

ENT

World of Revision

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Instructions

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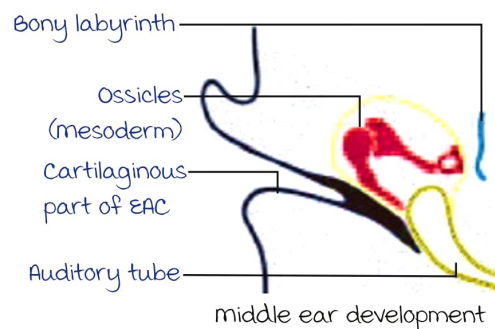
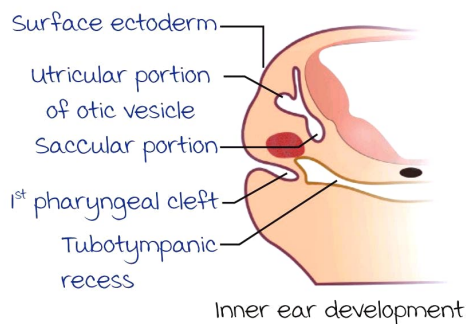
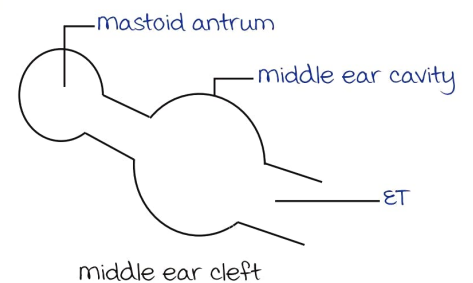
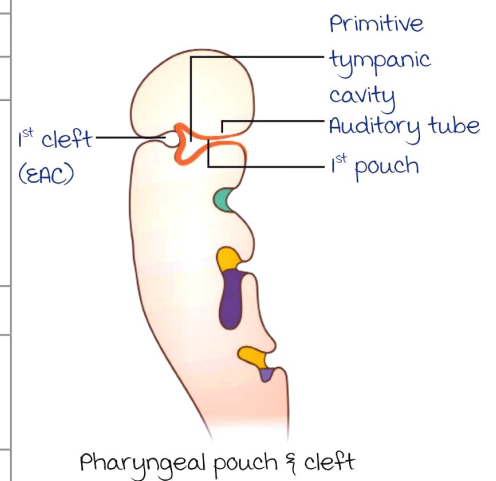
EAR : PART 1

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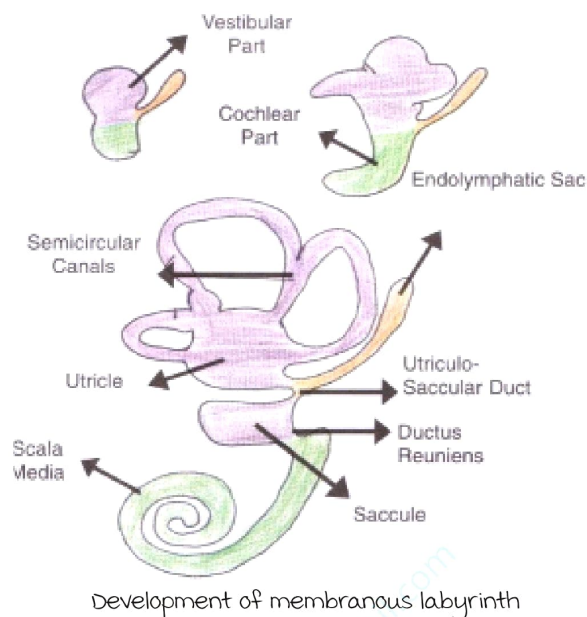
Embryology ?

