

# EAR - II



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# COMPETENCIES

**AN40.2:** Describe & demonstrate the boundaries, contents, relations and functional anatomy of middle ear and auditory tube

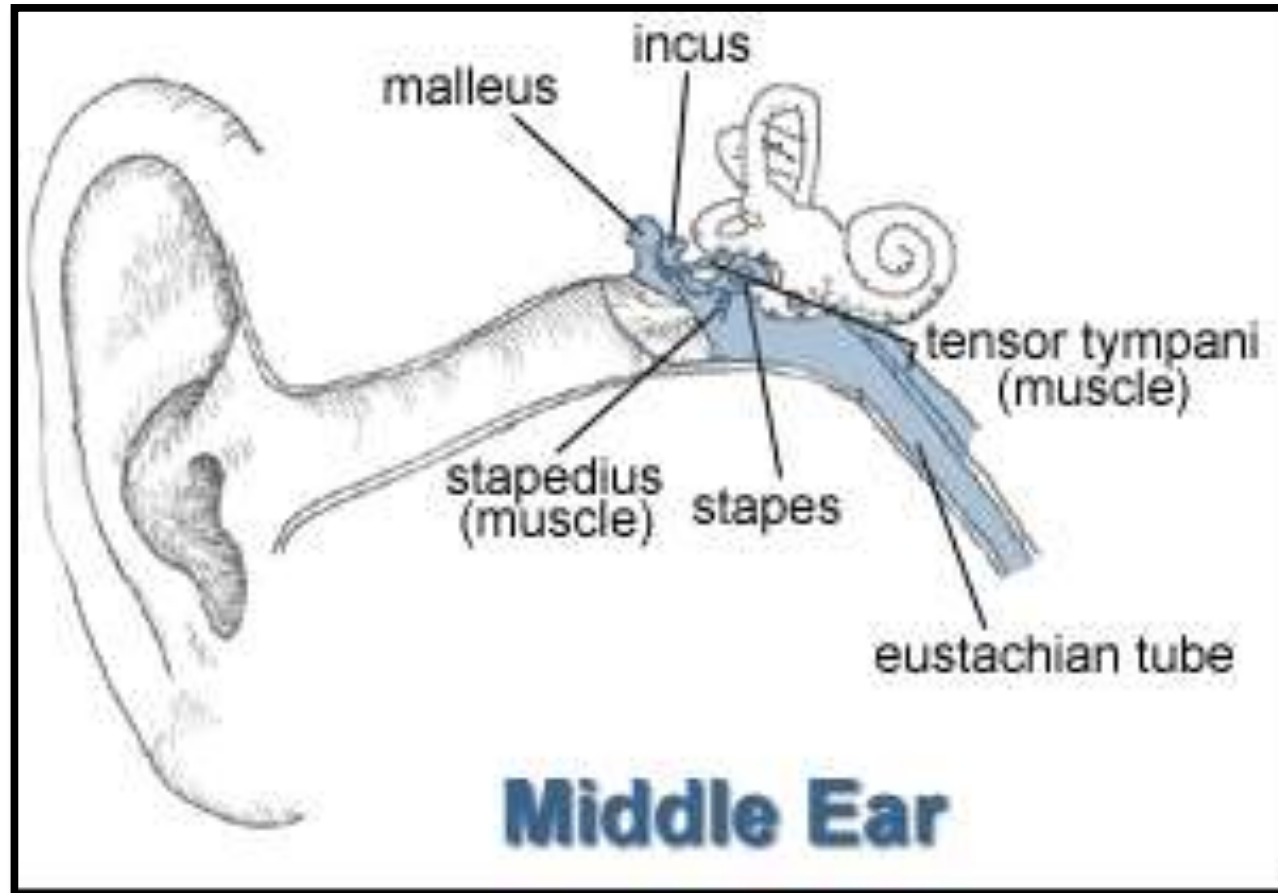
**AN40.4:** Explain anatomical basis of otitis externa and otitis media

# Lesson Plan

## **Middle Ear:**

- ❖ Introduction
- ❖ Communications
- ❖ Contents
- ❖ Subdivisions
- ❖ Boundaries:
  - Roof
  - Floor
  - Anterior Wall
  - Posterior Wall
  - Medial Wall
  - Lateral Wall

# Middle Ear

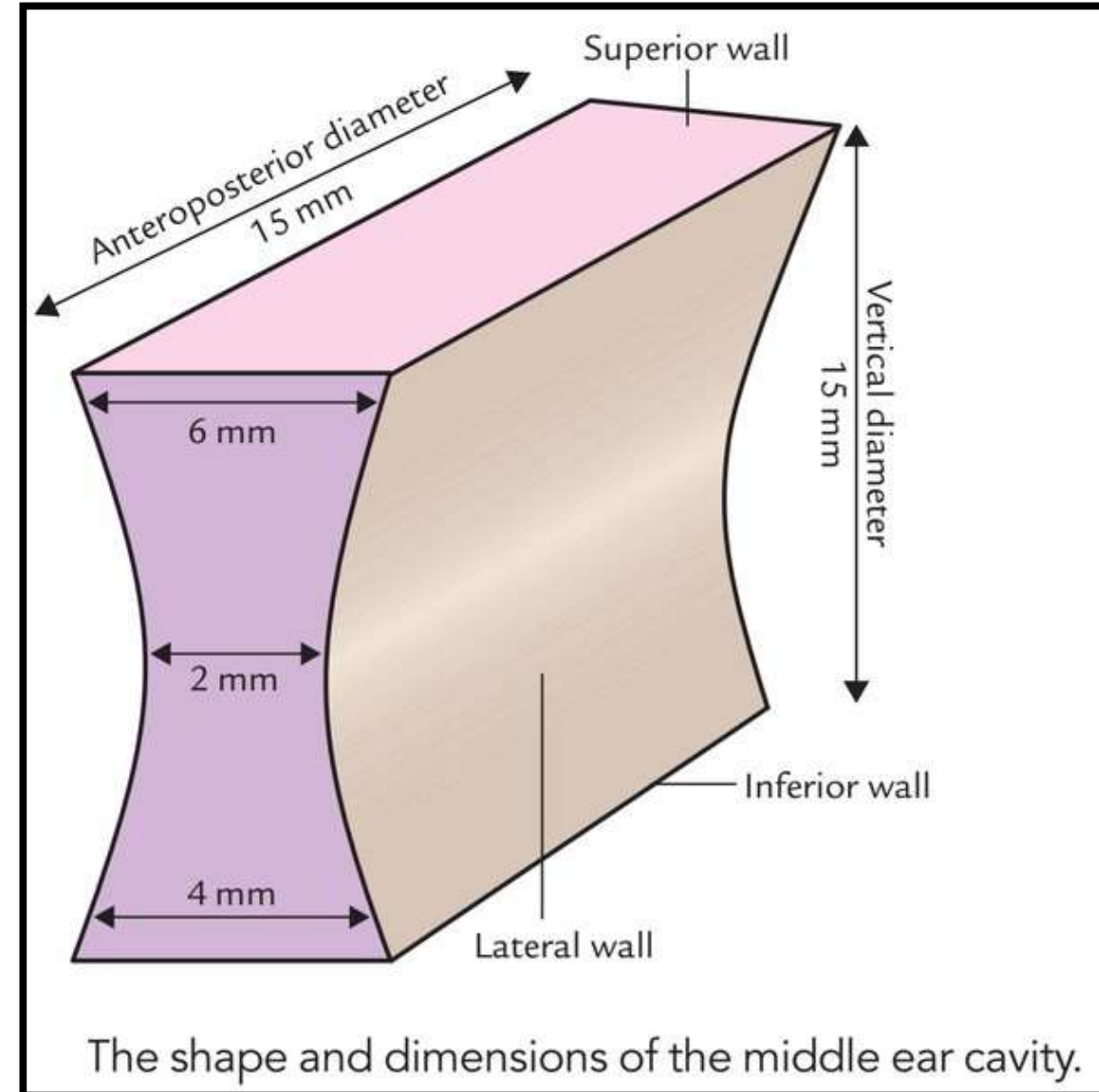
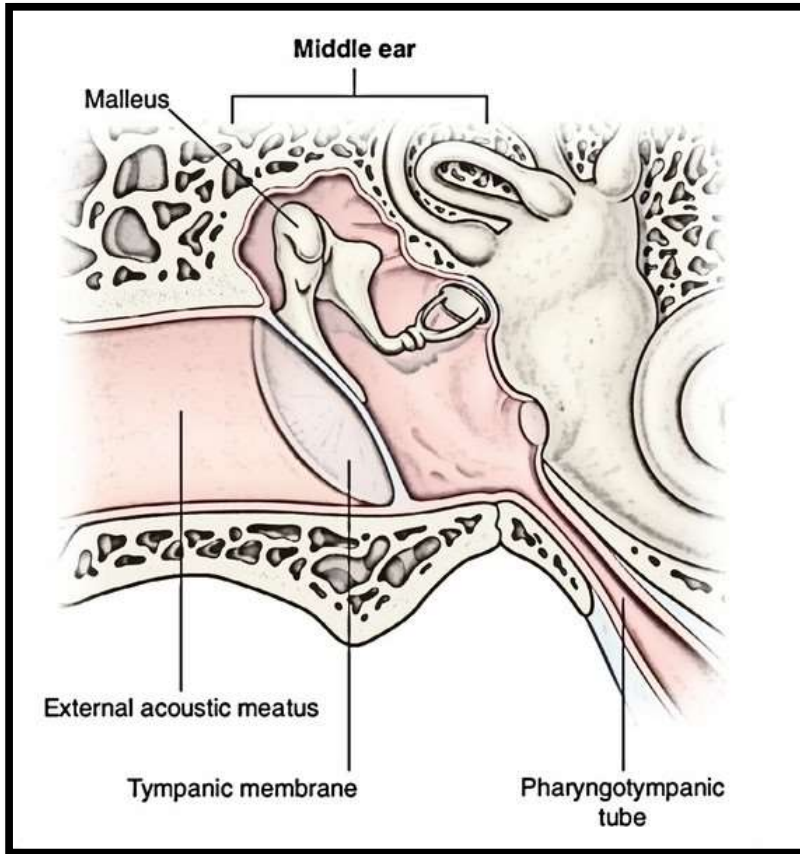


# Introduction

- Middle ear is slit-like air filled cavity within the **petrous part of temporal bone**.

