

Diseases of the **External Ear**

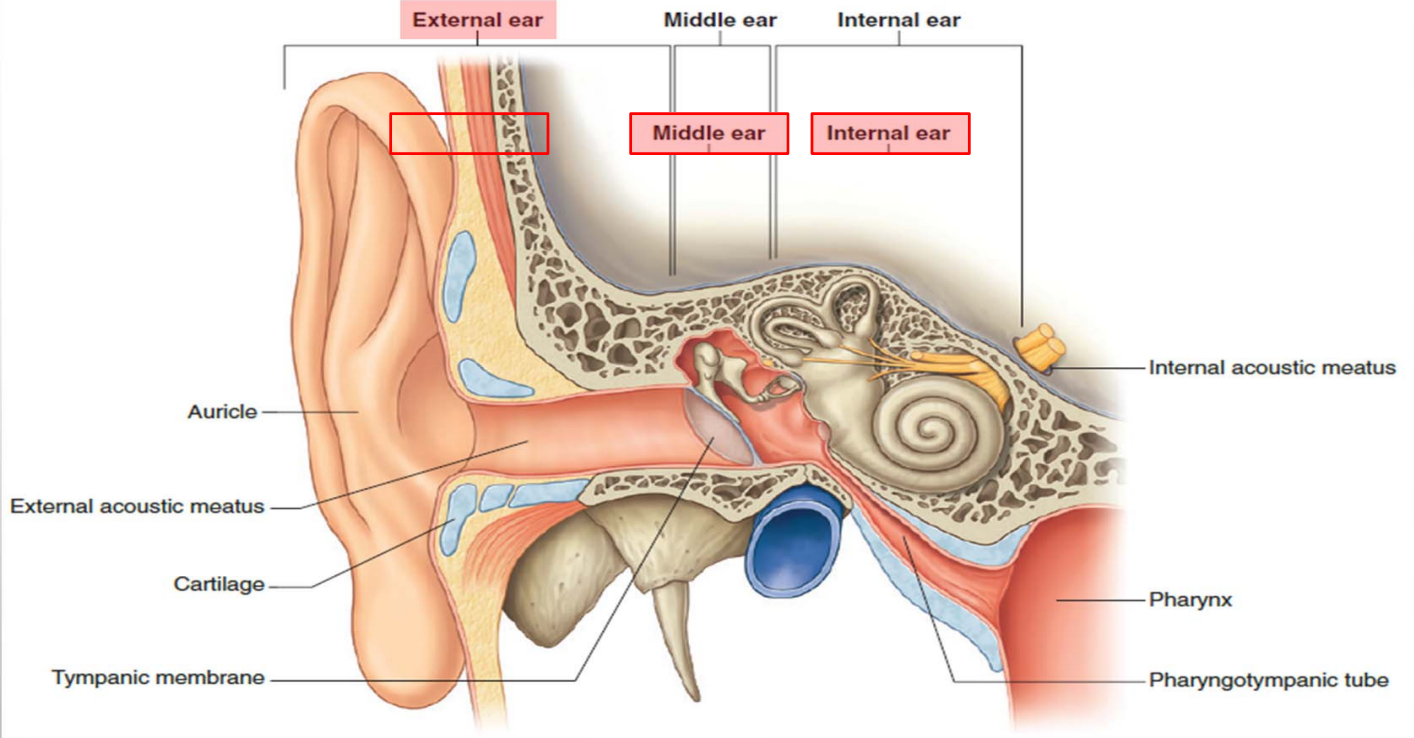
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Pinna

