ENT

RR-8.0

Contents

EAR : PART 1

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

Embryology & Anomalies

00:00:52

EMBRYOLOGY

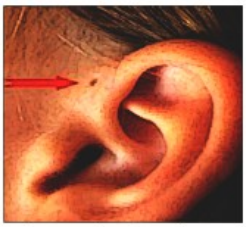
Structure	Origin	
Tragus, anterior helix	1st pharyngeal arch	Via Hillocks of HIS
Rest of the pinna	2nd pharyngeal arch	
External Auditory Canal (EAC)	1st pharyngeal cleft	
External Auditory Meatus (EAM)	1st pharyngeal arch	
Middle ear cleft : Middle ear cavity, mastoid antrum, eustachian tube	1st pharyngeal pouch/Tubotympanic recess	
Malleus, incus	1st pharyngeal arch	
Stapes suprastructure	2nd pharyngeal arch	
Stapes footplate	Otic capsule (Bony labyrinth)	
Tympanic membrane : 1. Outer layer (Epithelial) 2. Middle layer (Fibrous) 3. Inner layer (Mucosal)	All 3 germ layers : 1. Ectoderm 2. Mesoderm 3. Endoderm	
Mastoid : • Superficial • Deep	Temporal bone : • Squamous part • Petrous part	
Semicircular canals, utricle, utriculosaccular duct, endolymphatic sac	Pars superior	Otic capsule
Saccule & cochlea	Pars inferior	

Note : m/c congenital anomaly of middle ear → Fixation of stapes footplate.

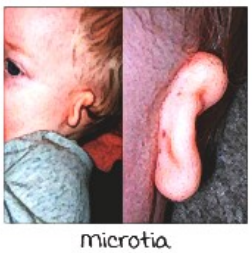
ANOMALIES

Pinna :

1. Preauricular sinus :
   - Fusion defect of the auricular tubercle.
   - m/c site : Root of helix.
2. Microtia : Malformed/underdeveloped pinna.
3. Anotia : Absent pinna.



Preauricular sinus



Microtia

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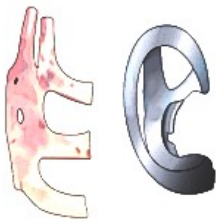
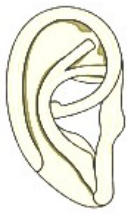
Management of Microtia/Anotia :

1. Pinna reconstruction :
   - AKA Otoplasty/Pinnaplasty.
   - Graft : Autologous costal (Rib) cartilage.
   - Age : >6 yrs (Costal cartilage is developed).



Pinna reconstruction

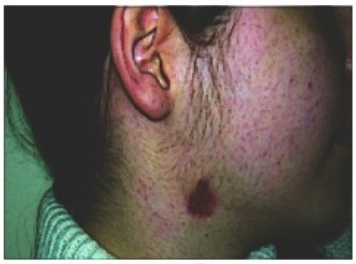


Pinna cartilage framework

2. Bone Anchored Hearing Aids (BAHA) :
   Indication : External ear deformities + Unable to afford Sx.

EAC :

1. Meatal atresia : Incomplete development of EAC.
   - Rx : Meatoplasty (Widening of cartilaginous part of EAC).
2. Collaural fistula : Persistent ventral part of 1st pharyngeal cleft.
   - Internal opening : Floor of EAC.
   - External opening : B/w angle of mandible & sternocleidomastoid.
   - Significance : Relation to facial nerve.
   - Mx in repeated infection : Excision of tract.



Collaural fistula

Mastoid & Inner Ear

00:08:14

mastoid :

Structure	Significance
Korner's septum	• Persistent petrosquamosal suture. • Incomplete clearance of disease.
Mastoid antrum	• Largest air cell • Present at deep-petrous part. • Fully developed at birth.(Other mastoid air cells grow until 18 years).
Tip of mastoid	• Develops at 2 yrs of age. • Exposed facial nerve. • Postauricular incision <2 yrs : Superior & horizontal to prevent facial nerve injury.