## Shape-

- Cuboid which is compressed from side to side.
- In coronal section- biconcave disc like.



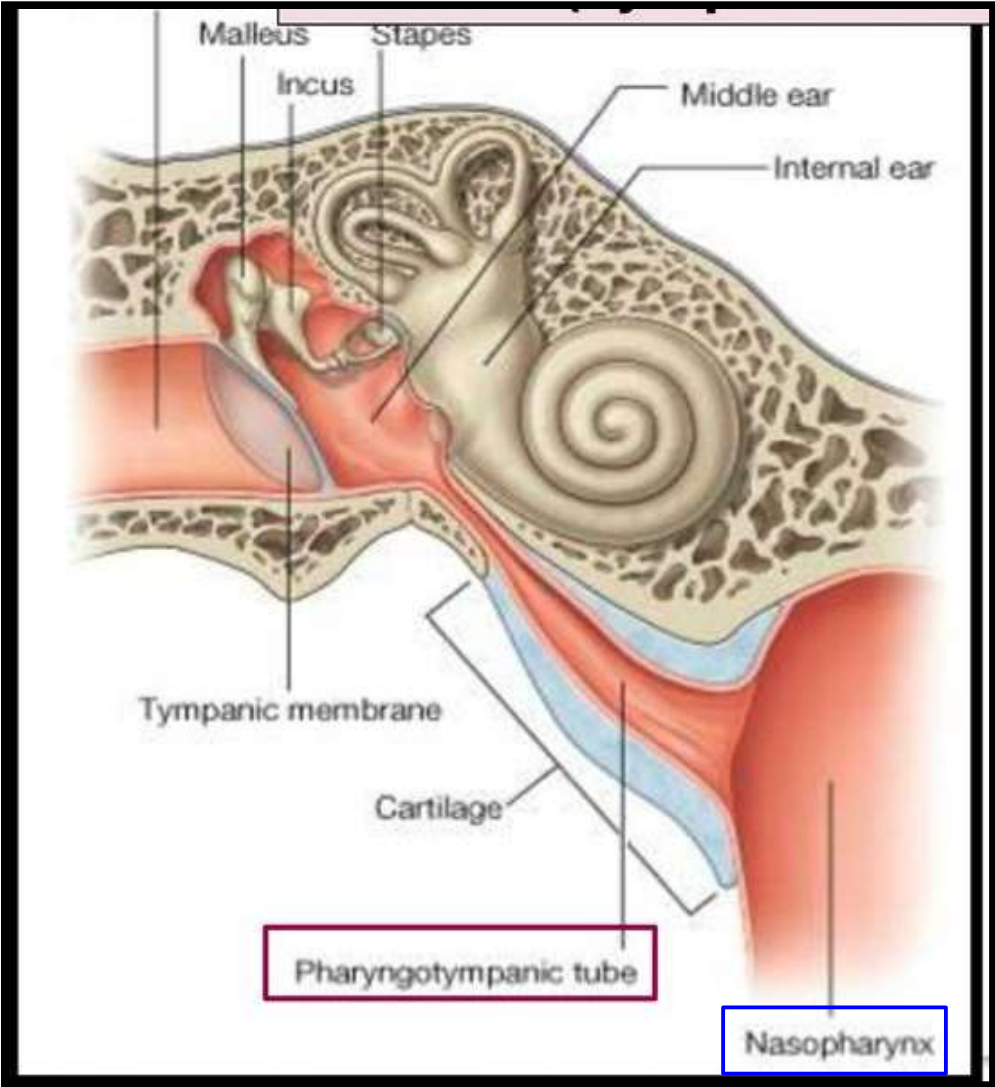
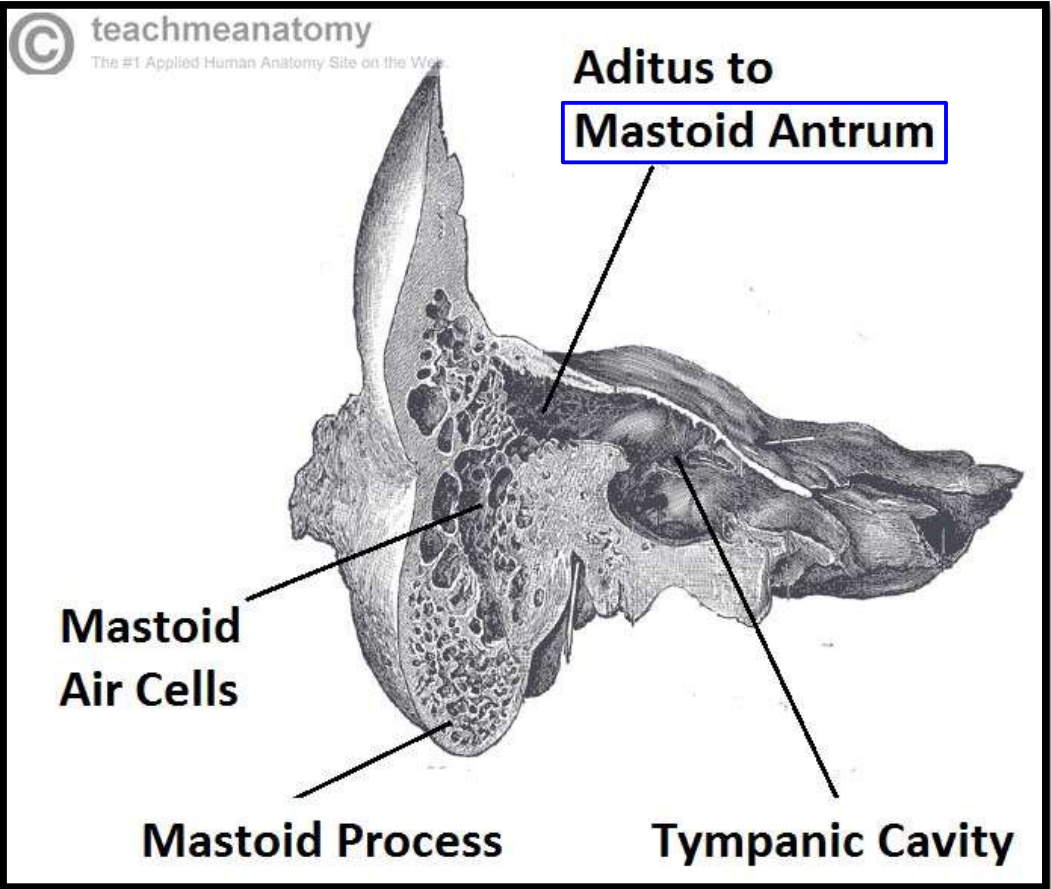
# Communications

## Anteriorly-

- With **Nasopharynx** through Pharyngotympanic tube.

## Posteriorly-

- With **Mastoid antrum** through aditus to mastoid antrum.



# Contents

❖ Outside the mucosa:

➤ **Ear Ossicles-**

- Malleus.
- Incus.
- Stapes.