External Auditory Canal



Pinna lateral surface

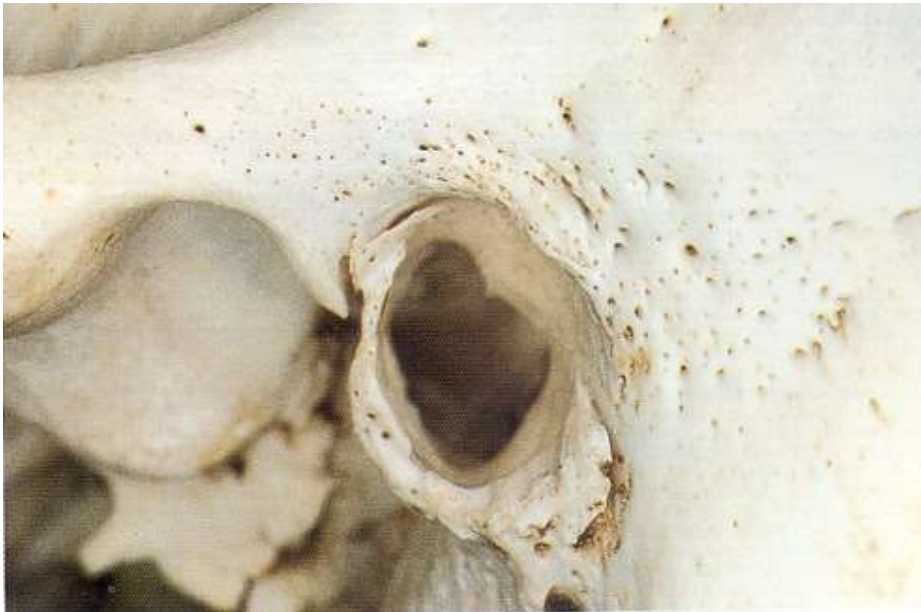


External Auditory Canal

Cartilaginous
part



Bony meatus



Bony canal

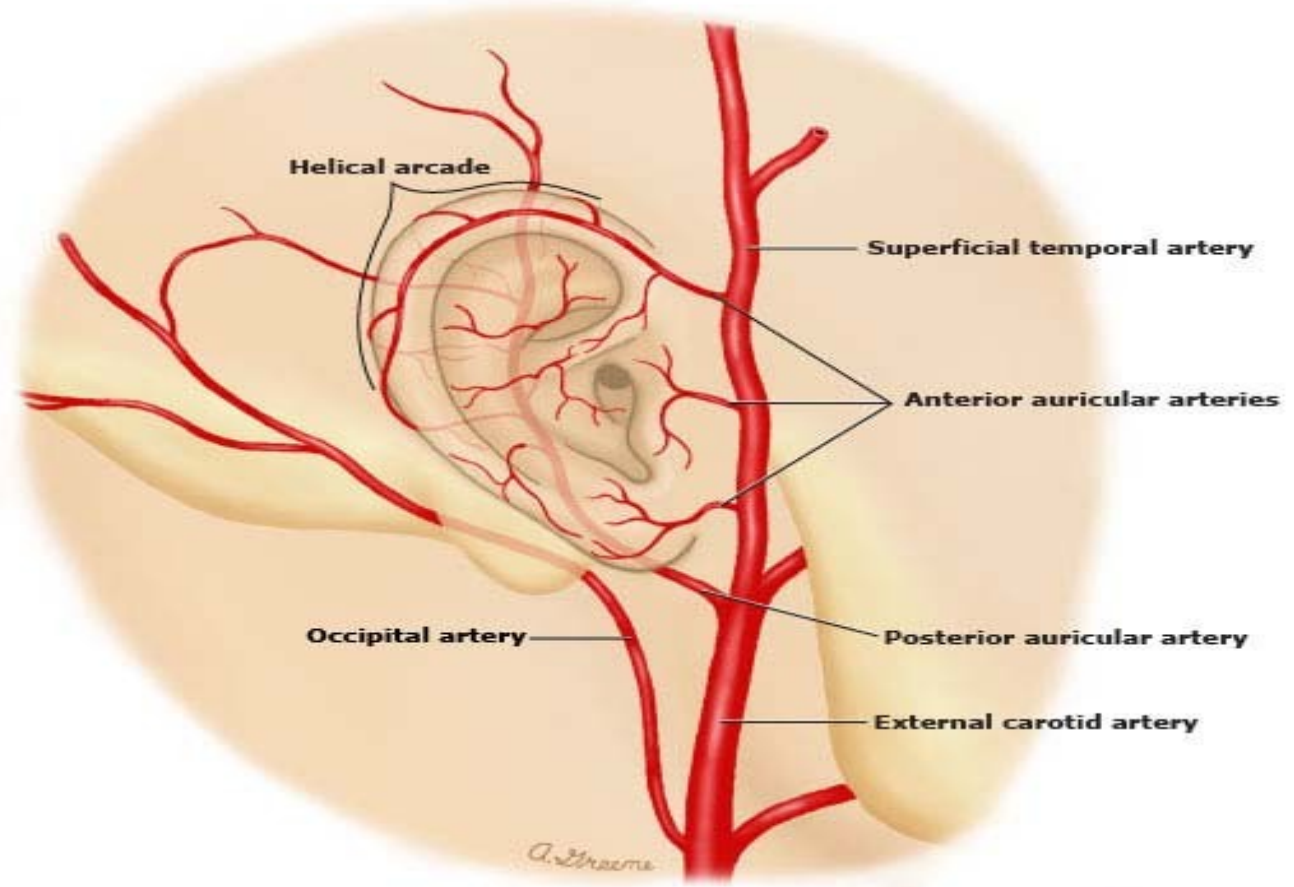


Blood supply

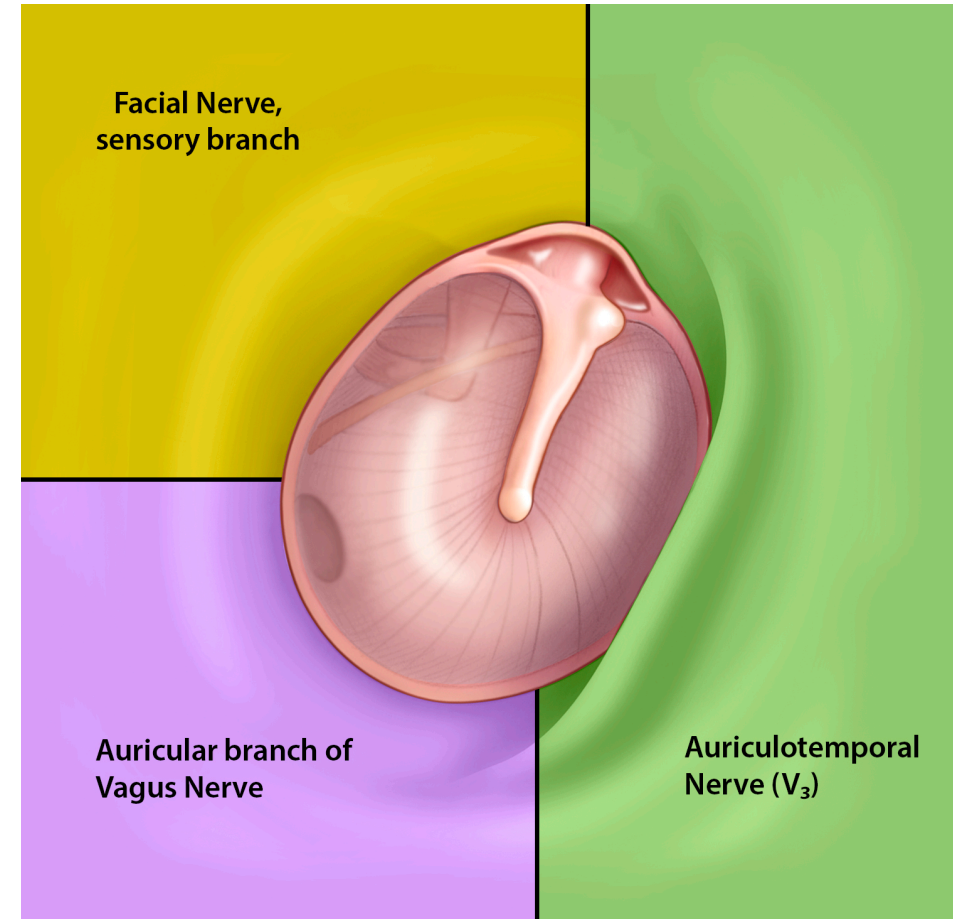
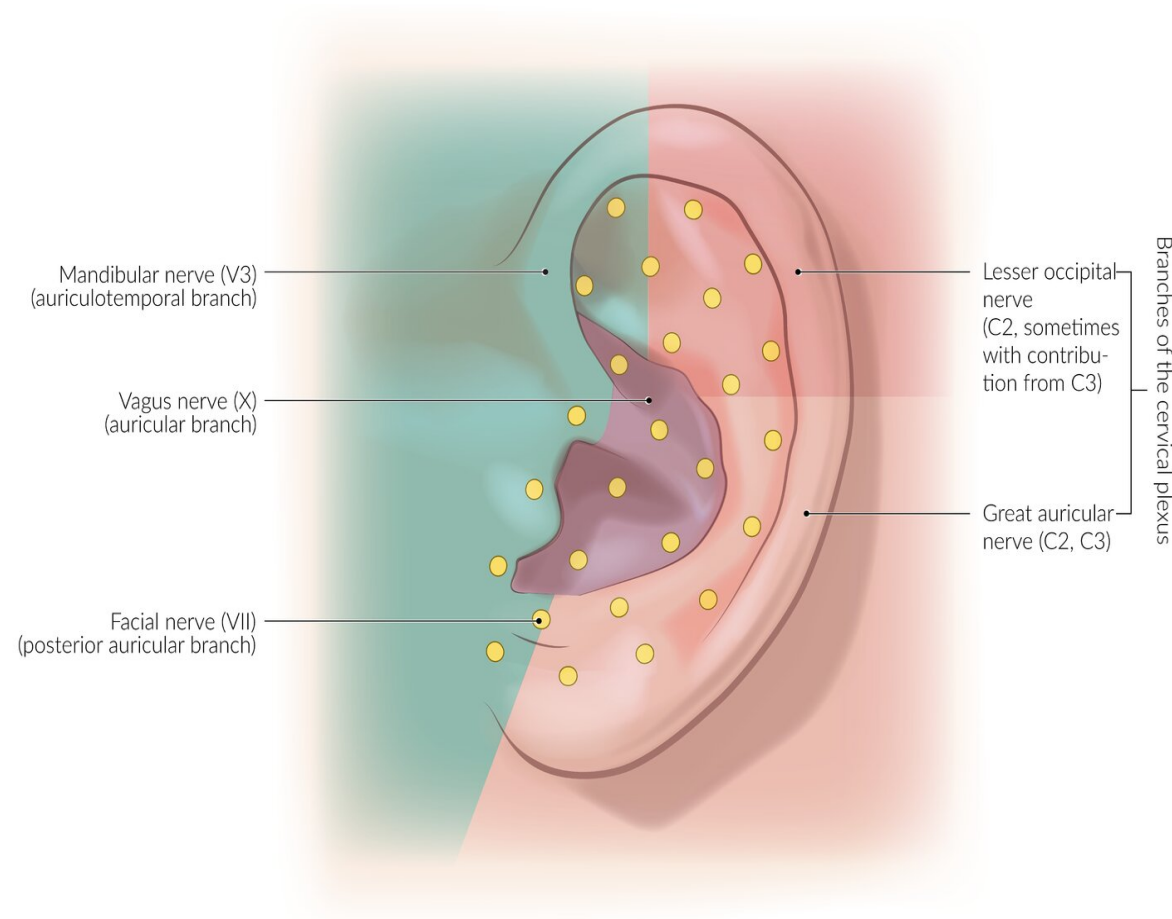
- The external ear is supplied by branches of the **external carotid artery**:
- **Posterior auricular artery**
- **Superficial temporal artery**
- **Occipital artery**
- **Maxillary artery** (deep auricular branch) – supplies the deep aspect of the external acoustic meatus and tympanic membrane only.
- **Venous drainage** is via veins following the arteries listed above.

