

10/10/20

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कारण

★ Anatomy of the ear.

Ear is divided into 3 parts.

- External ear
- Middle ear
- Internal ear / labyrinth

★ External Ear.

External ear consist of :-

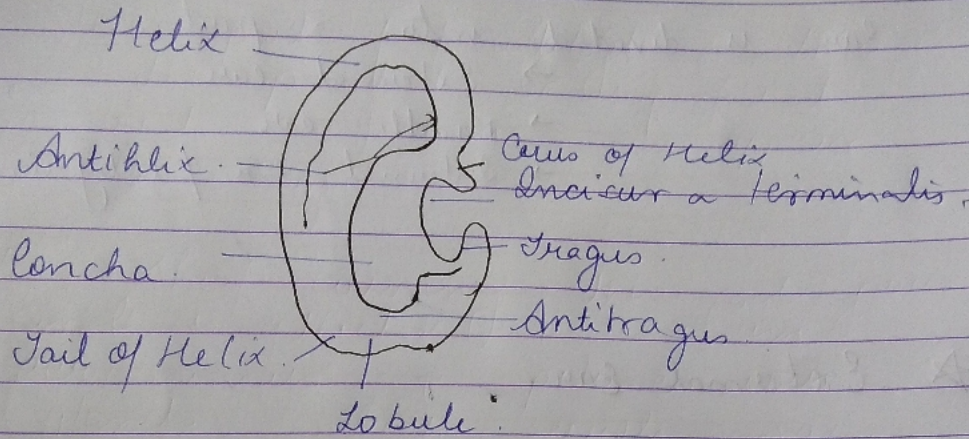
- Auricle or pinna.
- External acoustic canal
- Tympanic membrane.

1) Auricle or pinna -

The entire pinna except for its lobule & the outer layer of external acoustic canal is made up of yellow elastic cartilage covered with skin.

Skin is closely adherent to the perichondrium (connective tissue which covers the cartilage where it is not a joint) on its lateral surface & is loose on the medial surface.

Epithelium is squamous keratinizing.
Adipose tissue is present only in the lobule.



There is no gap ^{cartilage} b/w the tragus
of the Cus of Helix.
This area is c/d incisura terminalis
is. (used in → endural approach of
surgery.)

Blood supply →

Anterior surface of Pinna → Branch of
superficial temporal
artery.

Posterior surface of Pinna → Posterior
auricular artery, branch of
external carotid.

2) External Acoustic (Auditory) canal

- It is S shaped canal.
- Length \rightarrow 24mm
- Extends from the bottom of concha to the tympanic membrane
- As it is not straight

its outer part is directed,
upward, backward, medially.

its inner part,

downward, forward & medially.

Auditory Canal.

Cartilagenous

Bony.



\rightarrow forms outer $\frac{1}{2}$ of the canal.

\rightarrow It a continuation of the cartilage which forms the framework.

→ It has 2 deficiencies
the 'fissures of Santorini.'

- In this part of cartilage & through them, the parotid or superficial mastoid infection can appear in the canal.
- The skin covering the cartilaginous canal is thick & contains ceruminous & pilosebaceous glands which secrete wax.

Hair is only confined to
outer canal

0%
furuncles. (Staphylococcal infection of hair follicles) are seen only in outer $\frac{1}{3}$ of the canal.

Bony part :- It constitute inner $\frac{2}{3}$ (16 mm)

The skin covering the bony part is thin & continues over the tympanic membrane

It is devoid of hair & ceruminous glands

Nerve supply \rightarrow auriculotemporal nerve
CN V₃
CN X
CN VII

3) Tympanic membrane or the Drumhead.

- It is a partition b/w external acoustic meatus & middle ear.
- It is obliquely positioned & forms an angle of 55° deep external auditory canal.
- Its posterosuperior part is more lateral than its anteroinferior part.
- Its dimensions:
9-10 mm in ht.
8-9 mm wide
0.1 mm thick.

Tympanic membrane can be divided into 2 parts \rightarrow Pars Tensa.
Pars Flaccida.

Pars Tensa :- Most of the tympanic membrane is formed by Pars Tensa.

Important landmark of Pars tensa,

Annulus Tympanicus.

Umbo

Cone of light.

Pars flaccida → Pars flaccida is situated above the lateral process of malleus b/w notch of Riximus & the anterior posterior malleolar folds.