➤ **Muscles-**

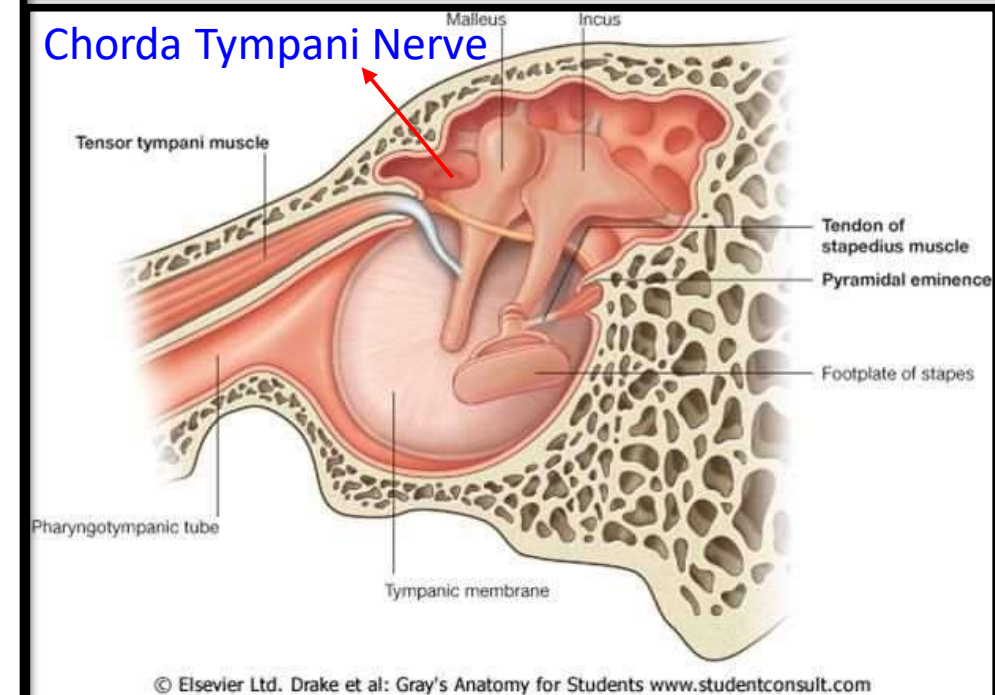
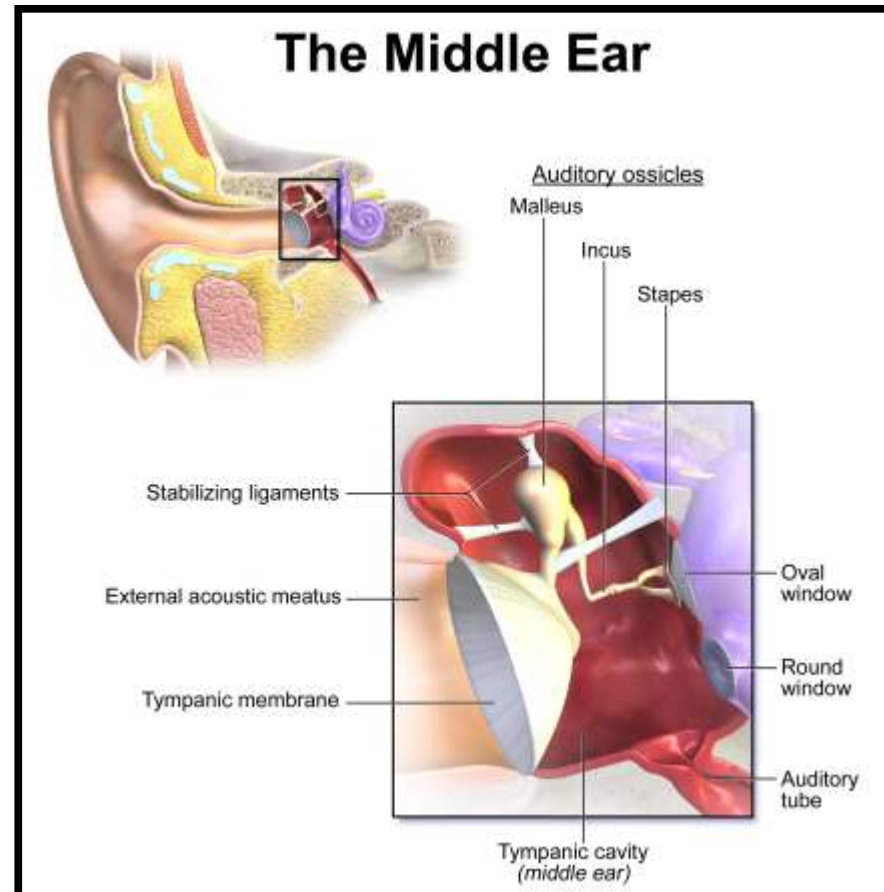
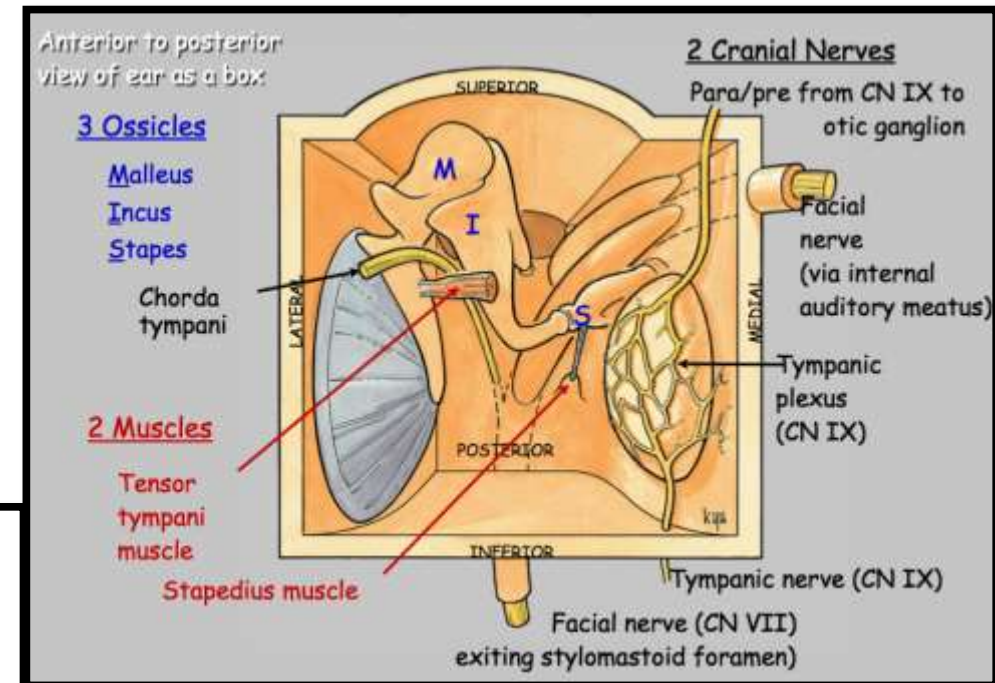
- Tensor tympani &
- Stapedius.

➤ **Nerves-**

- Chorda tympani &
- Tympanic branch of Glossopharyngeal.

➤ **Arteries & Veins**

➤ **Ligaments of ear ossicles.**



# Subdivisions

- Epitympanum (Attic)
- Mesotympanum
- Hypotympanum

## Epitympanum-

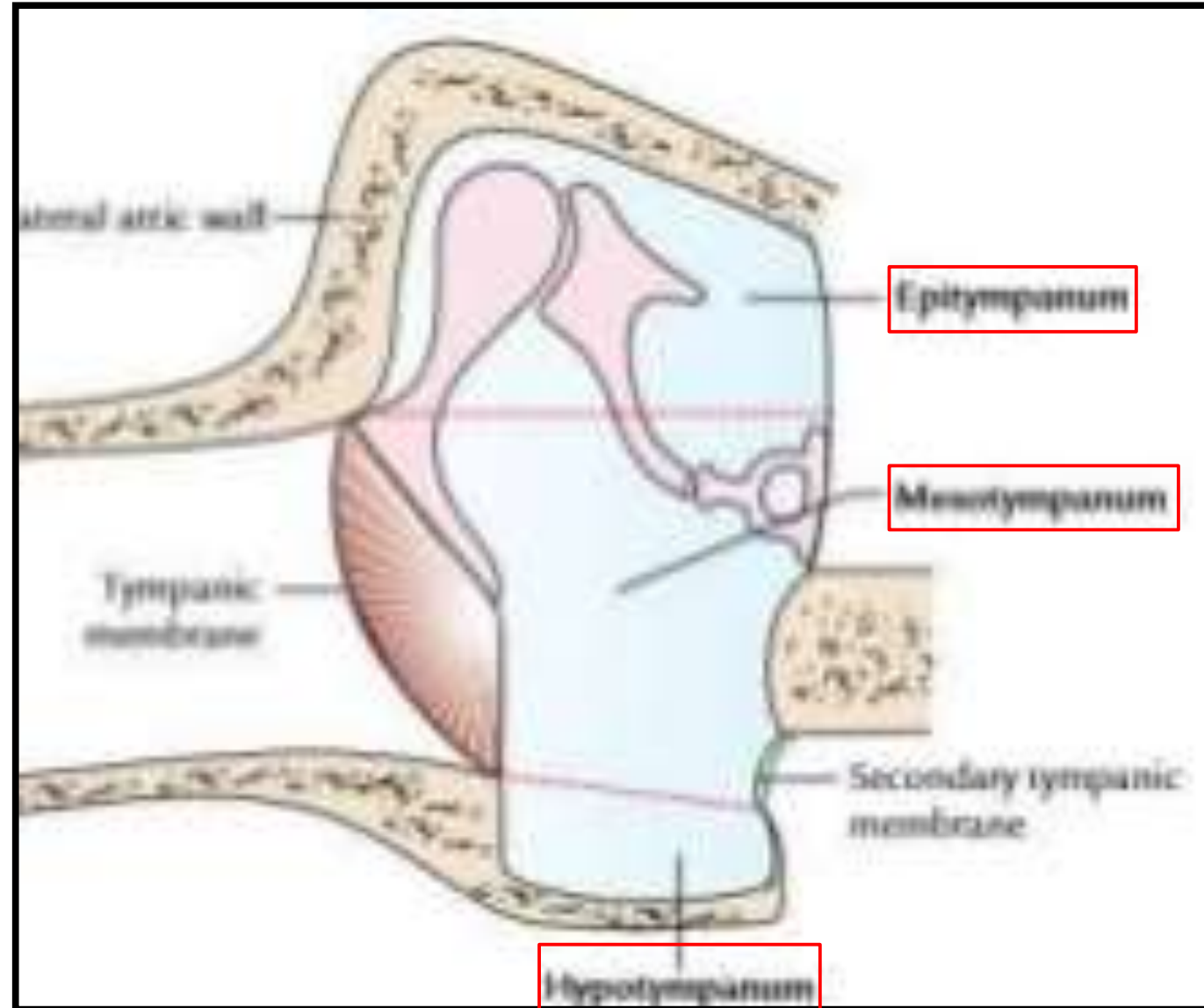
- ❖ A part above the tympanic membrane.
- ❖ It contains:
  - Head of Malleus.
  - Body and short process of Incus.

## Mesotympanum-

- ❖ A part opposite to the tympanic membrane.
- ❖ It is the narrowest part of middle ear.
- ❖ It contains:
  - Handle of Malleus.
  - Long process of Incus.
  - Stapes.