Lymphatic drainage:

- anterior to superficial parotid nodes.
- Posterior to mastoid nodes



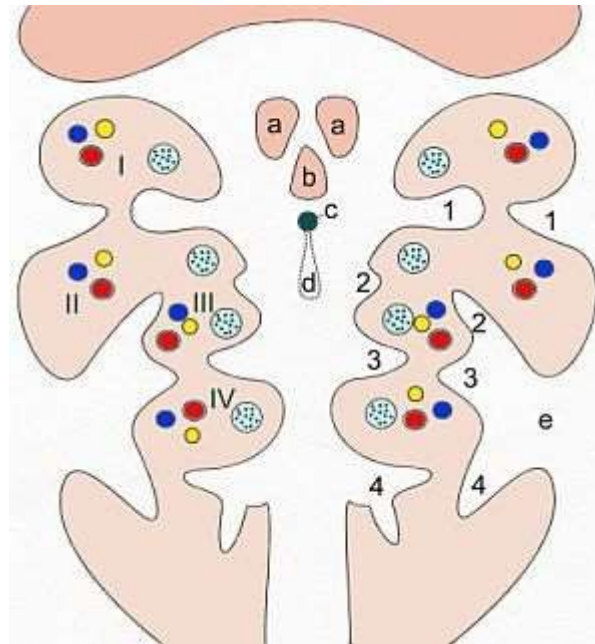
Nerve supply



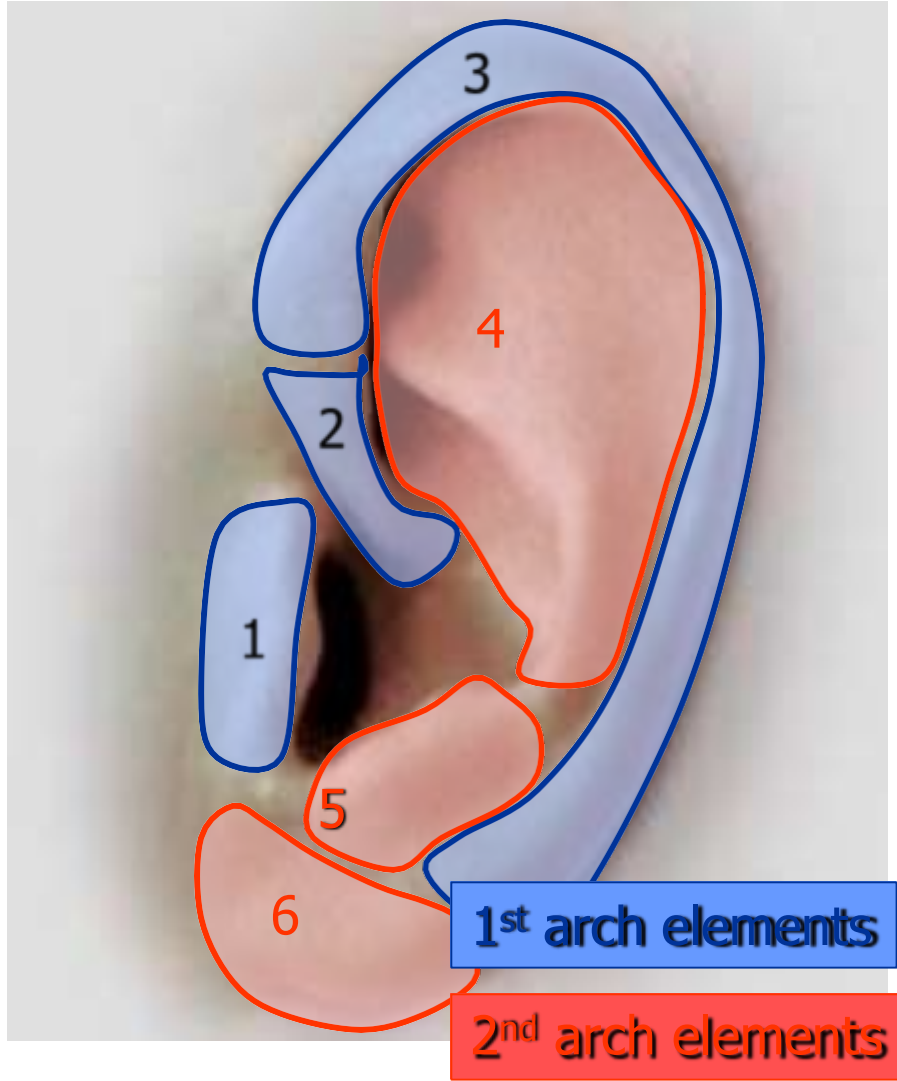
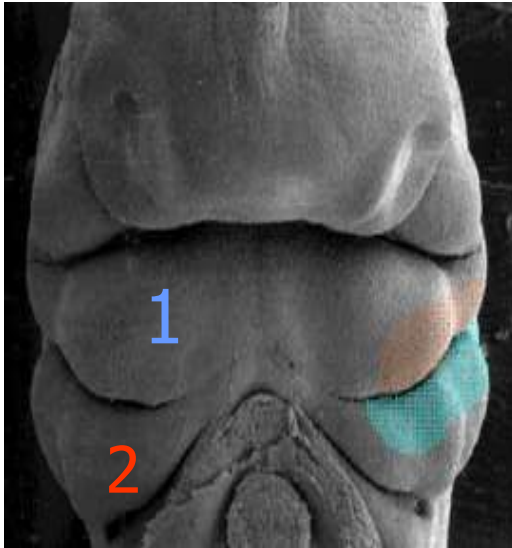
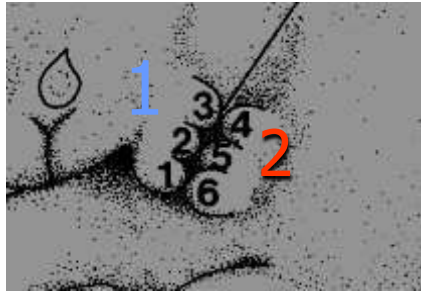
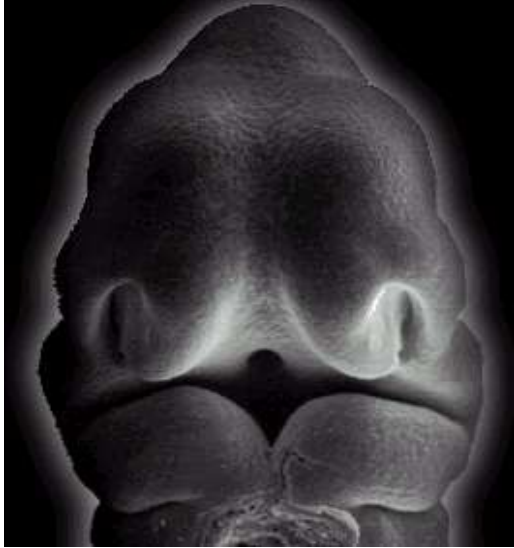
Development of the external ear

- From the mesenchymal proliferation of the first and second pharyngeal arches
- The external canal develops from dorsal portion of the first pharyngeal groove
- Six auricular hillocks (Hillocks of His), form around the external auditory meatus and eventually fuse to form the auricle
- Hillocks 1 to 3, arise from the first pharyngeal arch to form the tragus, helix, and cymba concha
- Hillocks 4 to 6, arise from the second pharyngeal arch to form the concha, antihelix, and antitragus

