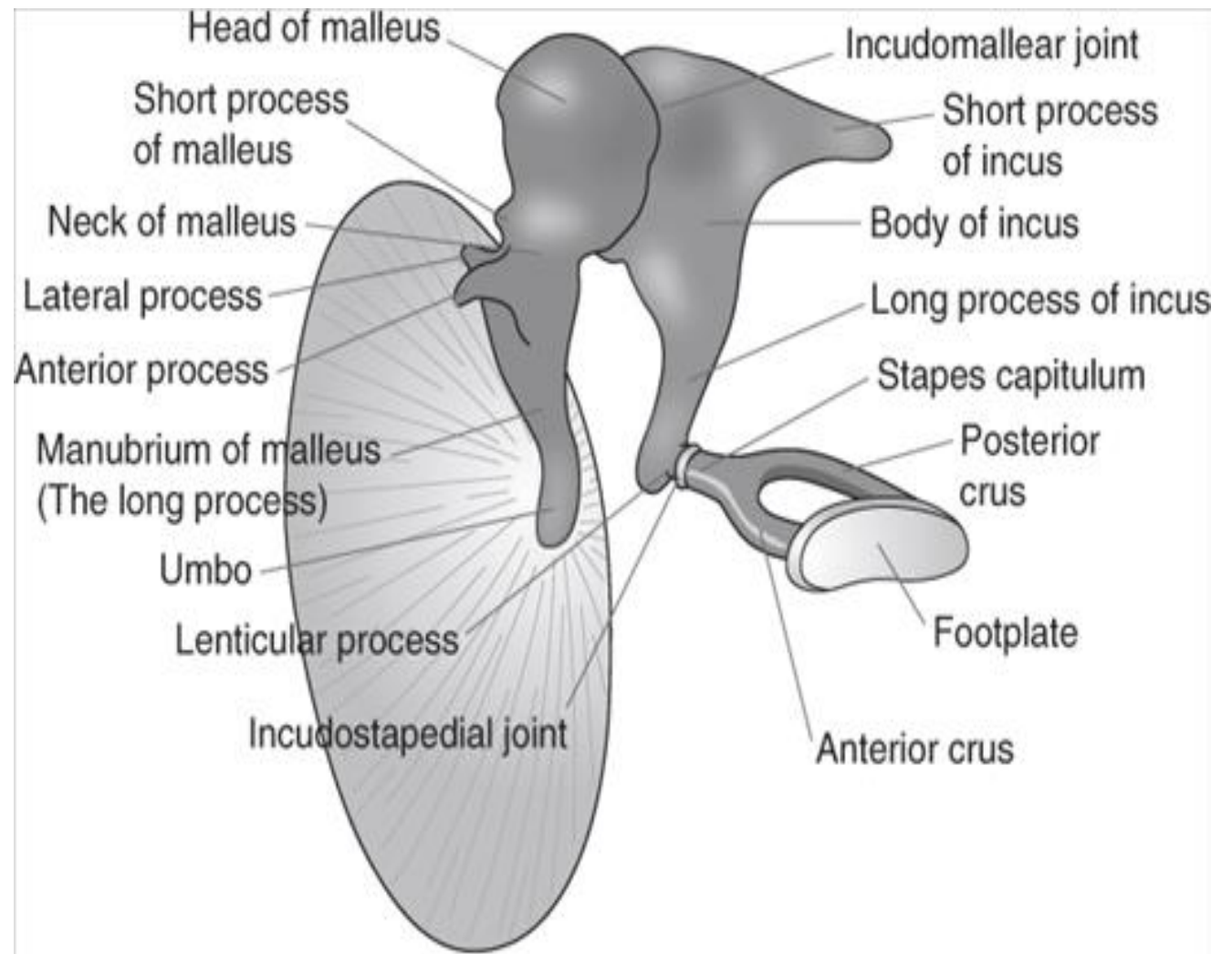
- vessels



Ear Ossicles

The ossicles conduct sound energy from the TM to the oval window

- Malleus
- Incus
- Stapes



Source: Lalwani AK: *CURRENT Diagnosis & Treatment in Otolaryngology - Head & Neck Surgery*, 3rd Edition: www.accesssurgery.com
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Muscles