## Hypotympanum-

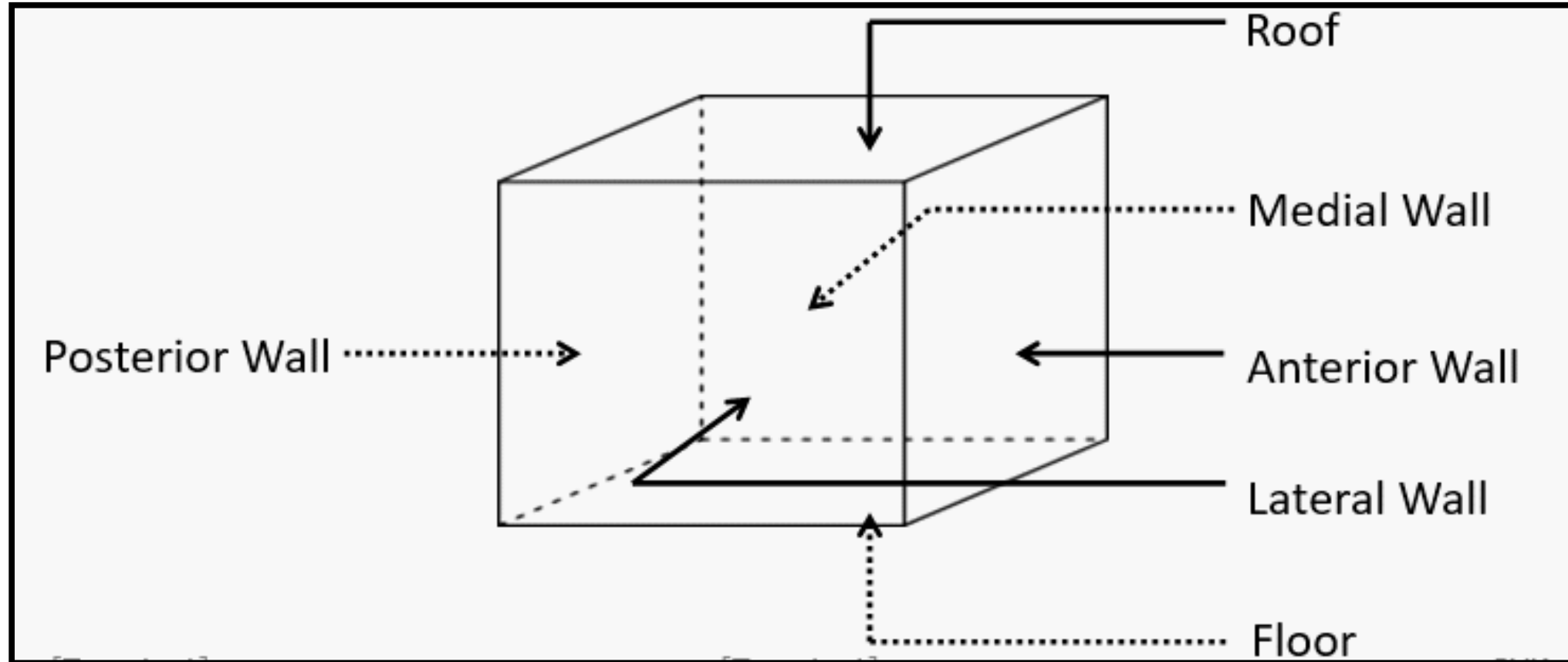
- ❖ A part below the tympanic membrane.





# Boundaries

- Roof
- Floor
- Anterior wall
- Posterior wall
- Medial wall
- Lateral wall



# Boundaries of Middle Ear contd...

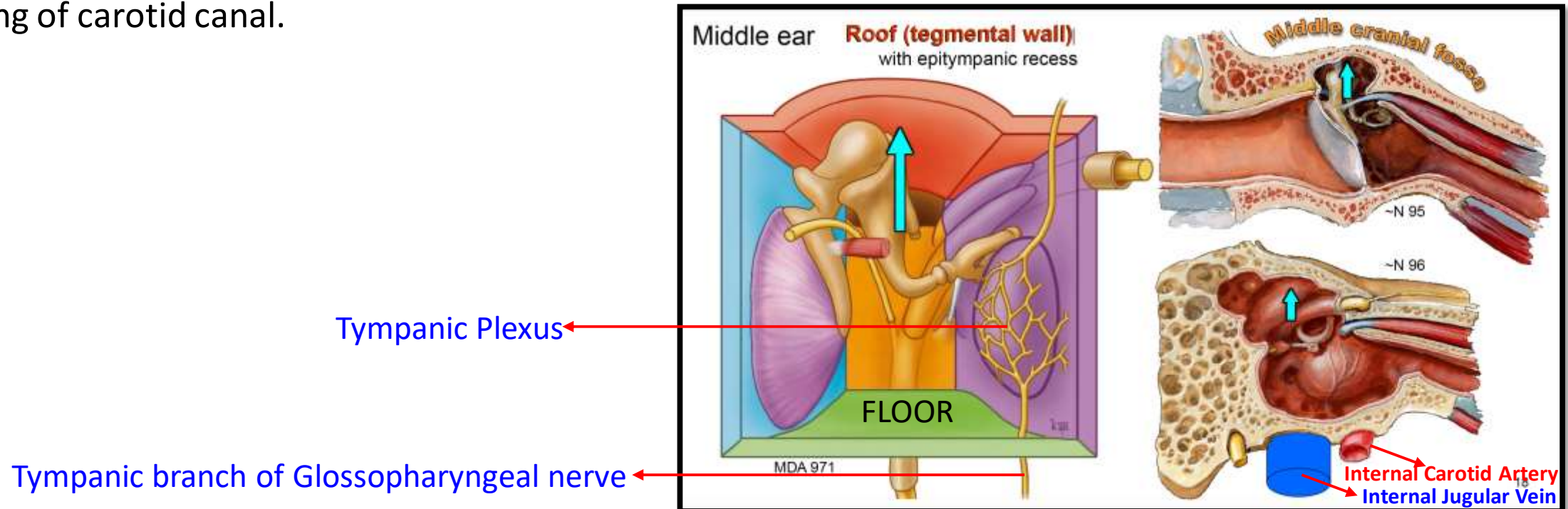
## Roof

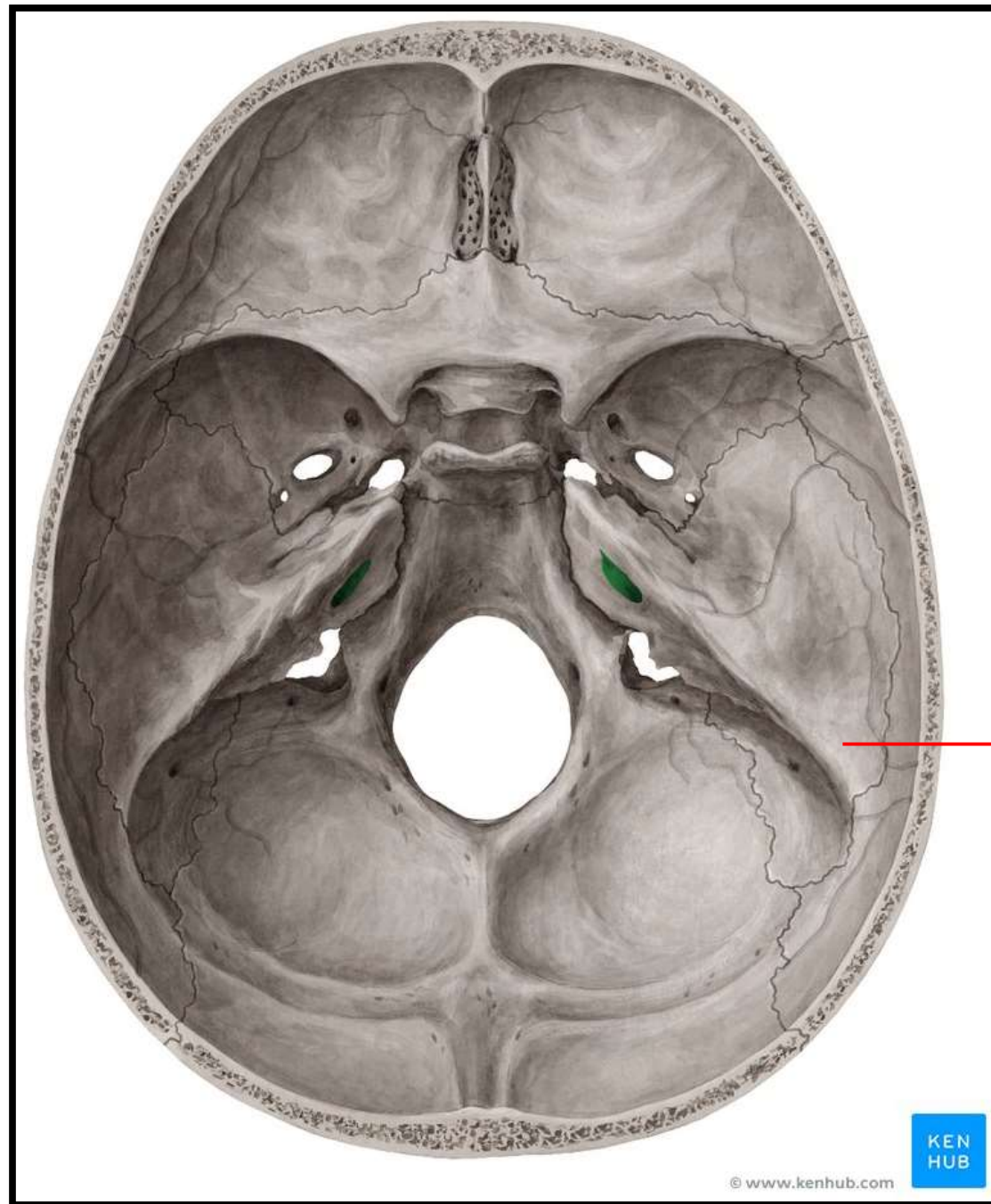
It is formed by **tegmen tympani**.