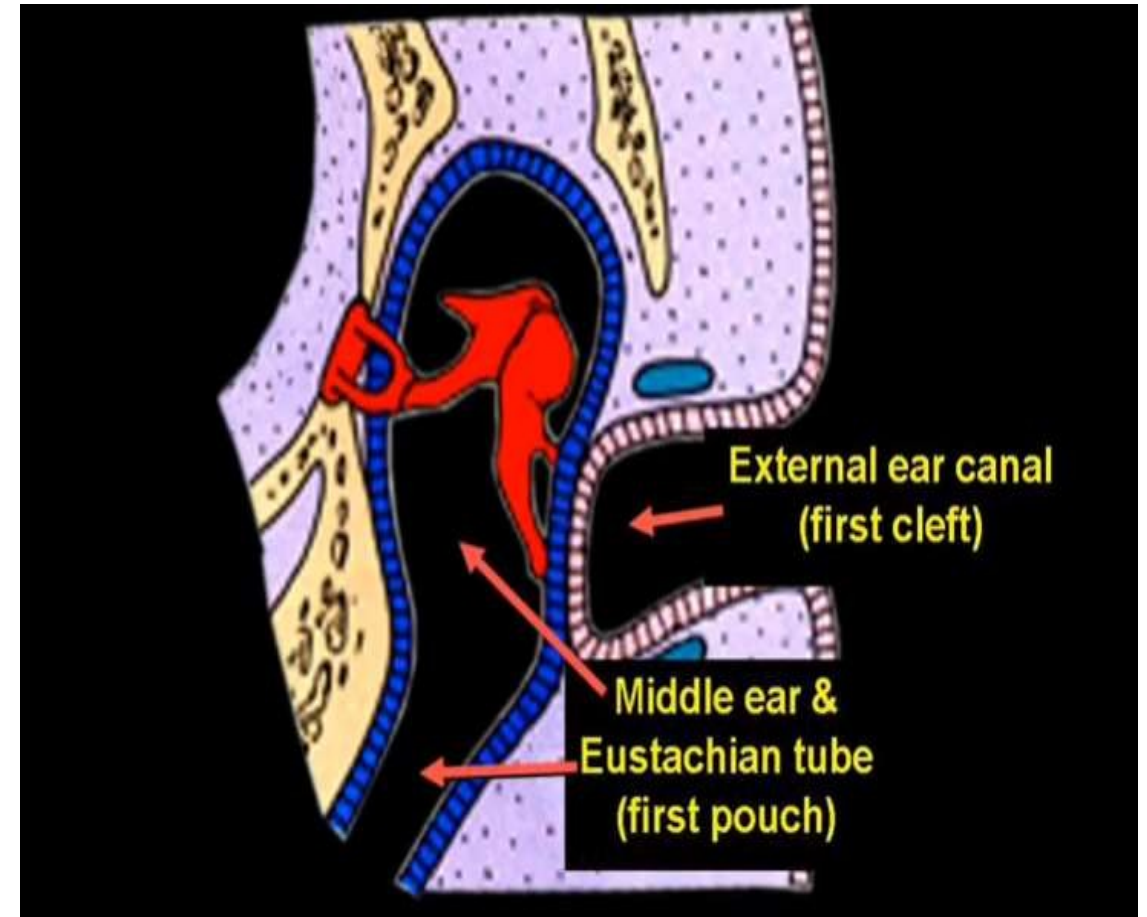
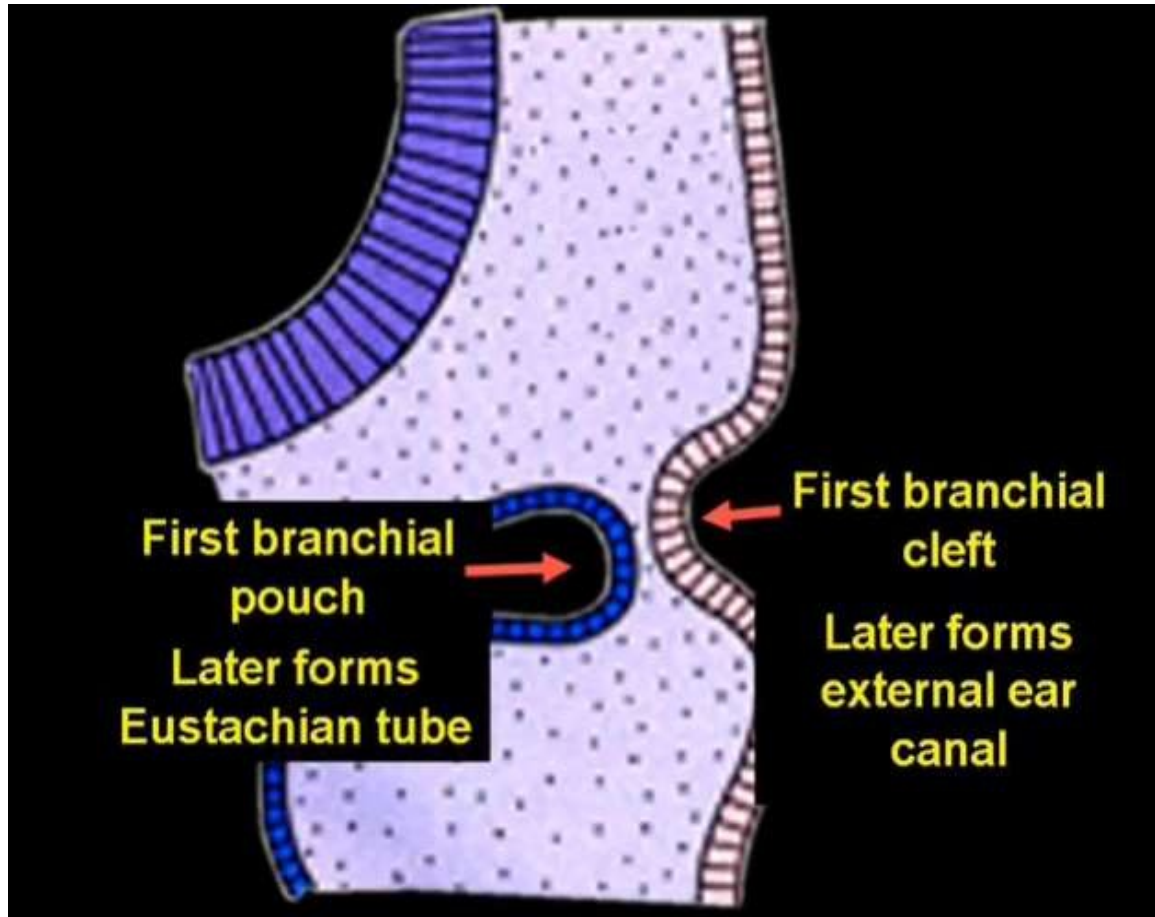
Development of the external ear