- **Stapedius:**

Origin:- From conical cavity & canal within pyramid

Insertion:- To posterior part of neck and upper part of posterior crus of stapes

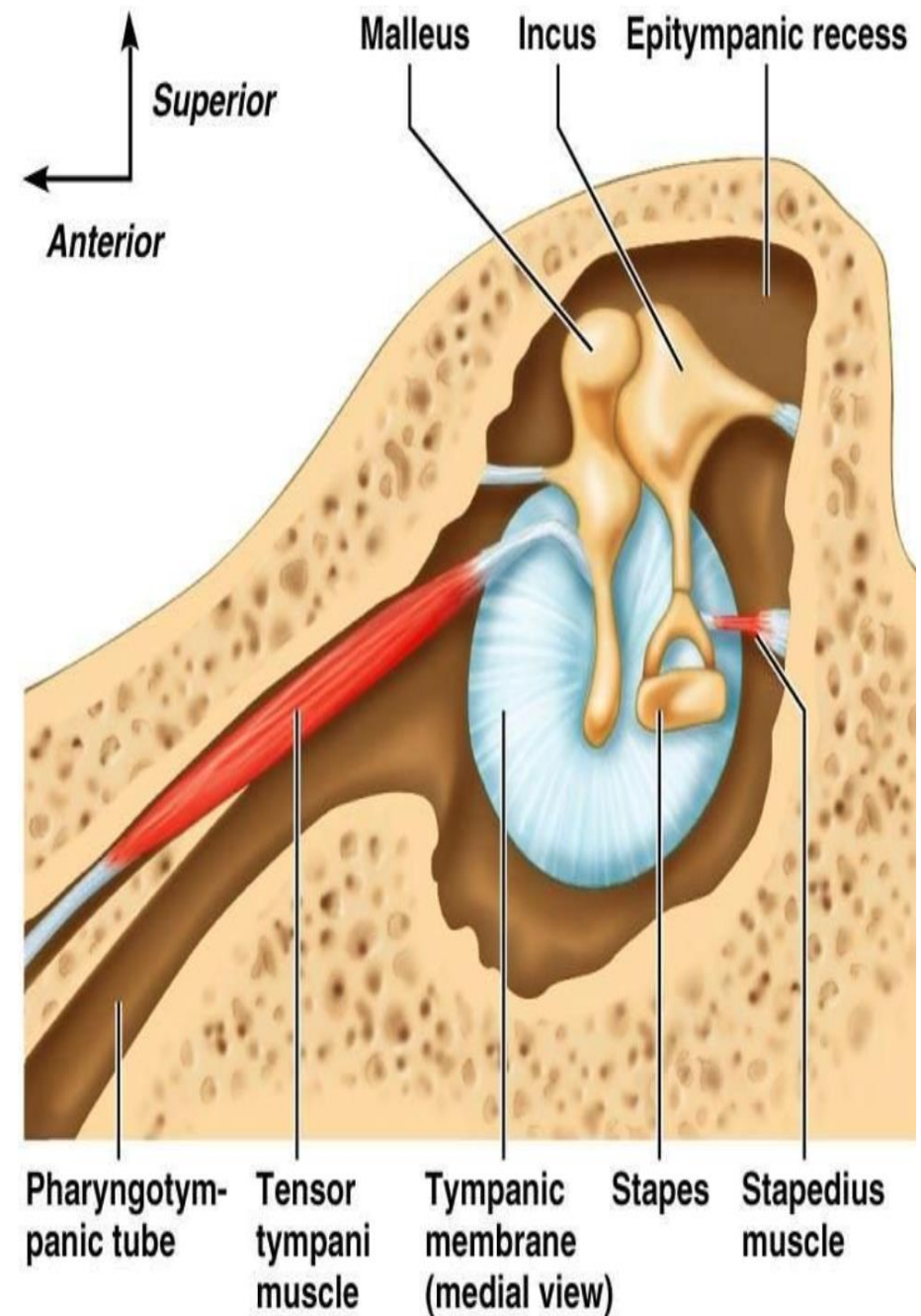
Nerve supply:- small branch of facial nerve

- **Tensor tympani:**

Origin:- walls of bony canals above ET, Cartilaginous part of ET, greater wing of Sphenoid bone