- It separates the tympanic cavity from middle cranial fossa.

## Floor-

- It is formed by a thin plate of bone.
- It separates the tympanic cavity from jugular bulb.
- Tympanic branch of Glossopharyngeal nerve (**Jacobson's Nerve**) pierces the floor between the jugular fossa and lower opening of carotid canal.

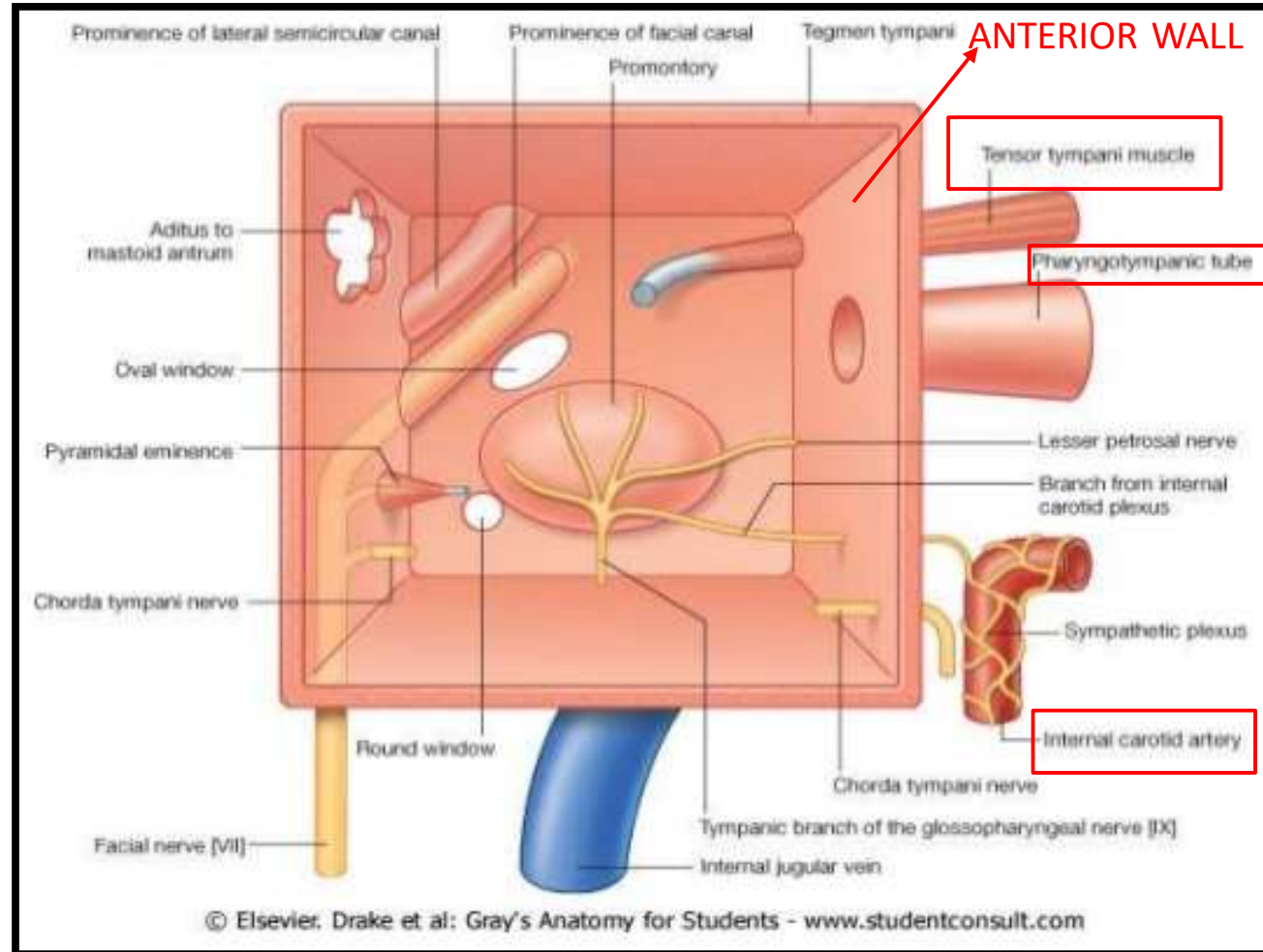
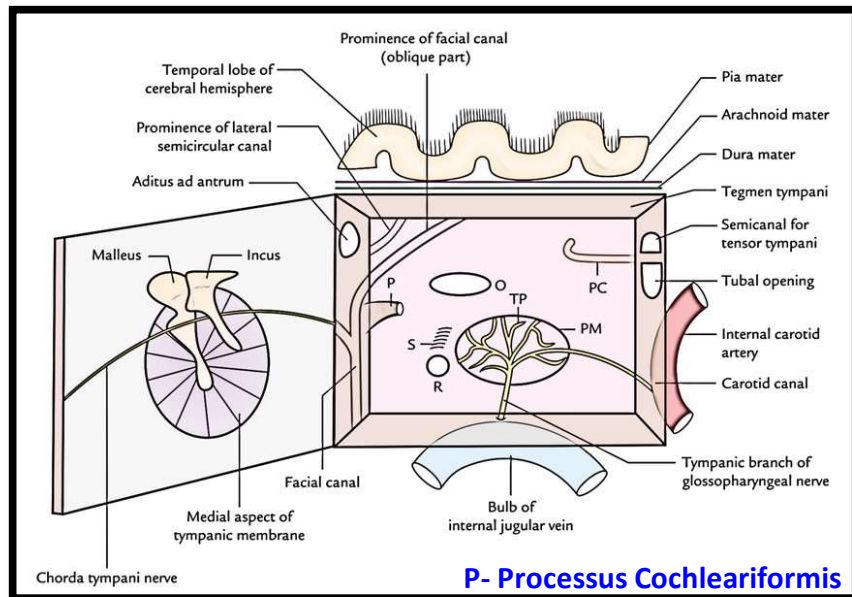




→ Tegmen Tympani

# Anterior Wall

- ❖ It is formed by a thin plate of bone.
- ❖ Its lower part separates the tympanic cavity from Internal Carotid Artery.
- ❖ Its upper part has **two canals**:
  - Upper one for the **Tensor tympani muscle**.
  - Lower one for the **Auditory tube**.
- ❖ Bony partition between the two canals extends backwards along the medial wall of tympanic cavity and called **Processus Cochleariformis**.



# Posterior Wall

❖ This wall separates the tympanic cavity from mastoid antrum and mastoid air cells.

❖ It presents following features:

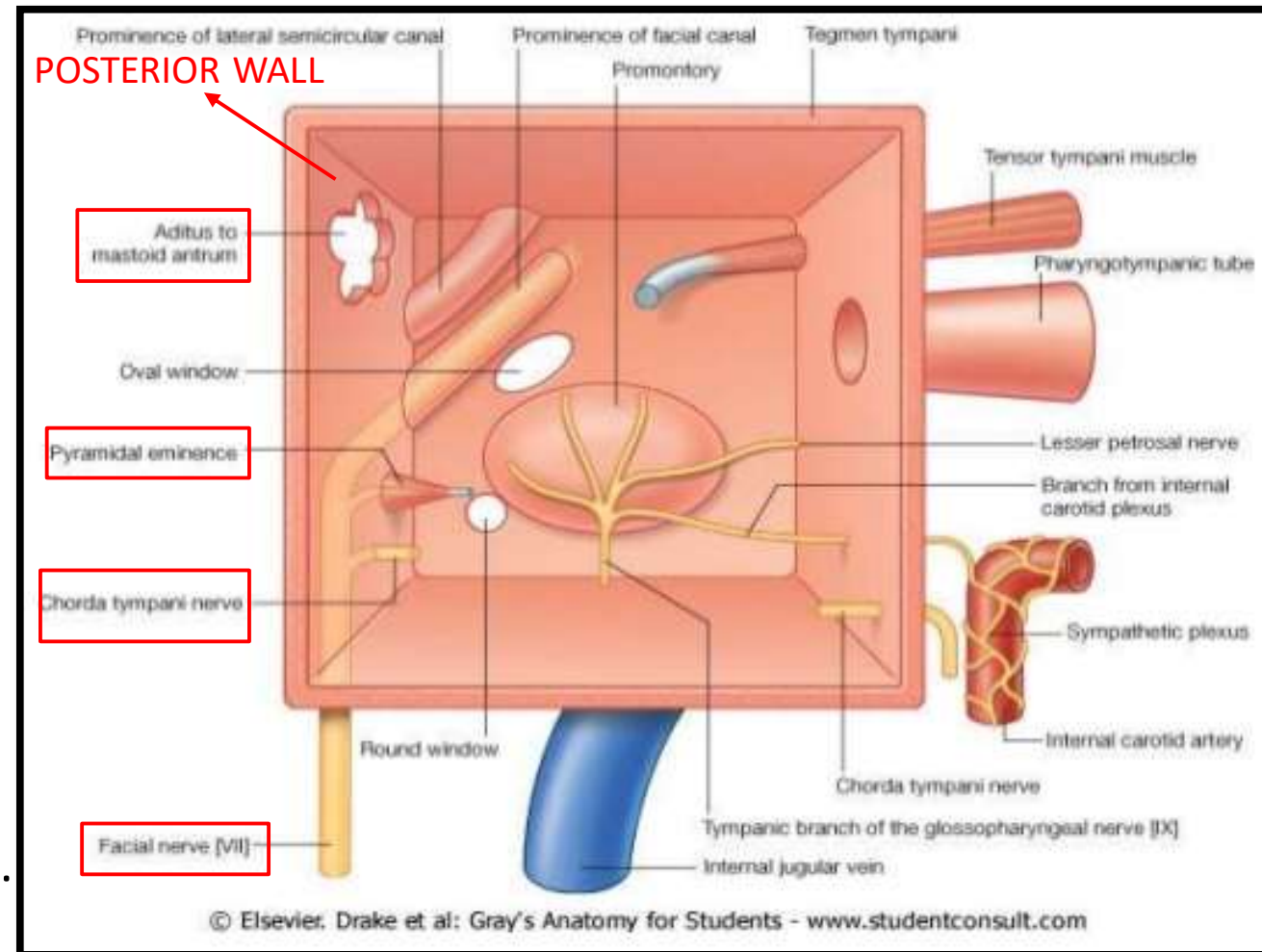
- Aditus-ad-antrum
- Fossa Incudis
- Pyramid
- Vertical part of facial canal
- Posterior canaliculus for chorda tympani nerve.