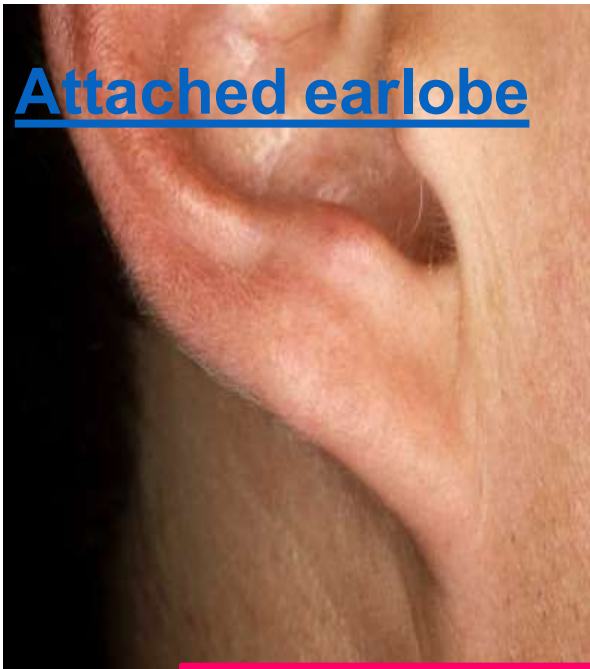
development of PINNA



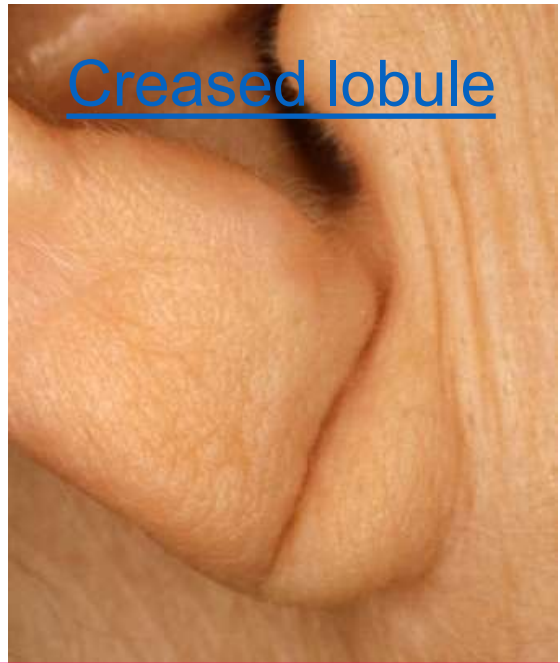
Development of EAC, ET & ME



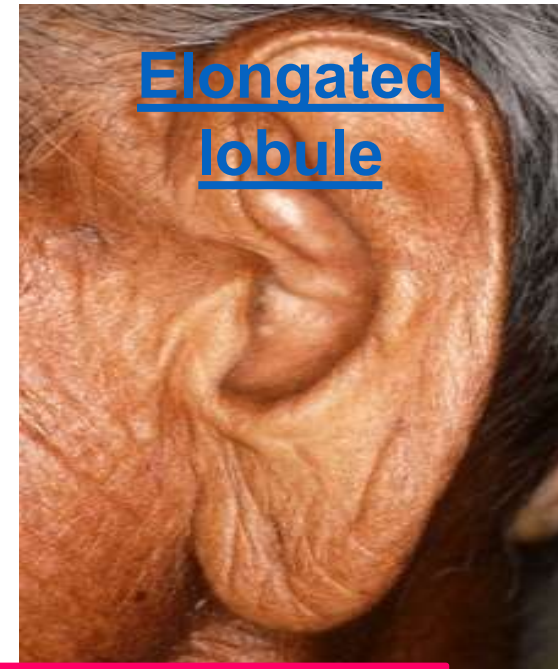
Attached earlobe



Creased lobule



Elongated lobule



MINOR ANATOMIC VARIATIONS

Darwin's tubercle



Reverse Darwin's tubercle



Diseases of the Pinna

■ Congenital disorders

- Anotia, Microtia
- Atresia of EAC
- Accessory auricle
- Auricular tags
- Bat ears
- Pre-auricular sinus/ cyst

■ Acquired disorders

- Auricular hematoma
- Perichondritis
- Cauliflower ear
- Keloids
- Herpes Zoster oticus

Congenital Aural Atresia

- A term used to refer to a spectrum of ear deformities present at birth that involve some degree of failure of the development of the external auditory canal (EAC)
- The malformation will also involve the TM, ME and ossicles.
- Associated abnormalities of the auricle are common
- The inner ear development of these patients is most often normal
- Occurs as a result of abnormal development of the first and 2nd branchial arches and the first branchial groove
- Various classifications exist

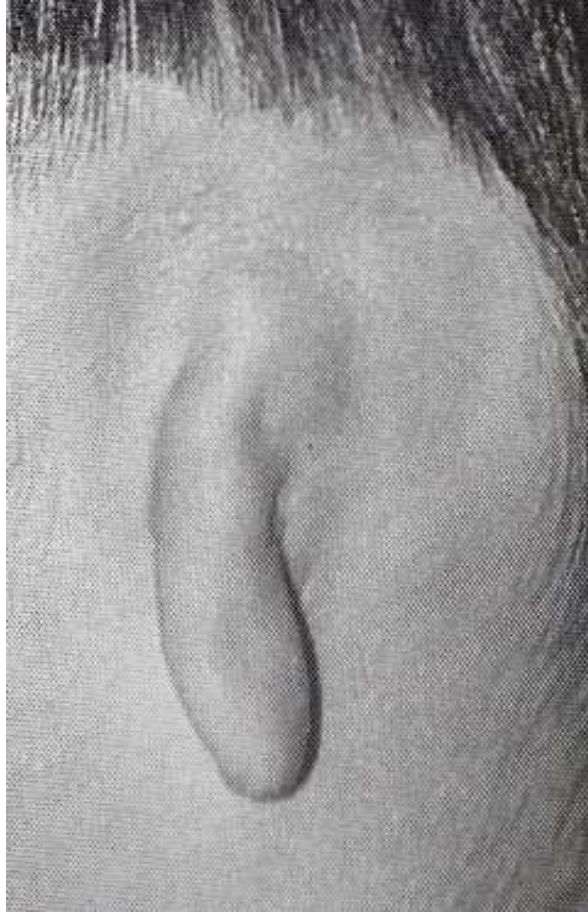
Anotia

complete absence of pinna



Microtia

small rudimentary pinna



Normal infant ear



Microtia I

- ▶ Ear is small
- ▶ Ear canal may be narrowed
- ▶ Structures and ear shape are otherwise normal

Microtia II

- ▶ Ear is small
- ▶ Some components are missing
- ▶ Shape is markedly abnormal
- ▶ Ear is still recognizable

Microtia III

- ▶ Ear consists of a vertical mass of soft tissue and cartilage
- ▶ Typically associated with atresia of the external canal

Microtia IV or Anotia

- ▶ Most extreme and rarest form
- ▶ All external ear structures are absent



Microtia I Q17.21



Microtia II Q17.22



Microtia III Q17.23



Microtia IV or Anotia Q16.0



Microtia
without canal atresia



Microtia
with canal atresia



- ❖ The exact cause is unknown
- ❖ Risk of 1 in 20 for subsequent children and children of the affected individual
- ❖ Microtia/anotia is an isolated finding in 60–80% of infants. Related findings include:
 - Hearing loss.
 - Other anomalies and syndromes, especially those involving the mandible and face which include:
 - The oculo-auriculo-vertebral spectrum (OAVS): OAVD, hemifacial microsomia and Goldenhar “syndrome”
 - Genetic syndromes, such as Treacher-Collins syndrome and trisomy 18
 - Teratogenic, such as retinoic acid embryopathy

Management of Anotia, Microtia and Aural atresia

- Complete history and Head & Neck examination
- Hearing assessment – CD vs. SNHL
- CT scan temporal bone
- Rule out associated ME/IE anomalies
- +/- Facial nerve anomalies

Treatment

- Auricular reconstruction using rib cartilage in staged surgical procedures or without surgery using prostheses
- Restore the EAC
- Hearing restoration/HA

Bat ear / lop ear / Outstanding ear



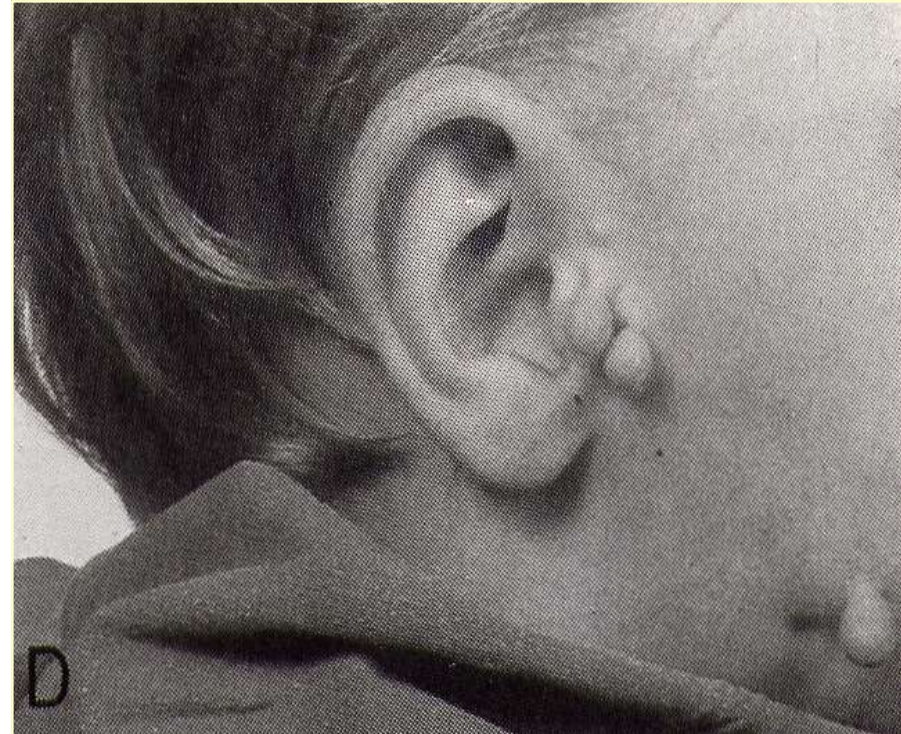
Bat ears

before and after 'OTOPLASTY'