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Structure		Origin
Pinna	Tragus & ascending crus of helix	1 st arch
	Rest of the pinna	2 nd arch
EAC (External auditory canal)		1 st cleft
External acoustic meatus		1 st arch
middle ear cleft	- Eustachian tube (ET) - Tympanic/middle ear (ME) cavity mastoid antrum : Largest mastoid air cell	1 st pouch (Tubotympanic recess)
Ossicles	malleus & incus	1 st arch mesoderm
	Superstructure of stapes (Head, neck, anterior & posterior crura)	2 nd arch mesoderm
	Footplate of stapes	Otic capsule/ Bony labyrinth
Tympanic membrane	Outer layer	1 st cleft (ectoderm)
	middle layer	1 st arch (mesoderm)
	Inner layer	1 st pouch (endoderm)
Inner ear	membranous labyrinth : - SCC, utricle, endolymphatic sac → Sacculle, cochlea →	Otic vesicle (ectoderm) : - Pars superior Pars inferior
	Bony labyrinth	Endochondral ossification of mesoderm around otic vesicle



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Anomalies of Pinna ? :

Preauricular sinus :

- m/c location : **Root** of helix.
- Fusion defect of auricular tubercles.

malformations :

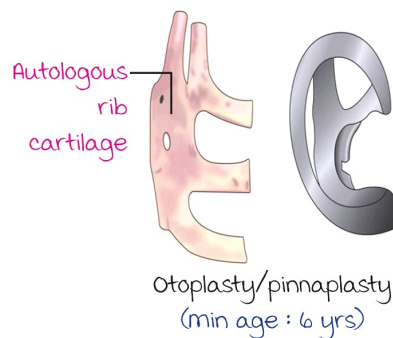
- microtia (Small pinna).
- Anotia (Pinna absent).



Pre-auricular sinus



microtia



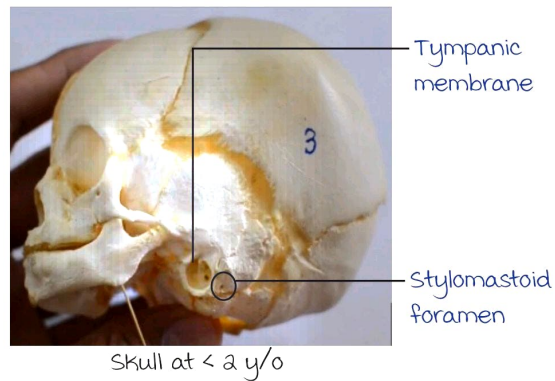
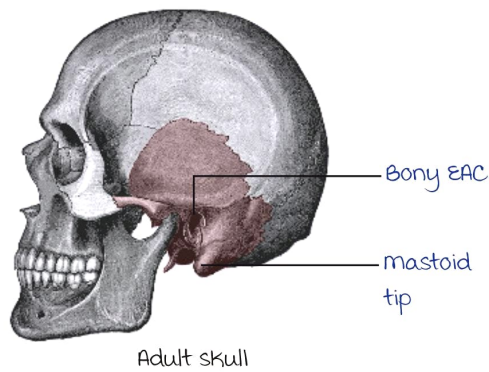
Development by Birth :

Completed :

- middle ear :
 - Ossicles
 - **mastoid antrum**
- Inner ear :
 - Organ of Corti
(By **20 - 25** weeks intrauterine life)
- Cartilaginous part of EAC

Not completed :

- **Bony** part of EAC
- **mastoid tip** (Develops at 2 yrs)



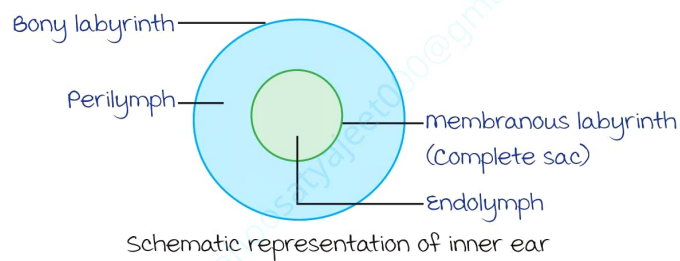
Note :

Child < 2 yrs :

Post-auricular incision → ↑ Risk of facial nerve injury (Not protected by mastoid tip).