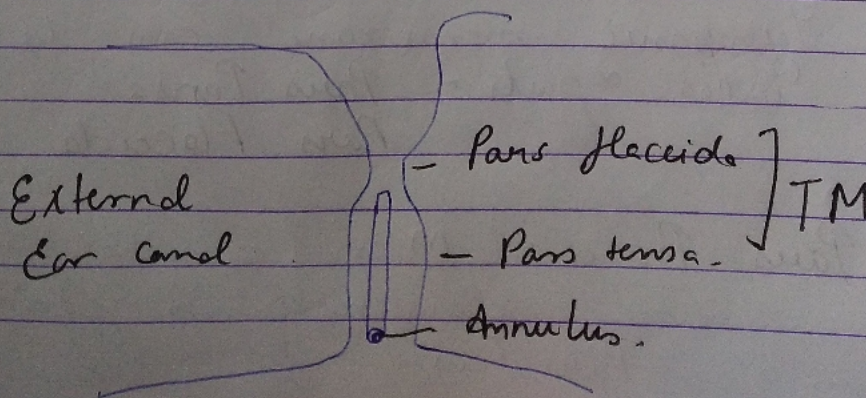
Nerve supply →

It is supplied by

Auriculotemporal nerve

Vagus nerve

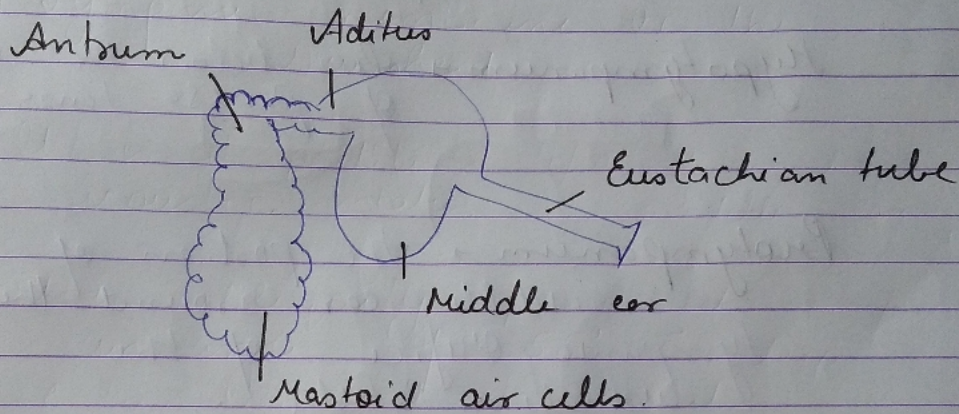
Glossopharyngeal nerve.



[MIDDLE EAR]

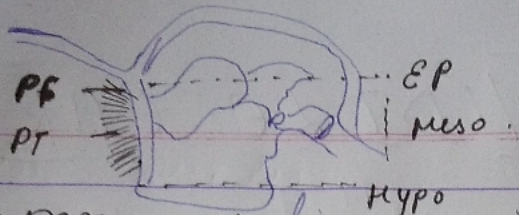
Tarek Shiny a
Scribe

The middle ear together with the
→ eustachian tube
→ aditus, antrum
→ Mastoid ear air cells } middle ear
cleft.



It is lined by mucous membrane
& filled with air

Middle ear lateral wall is formed
by Tympanic membrane & it extends
beyond the limit of tympanic
membrane & may be divided
into → Mesotympanum
Epitympanum
Hypotympanum
Protympanum.



Mesotympanum \rightarrow lies opposite the pars tensa.

Epitympanum \rightarrow lies above the pars tensa.

Hypotympanum \rightarrow lies below the level of pars tensa.

Protympanum \rightarrow the position of middle ear around the tympanic orifice of the Eustachian tube.

Middle ear is like a six sided box. $\square = \square$

- Mastoid Antrum \rightarrow It's an air containing space in the petrous portion of the temporal bone, communicating posteriorly to the mastoid cells & anteriorly to the epitympanic recess of middle ear.

- Aditus to antrum.

The aditus to antrum is a large, irregular aperture that leads backwards from the epitympanic recess into the mastoid antrum.

It lies above pyramid.

- Mastoid air cells.

The middle ear cavity is lined by mucous membrane & is filled with air.

It communicates anteriorly with the nasal part of the pharynx through the auditory tube.

Posteriorly, it communicates with the mastoid cells via mastoid antrum.