Auricular Appendages

(Auricular tags, Accessory auricles)



Pre Auricular Sinus

- A pit or sinus tract in the pre-auricular area
- External opening between tragus and crus helix

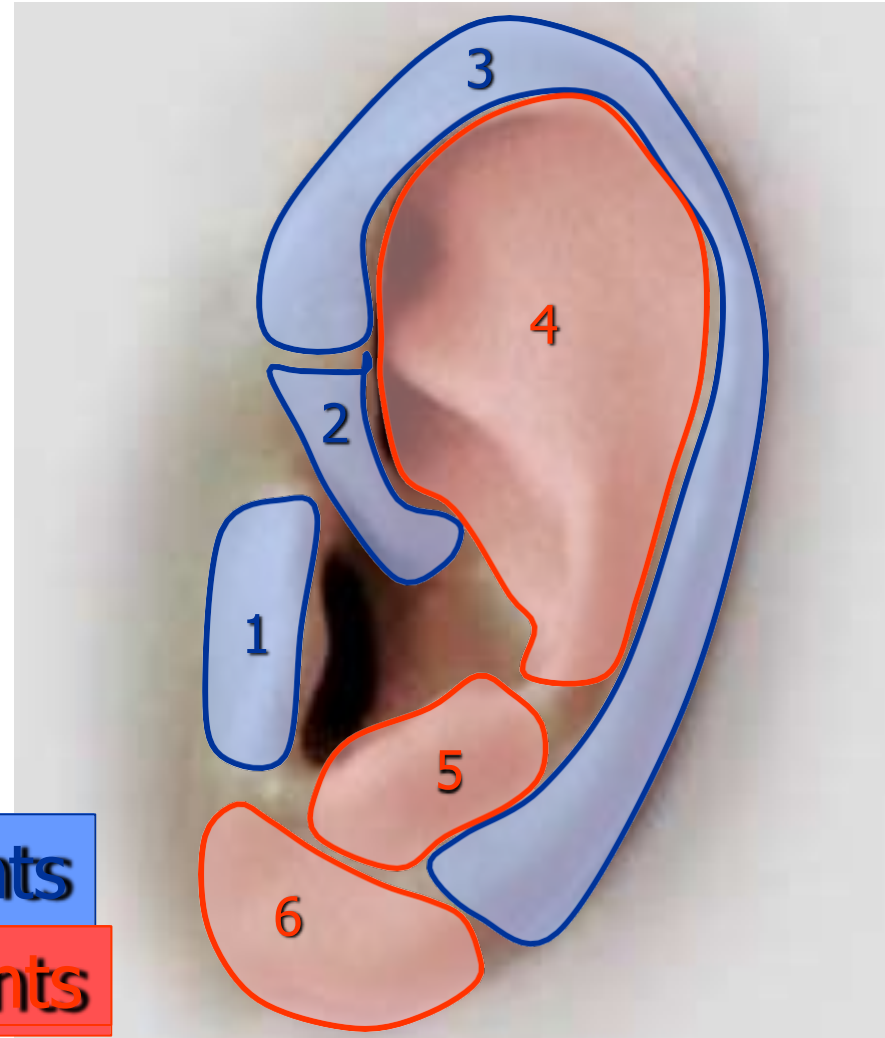


Preauricular sinus

→ Forms due to failure of complete fusion between first and second branchial arch elements.

1st arch elements

2nd arch elements



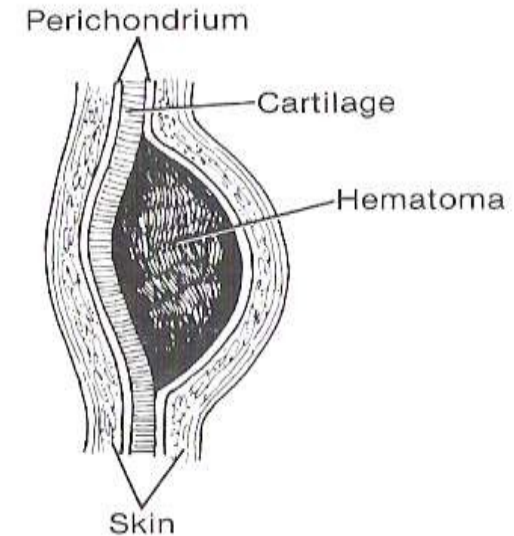
Auricular Hematoma

Hematoma Auris



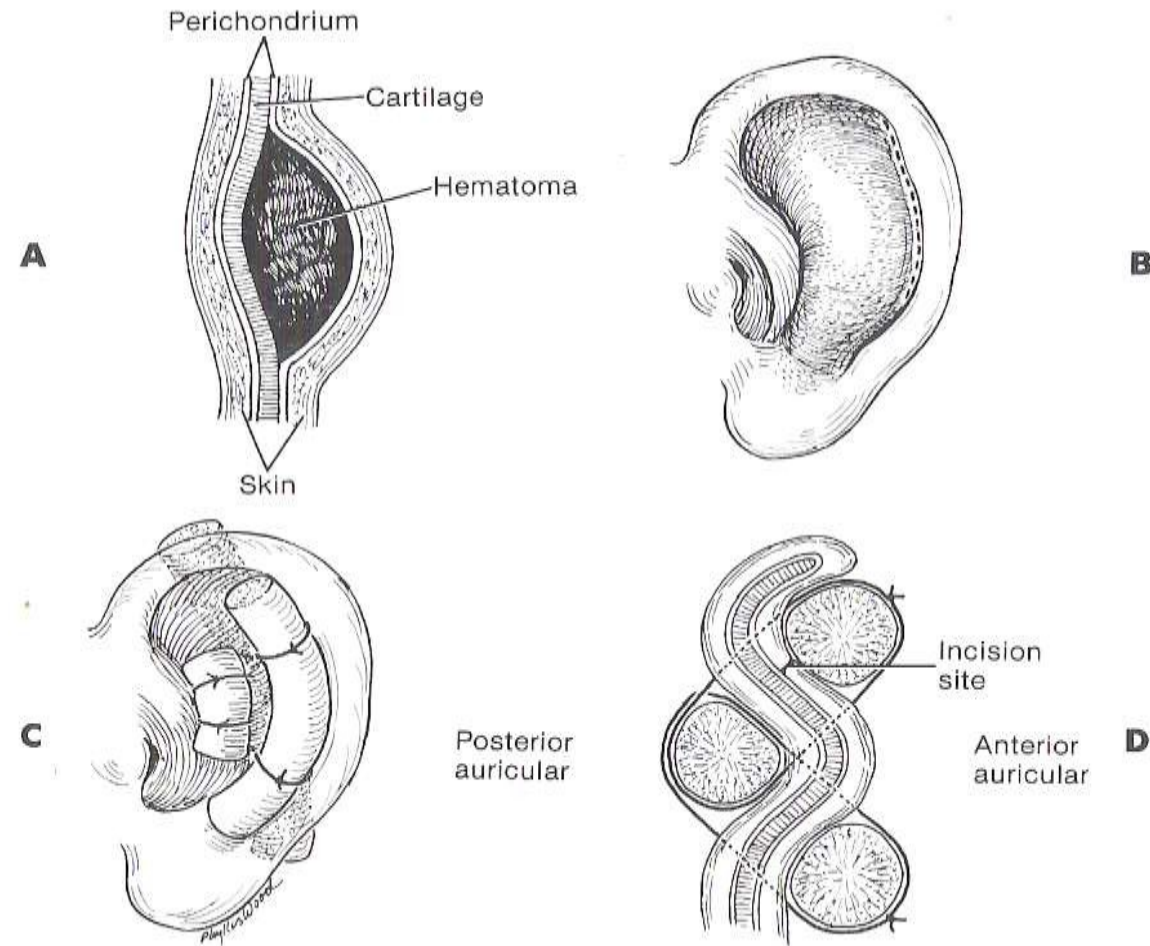
Auricular hematoma

- Collection of blood under the perichondrium
- Direct blunt trauma to the pinna
→ rupture of blood vessels
→ blood collects under perichondrium
- “Boxer’s ear”
- If not treated → thickening & fibrosis/ necrosis of cartilage : **Cauliflower ear**
- Treatment
 - If small → aspirate
 - If large → I/D with pressure dressing