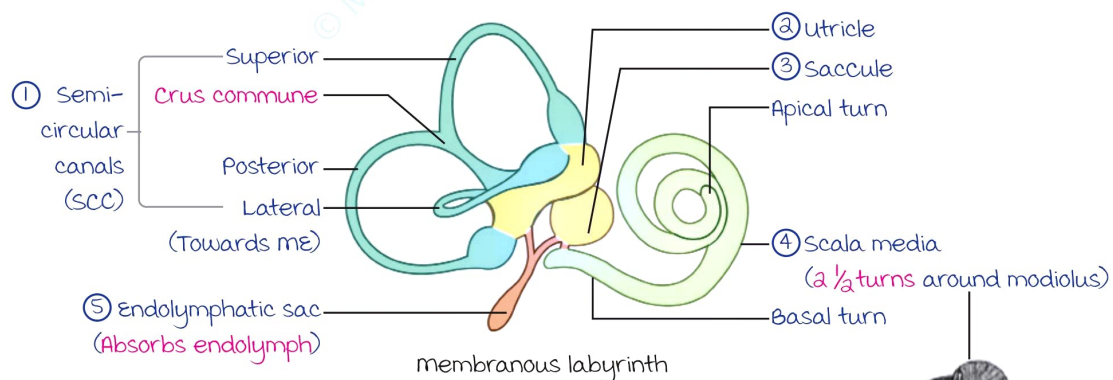
Anatomy of Inner Ear

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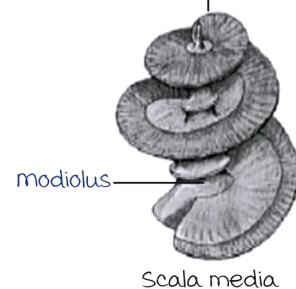
Membranous Labyrinth :

Parts :



Openings of SCC :

- 5 openings into utricle.
- **Crus commune** : Common opening of posterior & superior SCC.

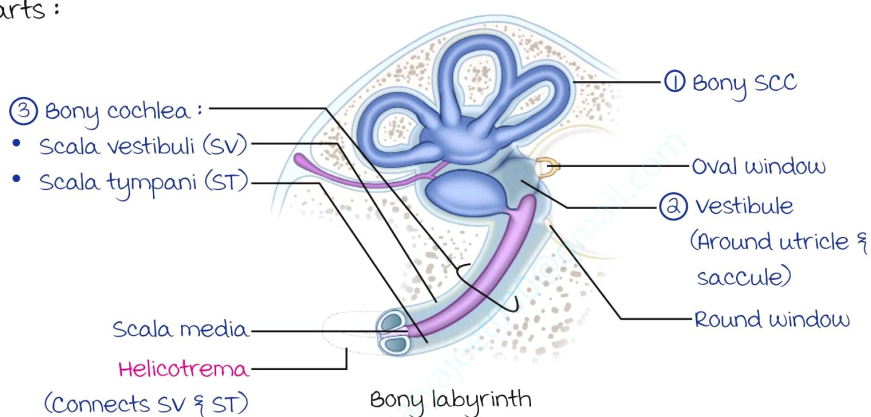


----- Active space ----- Functions ? :

	Function	Sensory end organ	Location
Balance	Rotational acceleration	Cristae	SCC
	Linear acceleration	maculae (Otoconia/Otolith)	utricle & saccule
Hearing	High frequency	Basal turn of organ of Corti	Scala media
	Low frequency	Apical turn of organ of Corti	