Comparison of fetal and adult skull :

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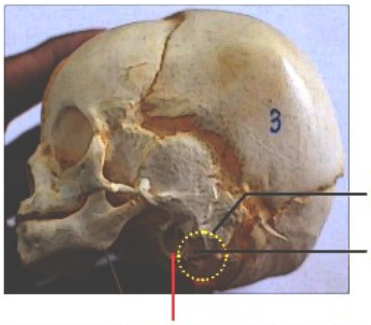
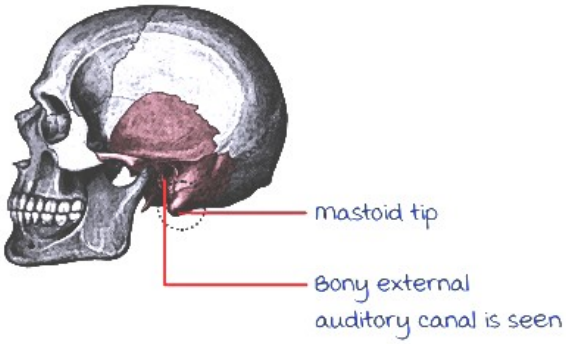




Inner Ear :

Parts : Membranous, bony labyrinth.

Anomalies :

Defect	Features
Scheibe aplasia	• Cochleosaccular dysplasia. • m/c congenital abnormality of inner ear.
Mondini aplasia	Cochlea has only 1.5 turns.
Alexander aplasia	• Defect in basal turn of cochlea. • High frequency hearing loss.
Michel aplasia	• Complete absence of bony and membranous labyrinth. • Absolute C/I for cochlear transplant.

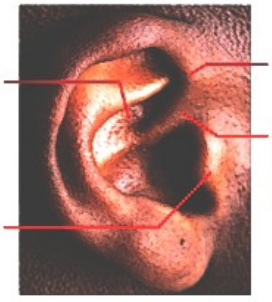
Note : Development of parts of ear

Parts completely developed at birth	Parts not developed at birth
• Middle ear • Inner ear : Organ of corti developed by 20-25 wks of gestation. • Mastoid antrum • Outer cartilagenous part of EAC	• Mastoid tip : 2 yrs • Bony EAC

Pinna

00:17:54

Anatomical Landmark :



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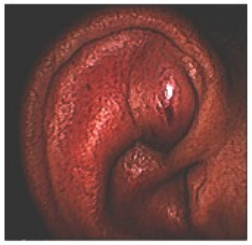
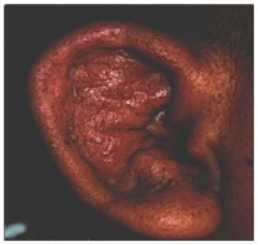
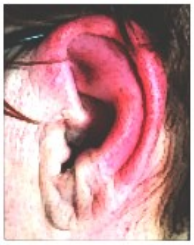
Diseases :

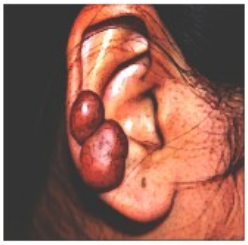
Cause : Skin (Lateral side of pinna) tightly adherent to perichondrium.

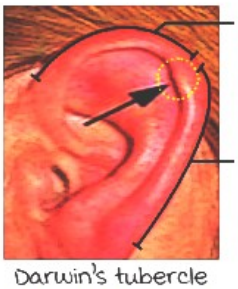
	Presentation	Mx
Hematoma (Organised hematoma AKA cauliflower ear)	Swelling lateral side of ear, h/o trauma ⊕	• Aspiration/drainage. • Contour dressing. • For cauliflower/boxer's/wrestler's/ pugilist's ear : Plastic Sx.
Perichondritis (m/c d/t Pseudomonas)	Red hot painful pinna, sparing lobule.	• Does not resolve spontaneously. • Antibiotics : Ciprofloxacin.
Keloid (Fibrous tissue formation)	H/o trauma, firm rubbery nodule on pinna.	• Intralesional steroids : 1st line of Mx. • Excision f/b post-op intralesional steroids/radiation to prevent recurrence.


Hematoma


Cauliflower ear


Perichondritis


Keloid



Darwin's tubercle
(Atavistic feature)

Anatomy of External Auditory Canal (EAC) 00:24:05

Total length of EAC : 24 mm.