Auricular hematoma

Surgical treatment



Cauliflower ear



KELOIDS

- Keloid is a special type of scar which results in overgrowth of tissue at the site of a healed skin injury.
- firm, rubbery lesions or shiny, fibrous nodules
- can vary from pink to flesh-colored or red to dark brown



- occurs more in blacks following piercing of ear
- Mostly in lobule of the pinna
- Asymptomatic except for the mass



Keloids

- Several approaches for *treatment*
 - Intralesional steroids
 - Surgical excision
 - Surgical excision followed by serial steroid injections
 - Radiation therapy

Exostosis

- localized, benign, bony hypertrophy which develop in the deep external auditory canal.
- Usually bilateral and multiple (can be single)
- Appears as shiny white sessile growths, stony hard and may be differentiated from cysts by palpation.
- Frequently seen in swimmers and occur more commonly in adult males with hx of cold water exposure.
- Usually asymptomatic unless they occlude the canal.
- Treatment is surgical removal



Osteomas

- Osteomas of the ear canal are benign tumors which differ from exostoses both clinically and histologically.
- relatively rare and usually unilateral and solitary and pedunculated
- It may arise from any portion of the bony external canal, although osteomas are usually attached to the tympanosquamous suture line and located close to the isthmus.
- Symptomatic if they trap cerumen or block the ear canal



Malignant tumors: Squamous cell carcinoma



Squamous cell carcinoma

- Indurated ulcer with everted margins
- Biopsy under L.A
- Regional L.N involvement
- **Small lesions** - Local Excision
- **Large lesions** – Excision with external beam radiation
- **Advanced Cases** – Radical resection of ear including Parotidectomy , neck dissection & mastoidectomy.

Basal cell carcinoma

- Results from proliferation of basal epithelium
- Seen in tragus , border of helix , meatal entrance
- Later cases – whole auricle is involved , with underlying bone and parotid gland involvement.
- Slightly raised lesion with rolled edge with penetrating ulcer – bleeds readily
- **Treatment** – Wide Excision
- **Advanced Stages** – Wide Excision & radiotherapy

Basal cell carcinoma



MALIGNANT MELANOMA

- Nodular pigmented lesion which tends to enlarge rapidly and eventually ulcerate
- Regional L.N Involvement & Distant metastasis
- **Local Disease** – Excision & Skin Graft
- **Large Tumours** – Wedge (or) Wide Excision
 - Radical excision involves complete excision of pinna & dissection of regional L.N

MALIGNANT MELANOMA



Infections of the External Ear

- Perichondritis
- Herpes zoster oticus
- Otitis Externa
 - Acute Localized otitis externa (Furuncle)
 - Acute diffuse otitis externa
 - Chronic otitis externa
 - Otomycosis
 - Malignant otitis externa

Perichondritis

Infection of the auricular cartilage

■ Causes:

- Trauma, piercing, following hematoma auris, surgery, frostbite, extension of otitis externa

■ Pathology:

- Infection leads to abscess formation b/w cartilage and perichondrium → cartilage loses its nutrition and oxygen supply → necrosis of cartilage

Acute Perichondritis



Chronic Perichondritis



Perichondritis

- Clinical features;
 - Irritation, swelling, pain over auricle & deep in canal
 - Tender auricle, induration, redness, fluctuation
 - Crusting and weeping in advanced cases
- Treatment;
 - Antibiotics: topical and systemic (oral or IV)
 - Debridement: remove necrotic cartilage pieces with skin coverage
 - Incision & drainage, if abscess forms
 - Pressure dressing

Herpes Zoster Oticus

- Infection with varicella zoster virus
- Presents with severe and persistent pain in ear
- **Early** - burning pain in one ear, headache, malaise and fever
- **Late** - (3 to 7 days): vesicles on pinna, EAC, TM,
- **Later** - involvement of VII & VIII cranial nerves

Ramsay hunt syndrome

vesicles with deafness, vertigo & VII paralysis

Herpes Zoster Oticus



Herpes Zoster Oticus

Treatment;

- Corneal protection
- Anti-virals: Acyclovir
- Oral steroid (10 to 14 days)

Otitis Externa

Otitis Externa

- Infection of the skin of the EAC: partly or whole skin
- Classification
 - Can be based on time course:
 - Acute otitis externa
 - Chronic otitis externa
 - Can be based on disease extent

Classification of the **OTITIS EXTERNA**

1. Localized
 - Furunculosis
2. Diffuse otitis externa
 - Idiopathic
 - Traumatic
 - Irritant
 - Allergic
 - Bacterial
 - Climate/ environment
3. Part of generalized skin condition
 - Seborrhoeic dermatitis
 - Allergic dermatitis
 - Atopic dermatitis
 - Psoriasis
4. Invasive
(malignant otitis externa/NEO)

Epidemiology

occurs in all age groups.

10 percent of people develop OE during their lifetime

more likely to occur in the summer. Due to increased ambient humidity and participation in outdoor water activities.

- 7 percent ages 0 to 4 years
- 19 percent ages 5 to 9 years
- 16 percent ages 10 to 14 years
- 9 percent ages 15 to 19 years
- 5 percent ages ≥ 20 years

Acute Localized otitis externa OR Furunculosis (Boil)

- Acute localized infection of the hair follicles
- Pathogen: *Staphylococcus aureus*
- Lateral 1/3 of EAC, typically postero-superior wall
- Obstructed apopilosebaceous unit

Furunculosis

Symptoms

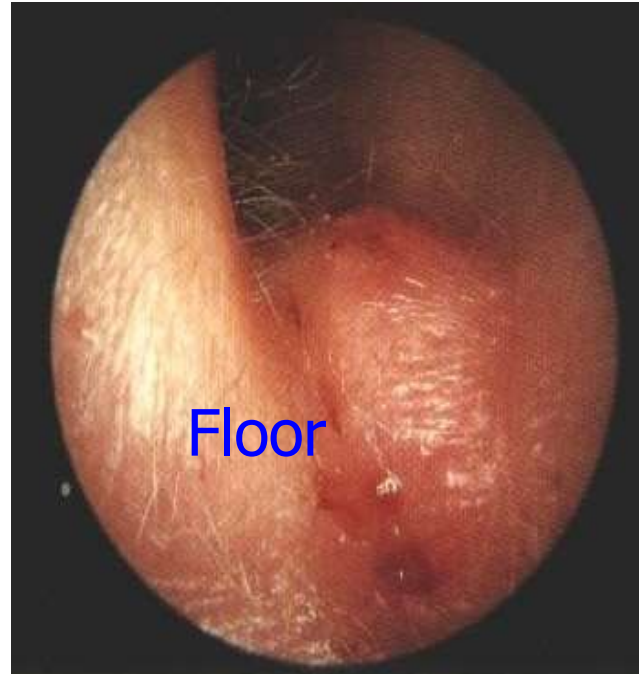
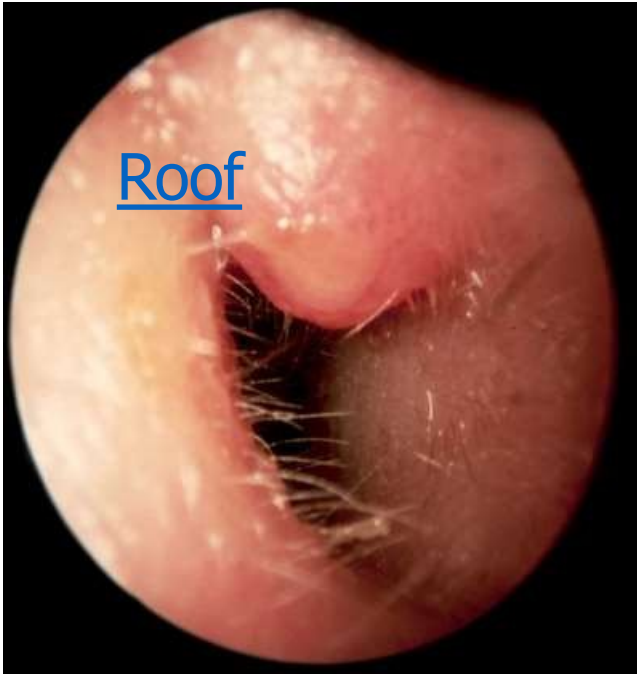
- Itching/ irritation,
- Localized pain, intense, mouth opening may aggravates,
- Bleeding: if ruptures
- Hearing loss (if lesion occludes canal)
- Fever, malaise, headache