Insertion:- Medial aspect of upper end of handle of malleus

Nerve supply:- branch of mandibular division of trigeminal nerve



Nerves & vessels of middle ear

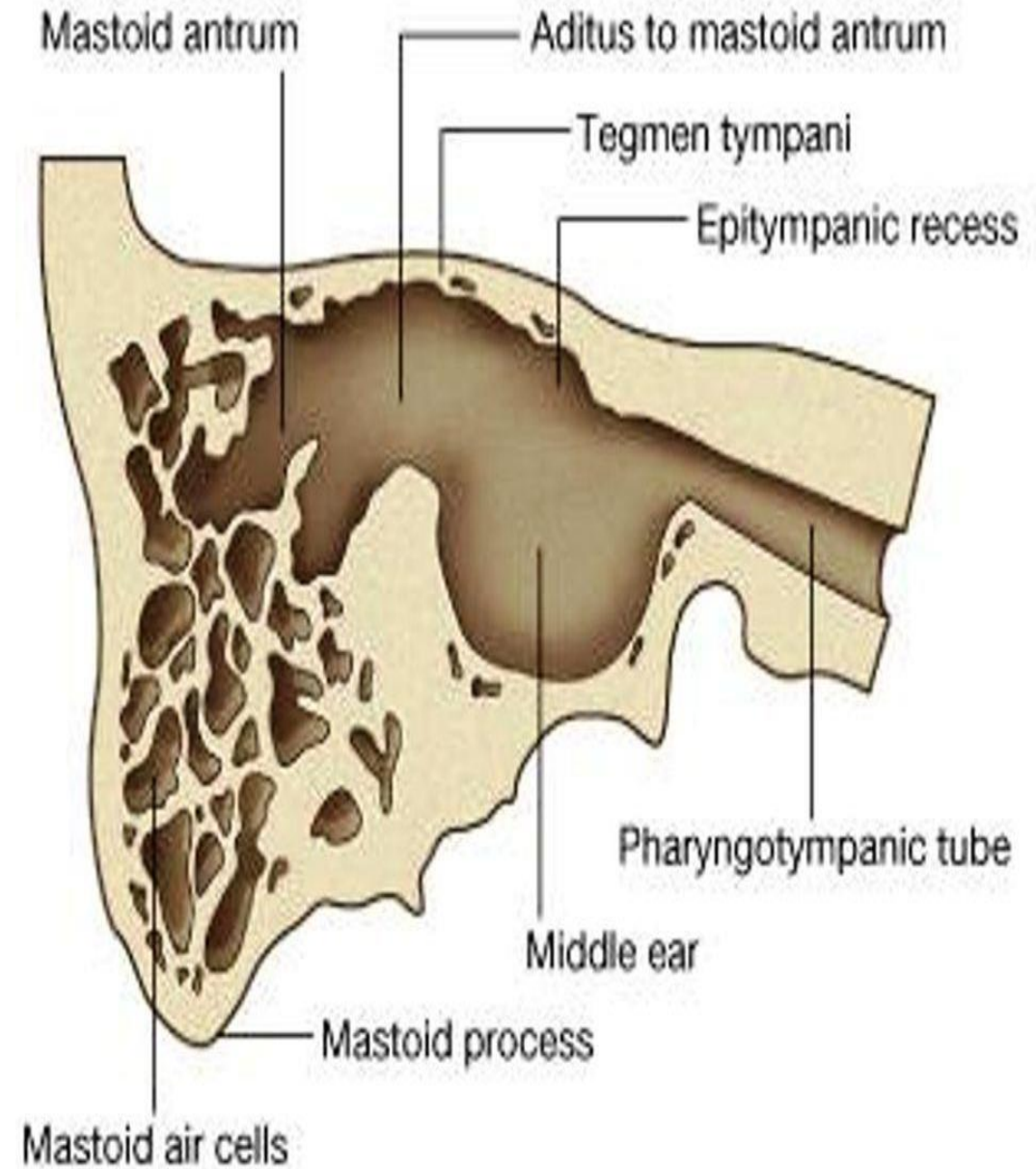
- Chorda tympani nerve
- Tympanic plexus
- Plexus of vessels of stylomastoid artery
- Internal carotid artery- petrous part
 - Carotico tympanic branches

Mastoid

- 3 important parts
 1. Aditus – connects epitympanum with mastoid
 2. antrum – largest air cell in the mastoid bone
 3. mastoid air cells