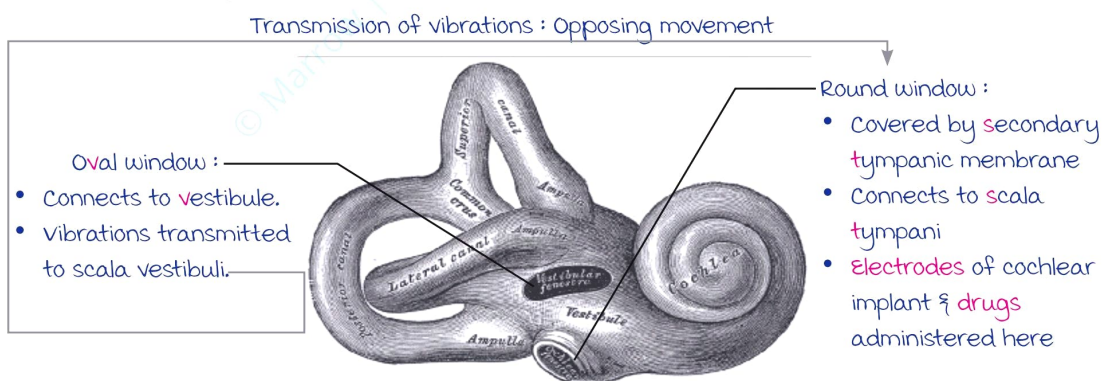
Bony Labyrinth :

Parts :



Openings :

1. Connecting to middle ear :

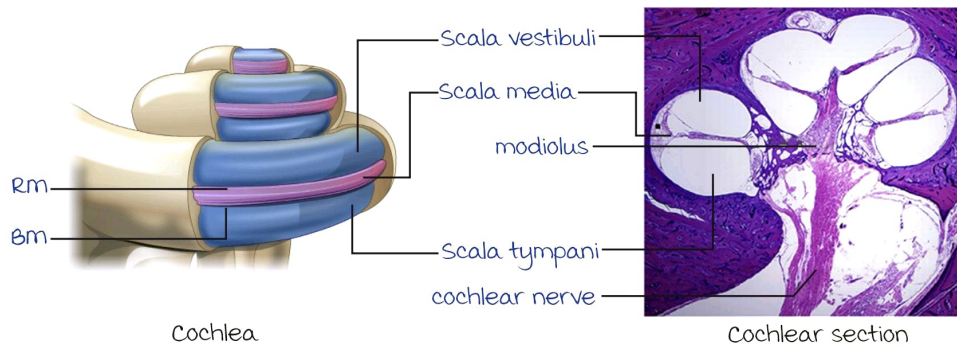


2. Connecting to brain :

- Internal acoustic meatus : CN VII & VIII entry.
- Cochlear aqueduct (CA) :
 - Connects to scala tympani.
 - CSF $\xrightarrow{CA}$ Perilymph (Resembles ECF; $> Na^+$).
- Clinical significance :
 - meningitis $\xrightarrow{\text{Openings}}$ Labyrinthitis.
 - Infant with meningitis : Check for hearing loss.

Scala media & Organ of Corti :

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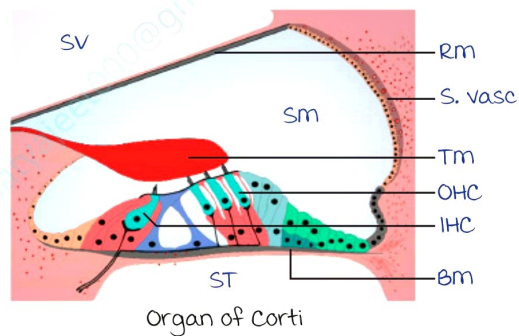


Organ of Corti :

- Lies on basilar membrane
- Function : **Transduction of sound** (mechanical energy → Electrical energy).

Parts of Organ of Corti ? :

- **Reissner's membrane (Rm)** :
Separates Sm & SV superiorly.
- **Basilar membrane (Bm)** :
Separates Sm & ST inferiorly.
- **Stria vascularis (S. vasc)** :
 - Produces **endolymph**.
 - maintains electrochemical gradient of endolymph.
 - Resembles ICF : $> K^+$ (+80 mV).
- **Tectorial membrane (Tm)** :
Receives projections from OHC.



	Inner hair cells (IHC)	Outer hair cells (OHC)
Arrangement	3500 cells in a single row	12,000 cells in 3 - 4 rows
Damage by noise & ototoxic drugs	Less prone	more prone
Primary nerve fibres	Afferent (Cochlear nerves)	efferent
Function	Transmit auditory stimuli	modulate function of IHC
Excitatory neurotransmitter	Glutamate	-

----- Active space -----

Auditory Pathway ?

00:31:07