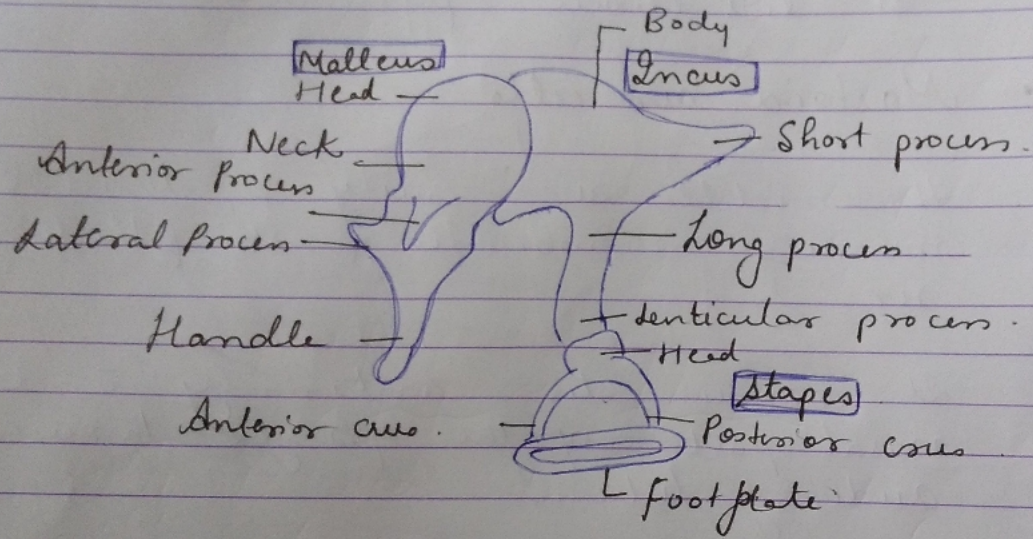
The mastoid air cells are small, air-filled cavities in the mastoid process.

The mastoid cells exhibit great variety in their size & number.

• Middle ear ossicles.

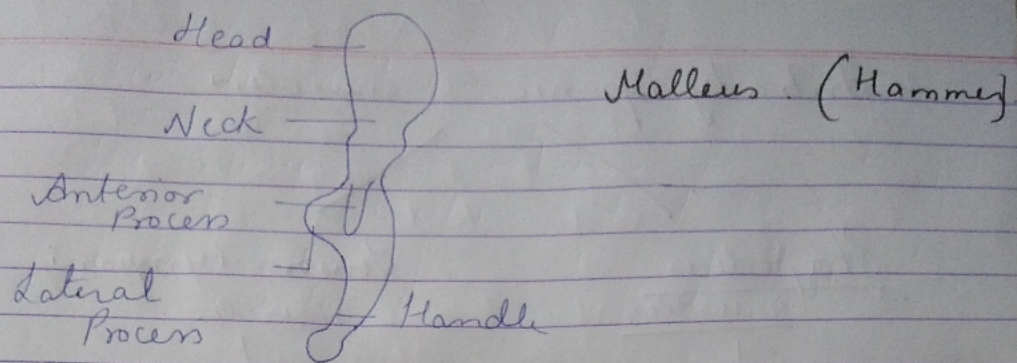
Three ossicles are present in the middle ear.

- Malleus (Hammer)
- Incus (Anvil)
- The stapes (Stirrup)

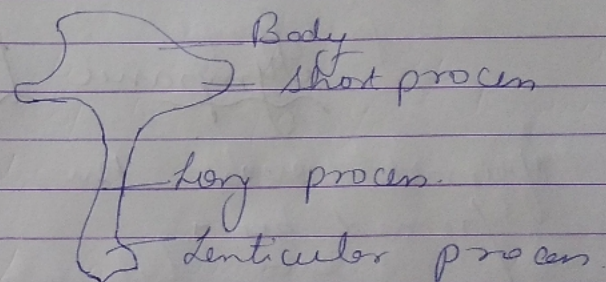


Malleus → Malleus has Head embedded in attic
 Neck embedded in attic
 Handle
 Lateral process
 Anterior process

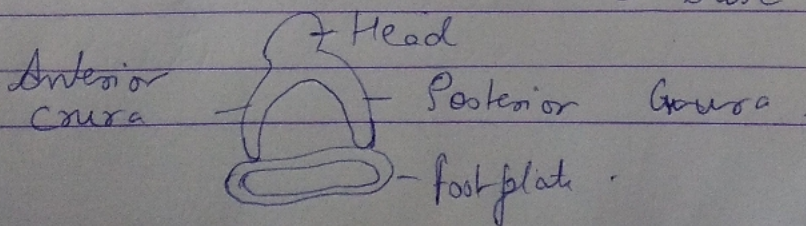
Manubrium is embedded in the fibrous layer of the tympanic membrane



Incus :- has a body of short process.
(Anvil) which lies in attic
& long process hangs vertically
& attaches to the head of stapes



Stapes - It is the smallest bone of the body. 3.5 mm in size.
It consist of Head, Neck,
& crura &
a base (foot plate).