## Aditus-ad-antrum-

- It is present in the upper part.
- Through this tympanic cavity communicates with the mastoid antrum.

## Fossa Incudis-

- It is a small depression close to the aditus-ad-antrum.
- It lodges the **short process of Incus**.



# Posterior Wall contd...

## Pyramid-

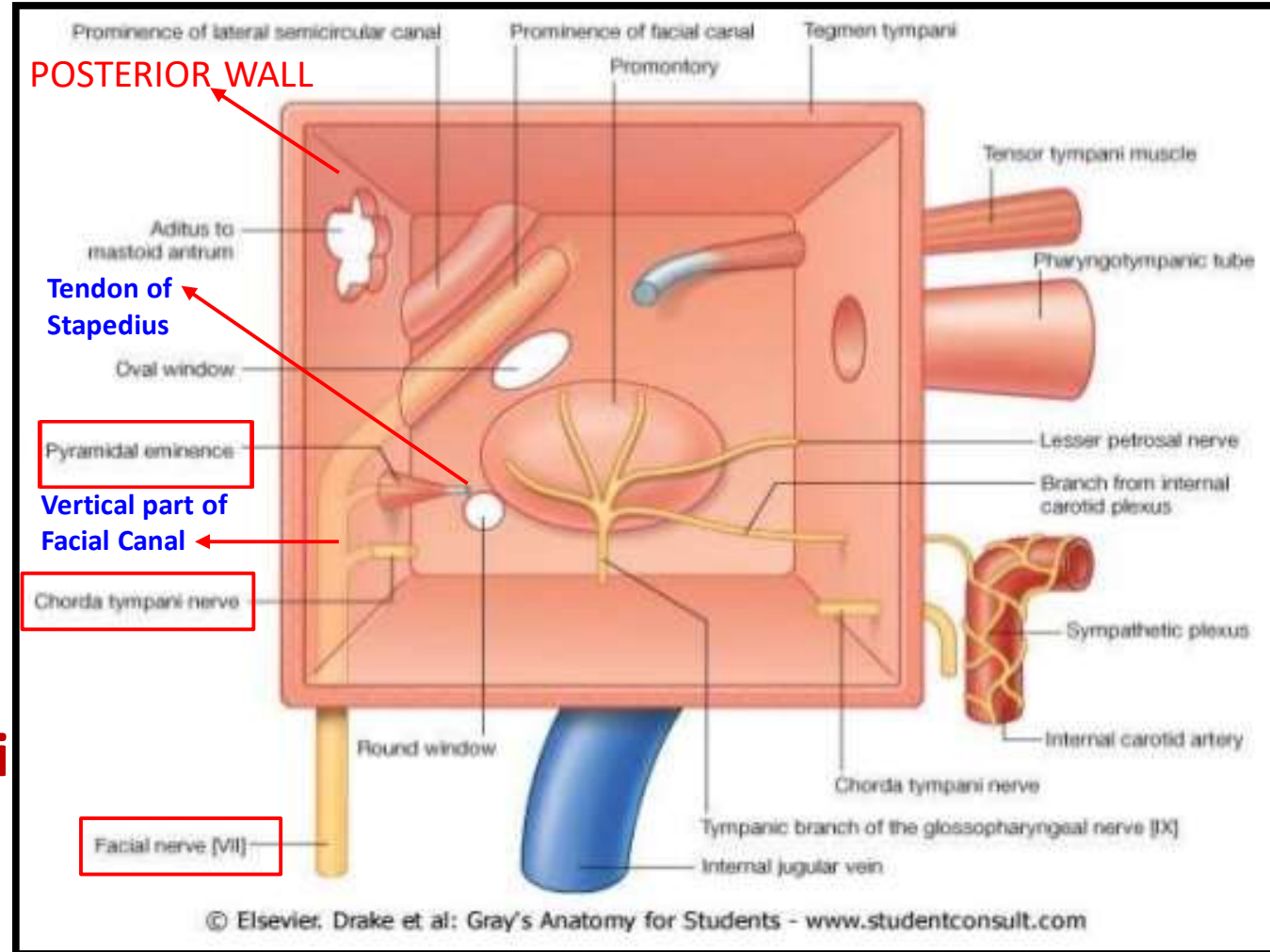
- It is a hollow, conical bony projection below the aditus-ad-antrum.
- It contains the **Stapedius** muscle.

## Vertical part of Facial canal-

- It is present behind the pyramid.

## Posterior canaliculus for chorda tympani nerve-

- It is a small aperture for emergence of chorda tympani nerve.

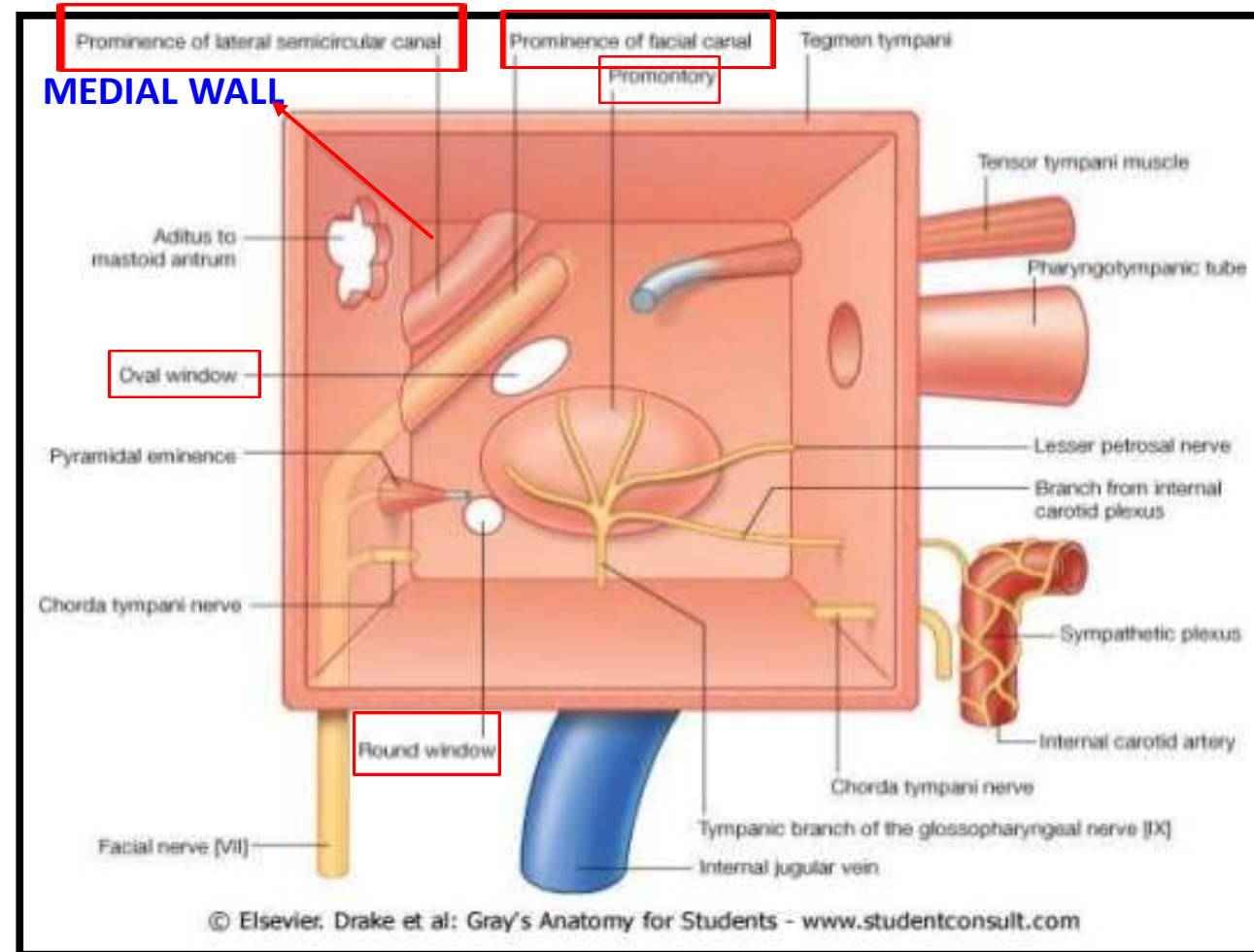


# Medial Wall

❖ It separates the middle ear from internal ear.