Parts :

	Cartilaginous (Outer 1/3rd : 8 mm)	Bony (Inner 2/3rd : 16 mm)
Direction	Upwards, backwards, medially (Pulled to visualize TM)	Downwards, forwards, medially
Lining epithelium	Stratified squamous epithelium	
Skin	Thick skin	Thin skin
Skin appendages	Contains sweat, sebaceous, ceruminous (modified apocrine) gland.	Absent
Deficiency	Fissures of Santorini (Present throughout birth) : Spread to parotid gland	Fissures of Huschke (Close by 4 yrs of age) : Spread to base of skull

Isthmus
5-6 mm lateral to TM; Narrowest part of EAC → Foreign body impacted medial to isthmus → Difficult to remove

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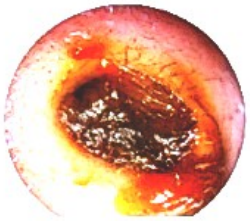
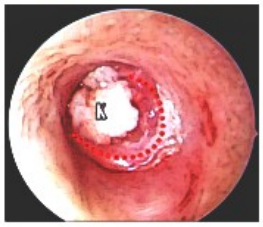
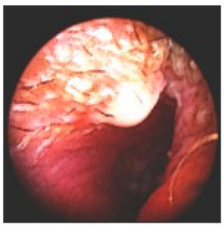
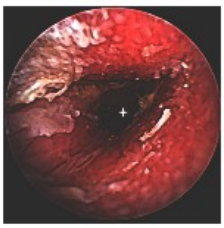
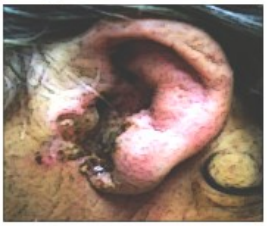
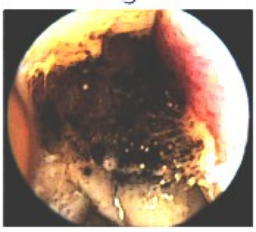
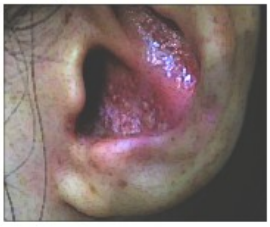
Condition of EAC

00:27:49

Conditions of EAC	Features		Mx
Impacted wax 	• Feeling of ear block • Pain ⊕		Aural syringing : • Temperature of water → Body temperature • Direction : Postero superiorly • C/I : TM perforation, removal of battery from ear
Keratosis obturans 	• Keratin collection (Laminar onion skin arrangement) • C/f : Severe otalgia; H/o chronic sinusitis, bronchiectasis • O/E : White mass + wax in deep meatus; Ulceration/granulation; EAC widening → Facial palsy.		Removal by instrumentation under anaesthesia
Furuncle 	• Etiology : m/c : Bacterial (Pseudomonas) > Fungal > Viral. • C/f : Pain ± Purulent discharge ± Blocked ear	• O/E : Localized swelling in cartilaginous part of EAC • m/c cause : Staphylococcus	Antibiotics : Amoxiclav
Diffuse otitis externa 		• O/E : Diffuse swelling • Itching → Abrasion • AKA Swimmer's/ tropical ear • Cause : Pseudomonas	Antibiotics : Ciprofloxacin

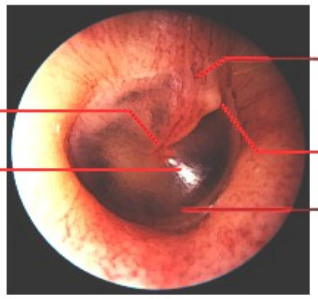
----- Active space -----

Conditions of EAC	Features	Mx
Malignant otitis externa  AKA Skull base osteomyelitis (D/t infection spread via fissure of Santorini)	• Seen in immunocompromised • M/c : Pseudomonas • C/f : Severe otalgia • O/E : Necrosis, granulations Complications : • 7th nerve palsy (m/c) • 9, 10, 11 CN : Affected late • Ix : Tc^{99} bone scan → ↑uptake	1. Antibiotics: • Oral : Ciprofloxacin • IV : Ceftazidime, cefoperazone, newer penicillins 2. Correct immunosuppression 3. Gallium-67, Indium-111, serial ESR to check resolution
Otomycosis 	• Aspergillus niger (m/c cause) > Candida ↓ ↓ • O/E : Wet newspaper appearance / Cotton ball appearance • C/f : Pain ± Discharge ± Blocked ear	Antifungal ear drops
Herpes zoster oticus 	• C/f : Pain ± Discharge ± Blocked ear • O/E : Vesicles in EAC • A/w facial nerve palsy → Called Ramsay Hunt syndrome (D/t herpes zoster reactivation in geniculate ganglion) • Other CN involved : 5th, 8th, 9th, 10th • Poor prognosis	Antivirals + steroids

Note :

Mucopurulent discharge : Disorder of middle ear.