Intra tympanic muscles =

Stapedius
muscles



~~sup~~

Smallest skeleton
muscles in the
body

Tensor tympani
muscles



It connect to the
base of the
malleus & is under
the control of the
trigeminal nerve.

Tympanic Plexus.

found over the Promontory.
formed by →

- (i) tympanic branch of
glossopharyngeal &
- (ii) sympathetic fibers

forms the plexus around the
internal carotid artery.

in Fig 4

Tony
Sriniva
Sridharan

Blood Supply :-

Middle ear is supplied by 6 arteries,
out of which two are the
main, i.e.

- (i) Anterior tympanic branch of Maxillary artery
- (ii) Stylomastoid branch of posterior auricular artery.

four minor vessels.

- (i) Petrosal branch of middle meningeal Art.
- (ii) Superior tympanic branch of middle meningeal artery
- (iii) ~~middle~~ meningeal artery traversing along the canal for tensor tympani muscles.
- (iii) Branch of artery of pterygoid canal
- (iv) Tympanic branch of internal carotid.

[INTERNAL EAR]

The internal ear or the labyrinth is an important organ of hearing and balance.

It consists of bony & a membranous labyrinth.

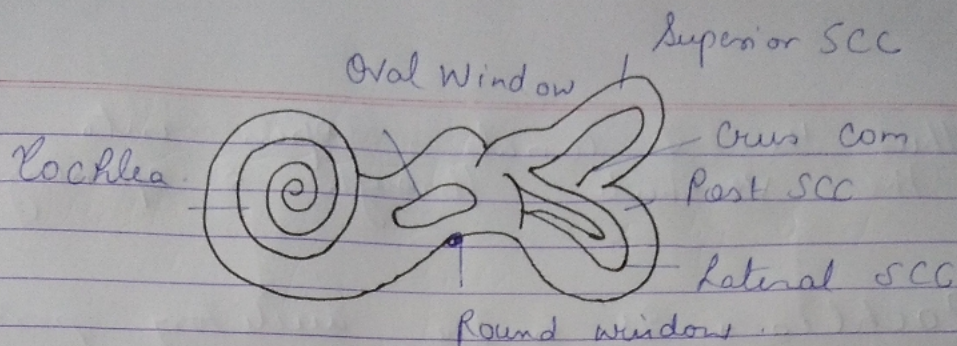
Membranous labyrinth is filled with a clear fluid called endolymph.

The space b/w the membranous & bony labyrinths is filled with perilymph.

Bony Labyrinth.

aka Osseous labyrinth is the rigid outer wall of the inner ear.

It consists of 3 parts -
Vestibule
Semicircular Canal.
Cochlea.



Vestibule \rightarrow It is the central channel of labyrinth.

In its lateral side lies the oval window.

Semicircular canal \rightarrow They are 3 in number -
 LSCC
 PSCC
 SSCC

Each canal has -

ampullated end



opens into vestibule

non ampullated end



of P & S SCC
 unite to form
 a common channel
 c/d Cross Comm

Thus the 3 canals open into the vestibule through 5 openings.

Cochlea → It is the auditory portion of the inner ear.

It is a spiral shaped lab. cavity in the bony labyrinth, making 2.5 turns around its axis, the modiolus.

A core component of the cochlea is the organ of Corti, the sensory organ of hearing.

The cochlea is a spiralled hollow, conical chamber of bone, in which waves propagate from the base to the apex.

Three scalae of chambers.

The Scala Vestibuli (containing perilymph)
The Scala Tympani (" ")
The Scala Media (" endolymph)

Tanu Shriya
Srivastava.

Membranous labyrinth.

- It consist of -
- Cochlear duct
 - Saccul
 - Utricl
 - 3 semicircular ducts
 - Endolymphatic duct & sac.

Blood supply of labyrinth =

Internal auditory artery.

Venous drainage of labyrinth.

- Internal auditory vein.
- Vein of Cochlear aqueduct
- Vein of Vestibular aqueduct.

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