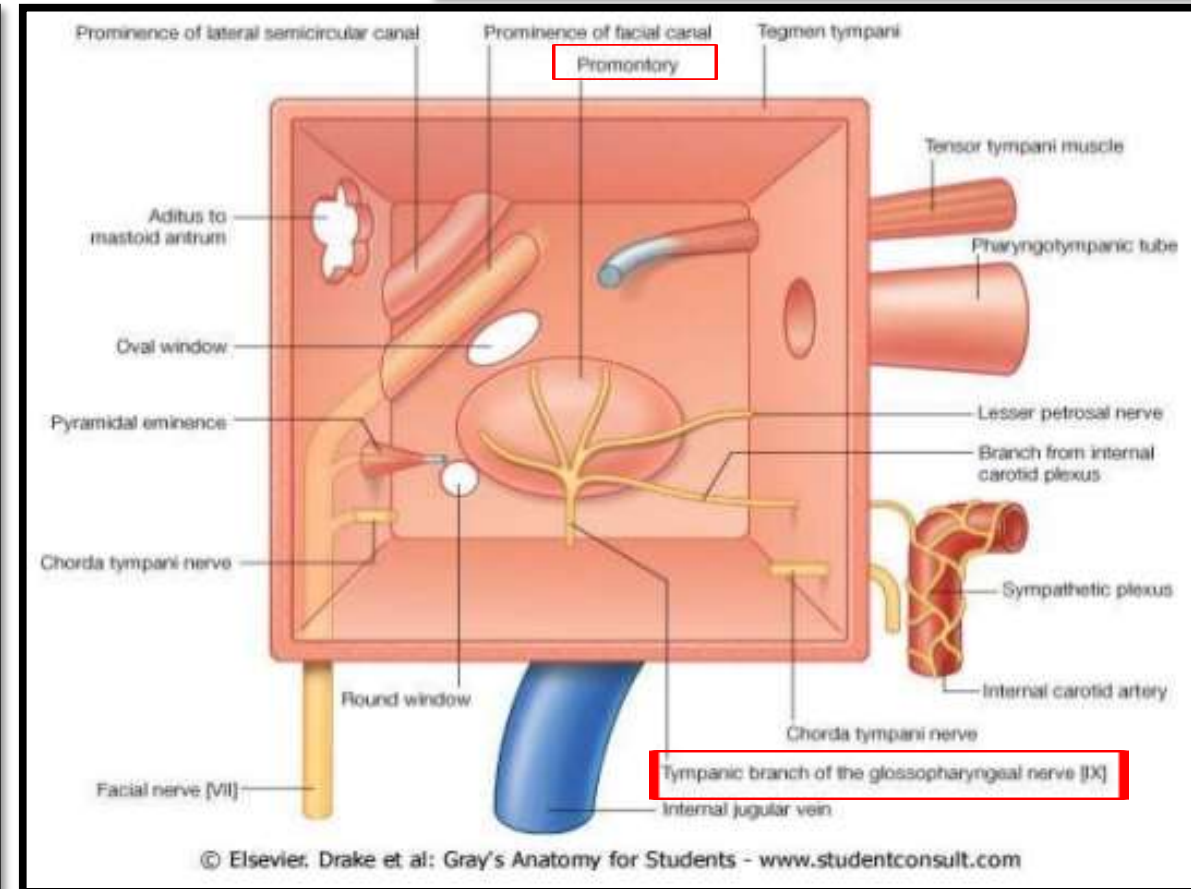
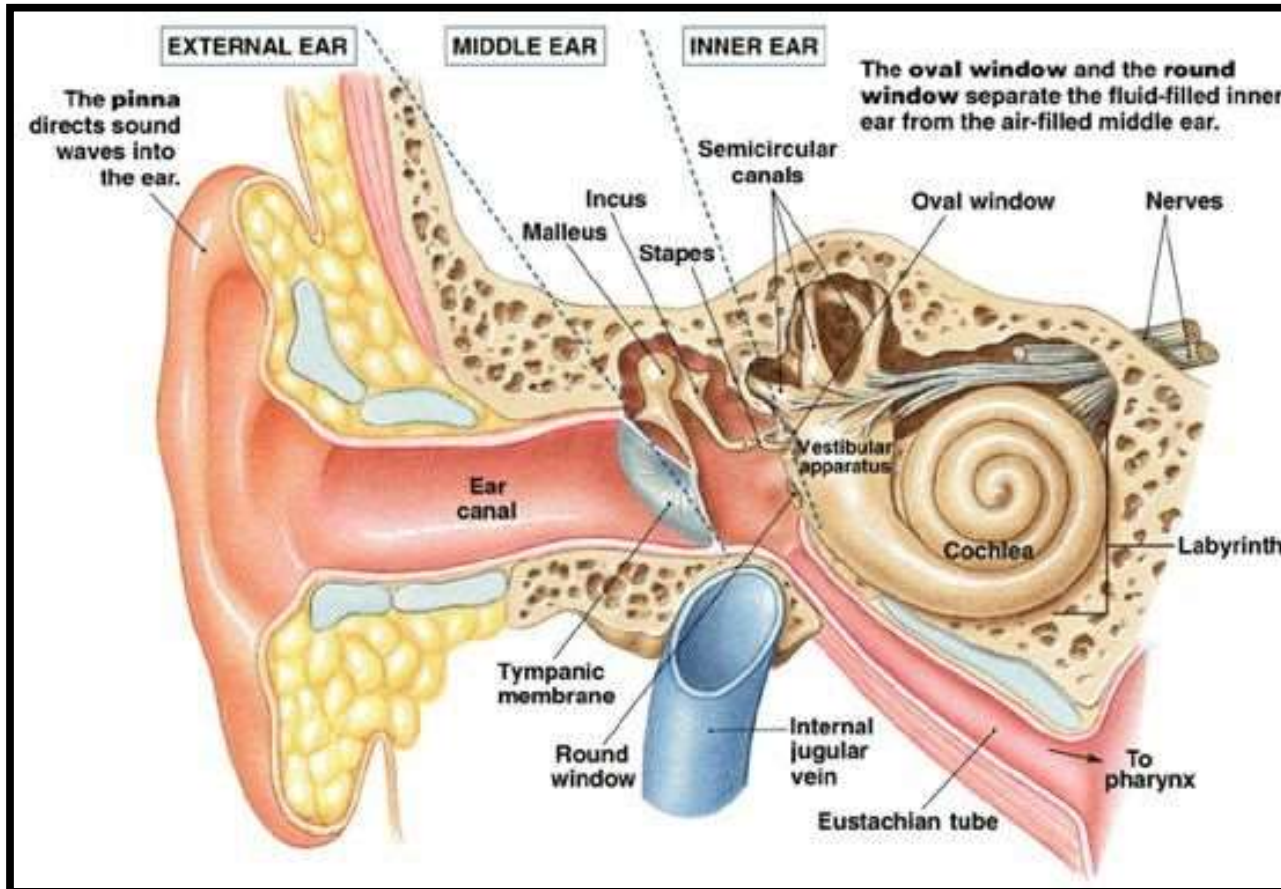
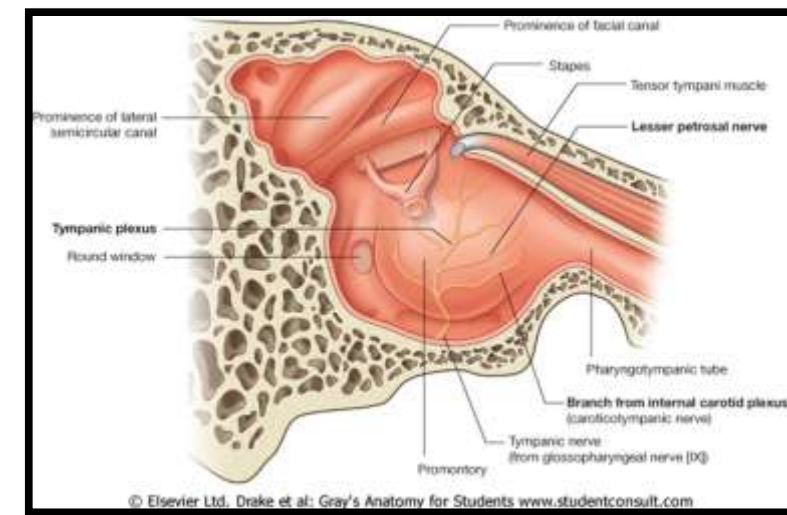
❖ It presents the following features:

- Promontory
- Oval Window (Fenestra vestibuli)
- Round Window (Fenestra cochleae)
- Sinus Tympani.
- Prominence of oblique part of Facial canal
- Prominence of Lateral semicircular canal of internal ear



# Promontory

- It is a rounded prominence in the centre of medial wall.
- It is produced by basal turn of cochlea.
- Tympanic branch of Glossopharyngeal nerve (**Jacobson's nerve**) ramify on it to form tympanic plexus.