Anatomy of Tympanic Membrane (TM) 00:38:43



Umbo

Cone of light (Anteroinferior quadrant)

Pars flaccida/Shrapnell's membrane
- Most mobile

Lateral process (Handle of malleus)

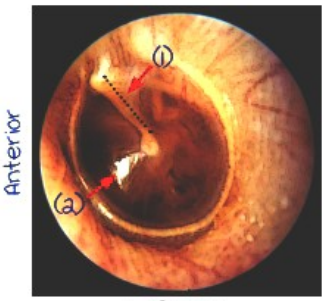
Pars tensa :
- Fixed to umbo & annulus
- Mobile part : Paramedian/periphery

Right TM

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

Characteristics :

- Colour : Pearly grey & translucent.
- Angle : 55° with horizontal.
- Effective vibratory area : 55 mm^2.
- Middle ear structures seen through tympanic membrane :
  - Incus.
  - Incudostapedial joint.
  - Shadow of round window.
  - Eustachian tube area (Anteriorly) : very rarely.



Left TM

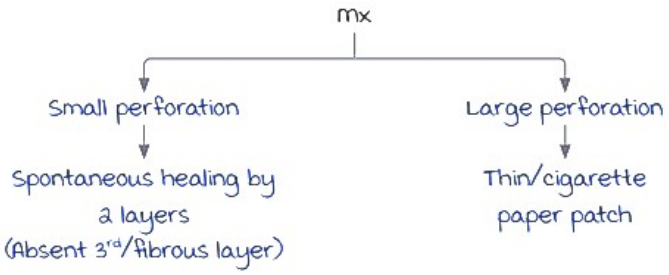
Side Identification :

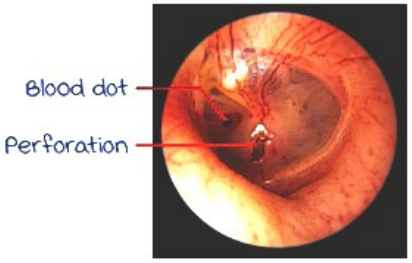
1. Upper end of malleus (if point to right, indicates right sided TM).
2. Cone of light : Antero-inferior quadrant.

TM Perforation 00:43:00

Traumatic Perforation :

C/f : Pain, ↓hearing, ear bleed.

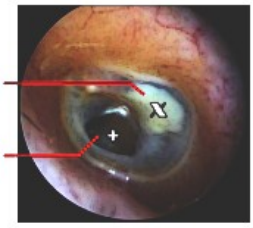




Tympanosclerosis :

- Chronic inflammation of ME (CSOM, SOM).
- TM perforation.

→ Calcification, Hyalinization


Tympanosclerosis

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

Anatomy of Middle Ear

00:44:50

Walls :

	Structures	Significance
Lateral	• Tympanic membrane : – Pars tensa – Pars flaccida • Scutum	-
Medial	Tympanic/Horizontal segment of facial nerve	m/c dehiscent segment of facial nerve
	Processus cochleariformis	• Landmark for 1st genu of facial nerve • Tensor tympani takes lateral turn to attach to upper end of malleus handle
	Oval window	Foot process of stapes present here
	Lateral semicircular canal bulge	• m/c semicircular canal eroded d/t infection/by cholesteatoma • Stimulated by caloric test
	Round window	Electrodes of cochlear implant & drug delivery
	Promontory	• Formed by basal turn of cochlea • Tympanic plexus lie over promontory : Formed by Jacobson's nerve (Branch of 9th CN) & sympathetic plexus around ICA
Posterior	Aditus	Superior most (Connecting middle ear to mastoid)
	Chorda tympani	Enters posterior wall → Exits from anterior wall
	Vertical/Mastoid segment of facial nerve	m/c site of facial nerve injury during mastoid Sx
	Fossa Incudis	Short process of incus present on fossa
	Facial recess/Supra-pyramidal recess	• Boundaries : Laterally → Chorda tympani; Medially → Vertical part of facial nerve; Superiorly → Fossa Incudis • Intact canal wall mastoid Sx & cochlear implant
	Sinus tympani/Infra-pyramidal recess	• Hidden area (B/w ponticulus superiorly & subiculum inferiorly) • m/c site for residual/recurrent cholesteatoma
	Pyramid	Stapedius arises (Attaches to neck of stapes)
Anterior/Carotid	Tensor tympani	Originates here —Attaches→ Upper end of malleus handle
	Chorda tympani	Exits through this wall → Called canal of Huguier
	Eustachian tube	Opening ⊕
	Close relation to internal carotid artery (Separated from anterior wall by thin bony plate → If ICA aneurysm/Anterior wall Sx → ↑Risk of injury)	