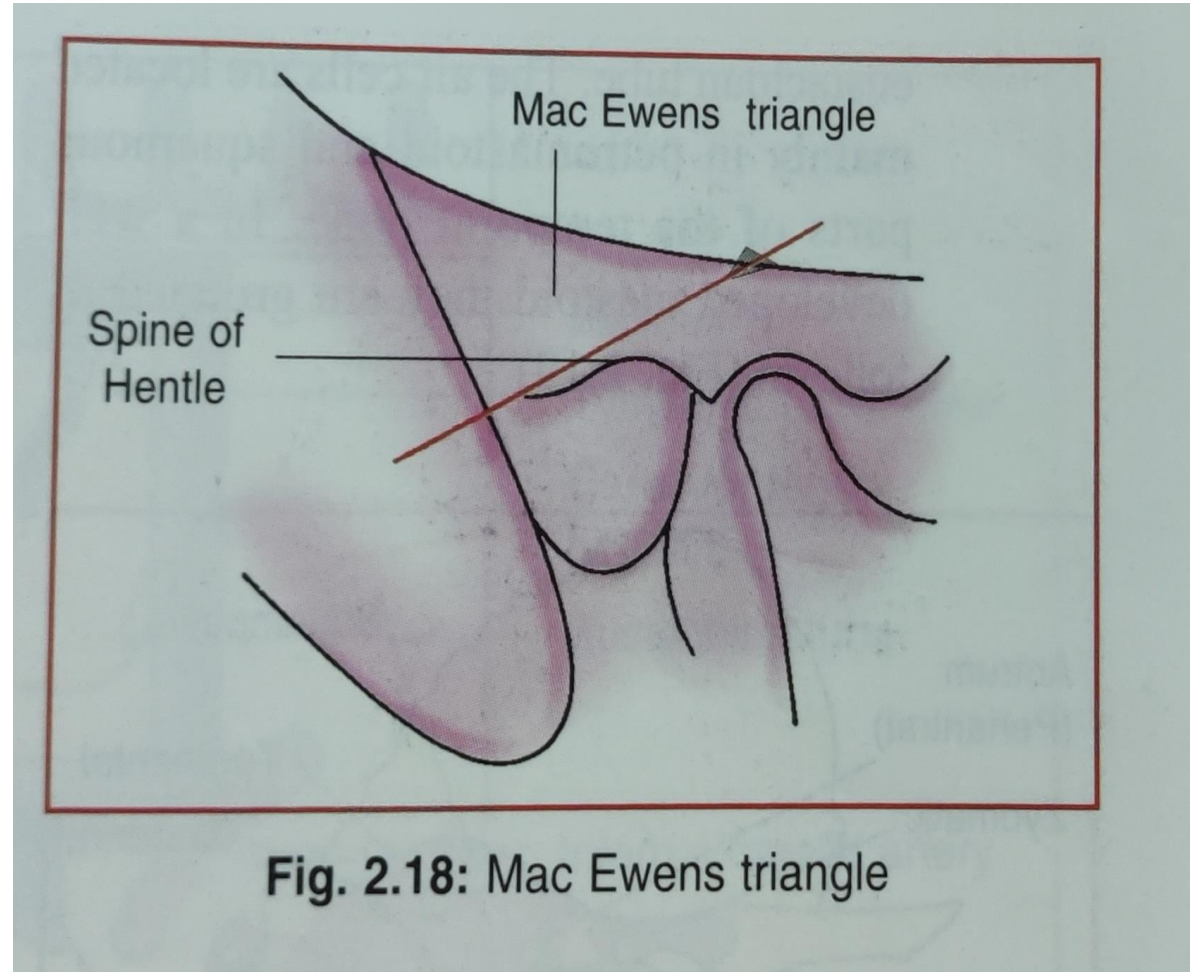
Mastoid air cells

- Pneumatic (70%),
Sclerotic (20%), diploic (5%)
- Depends on- heredity, environment,
nutrition, infection ,
ET function
- Five regions of pneumatization –middle ear,
mastoid,
Perilabyrinthine, petrous apex & accessory
- Five air cell tracts-postero-superior, postero-medial, subarcuate, perilabyrinthine, peritubal



Mac Ewen's Triangle

- Bounded by temporal line of supra mastoid crest and postero superior bony meatal wall and tangential line joining these two.



THANK YOU