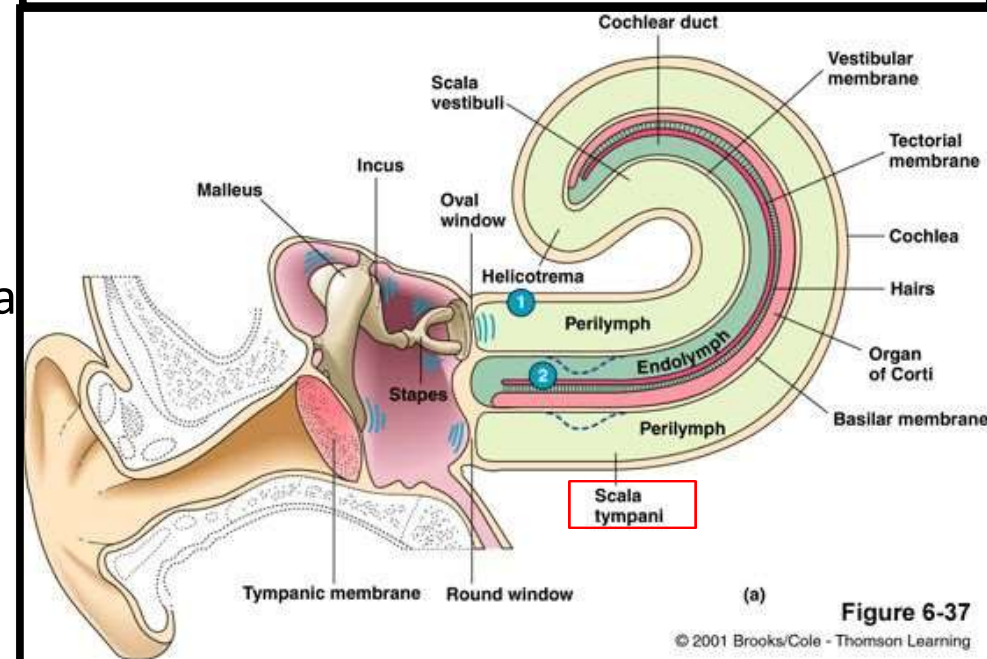
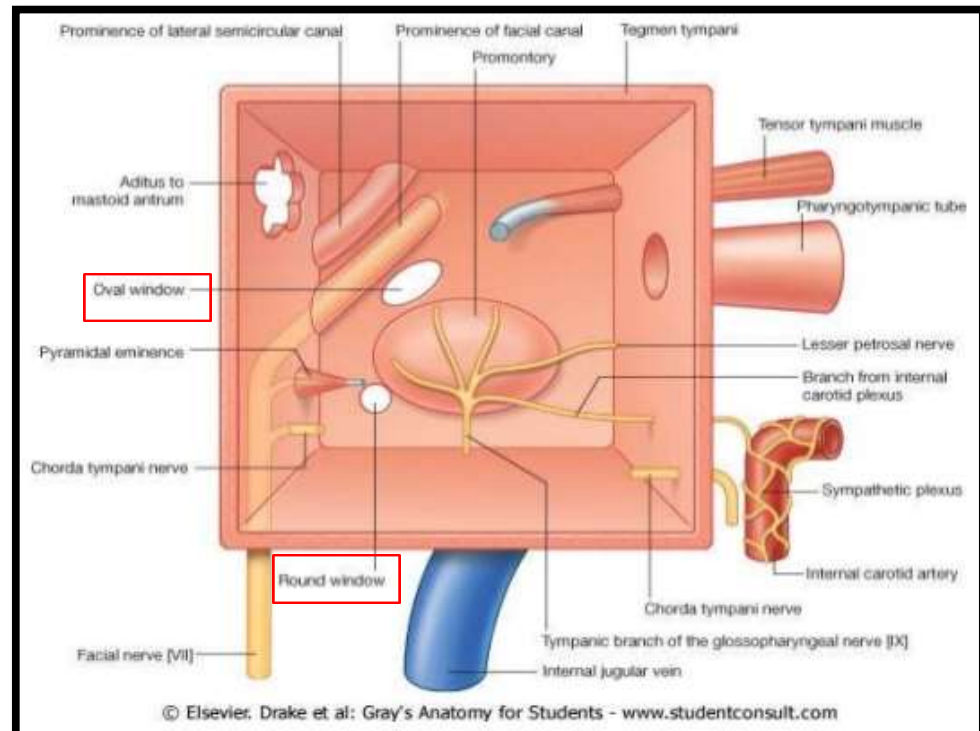
# Medial Wall contd...

## Oval Window (Fenestra Vestibuli)-

- It is an oval aperture located above and behind the promontory.
- It is closed by **base (footplate) of stapes** and annular ligament.

## Round Window (Fenestra Cochleae)-

- It is a small, round opening below and behind the promontory.
- It is closed by **secondary tympanic membrane**.
- Secondary tympanic membrane separates the middle ear from scala tympani.



# Medial Wall contd...

## Sinus Tympani-

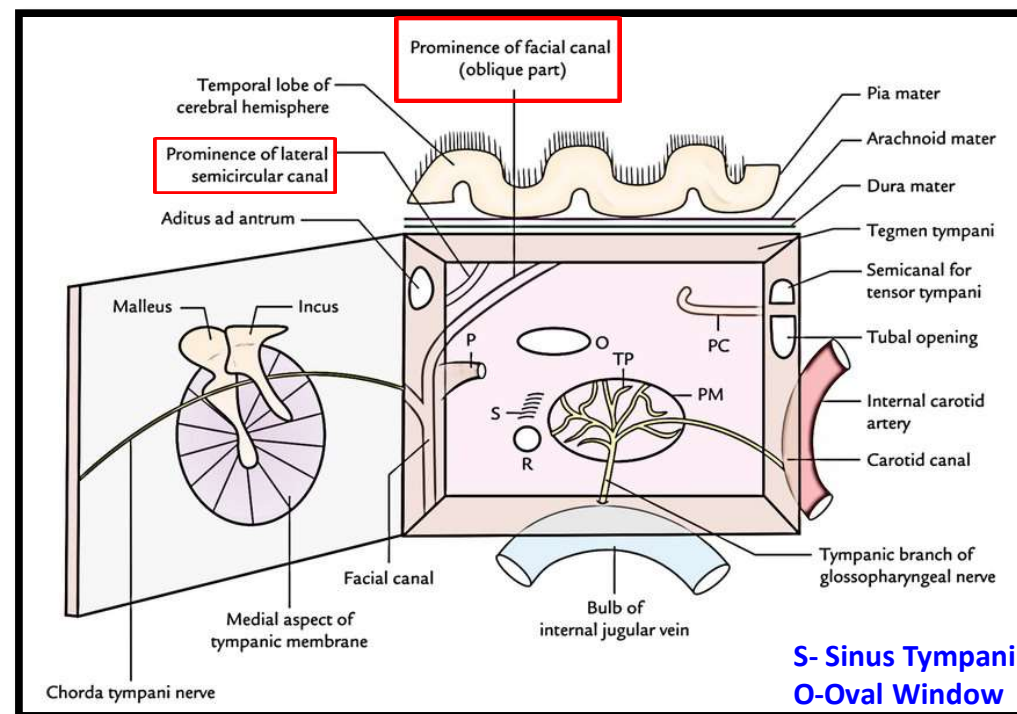
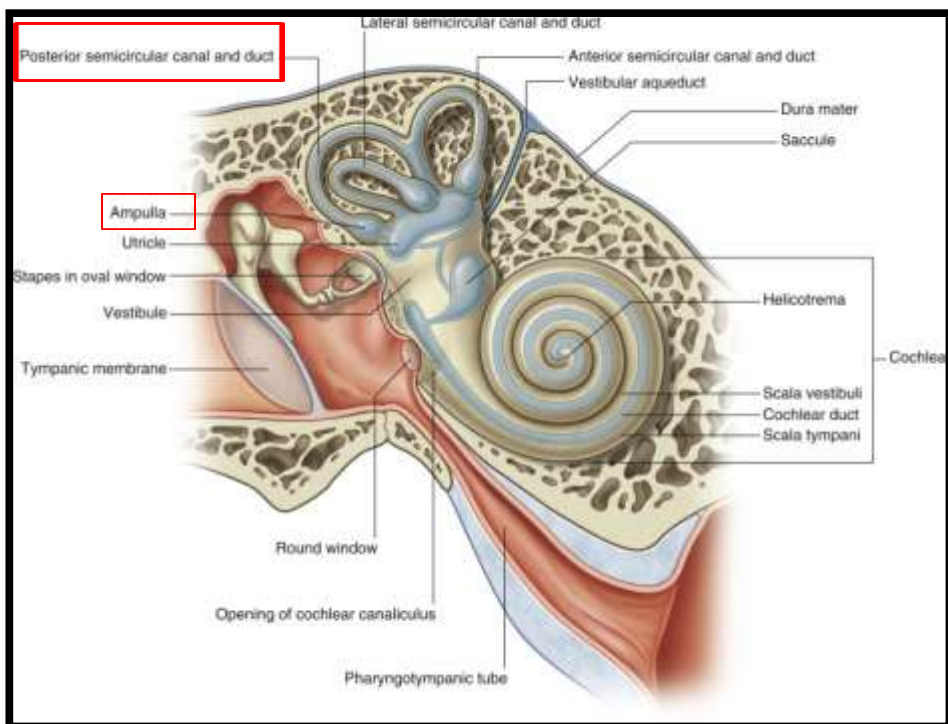
- It is a depression behind the promontory between oval and round window.
- It indicates the position of ampulla of posterior semicircular canal.

## Prominence of oblique part of Facial canal-

- It is present above the oval window.

## Prominence of Lateral semicircular canal of internal ear-

- It is a small ridge high up in the angle between medial and posterior walls.



# Lateral Wall

- Most of the lateral wall is formed by **tympanic membrane**.
- Chorda tympani nerve passes across the tympanic membrane, lateral to the long process of Incus and medial to the handle of Malleus.
- Chorda tympani nerve enters the tympanic cavity through the posterior canaliculus.
- Chorda tympani nerve leaves the tympanic cavity through the anterior canaliculus.