Otoscopy findings

- Raised nodule, red area
- Tenderness
- Occasional fluctuance
- Localized edema
- Deeper canal is normal

Furunculosis



Large boil, about to burst

Furunculosis

Treatment:

- Local heat
- Analgesics
- Oral anti-staphylococcal antibiotics
- **Icthammol in glycerin** wick
- Incision and drainage → pointing localized abscess
- IV antibiotics for soft tissue extension

Acute Diffuse Otitis Externa (AOE)

- "swimmer's ear"
 - Mild/ Moderate/ Severe
- Predisposing factors
 - Swimmers,
 - Pts with tendency to retain water in EAC (due to stenosis, exostosis, retained debris),
 - Living in humid climate,
 - Self inflicted trauma – very common.

Acute Diffuse Otitis Externa

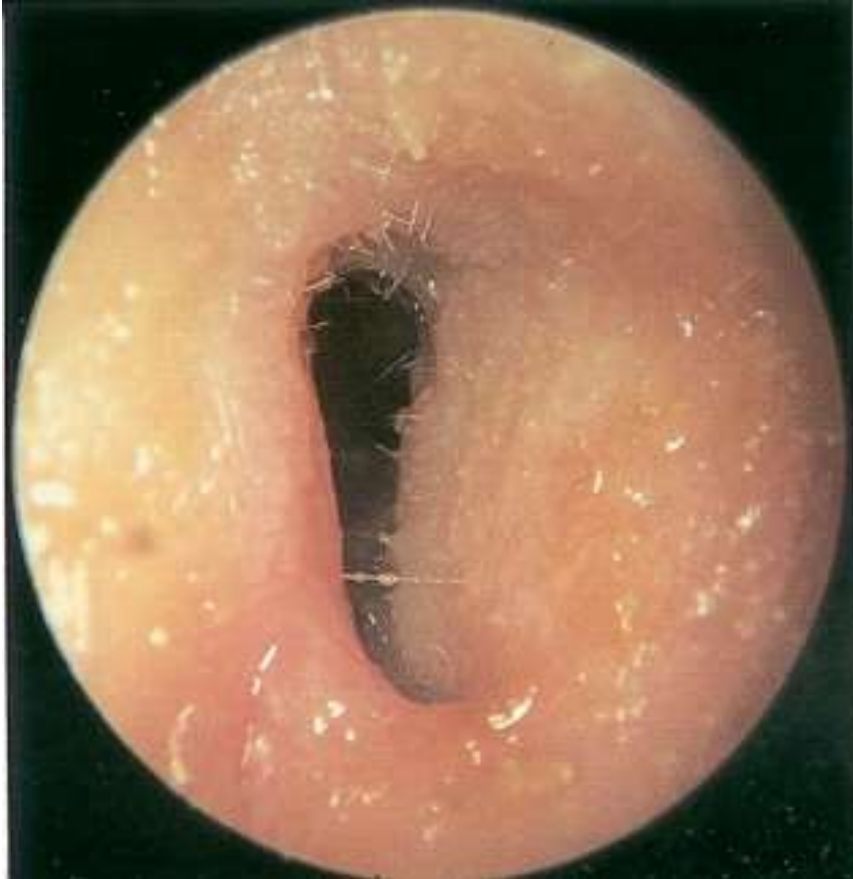
■ Symptoms:

- Initial itching & discomfort
- Pain and tenderness at later stage: worse with ear movement
- Sense of fullness and hearing loss

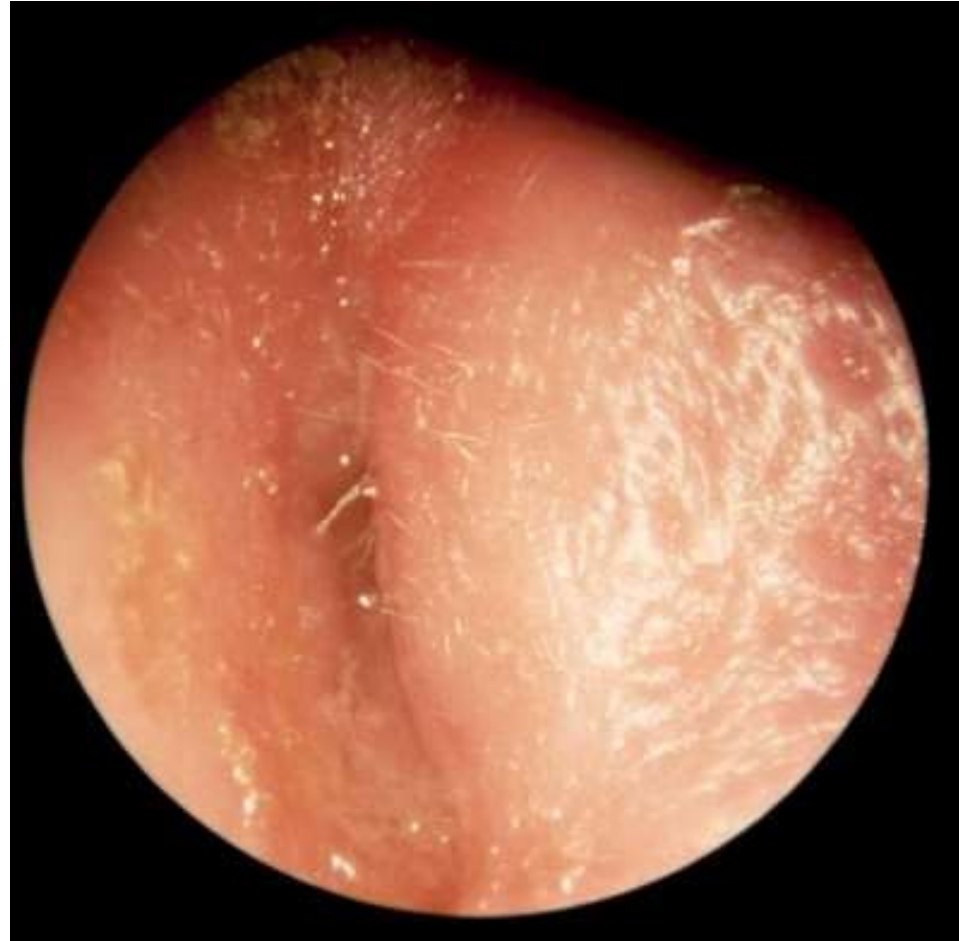
■ Signs:

- Tenderness on moving pinna or pressing tragus
- **Otoscopy:** Initially red and dull skin of EAC → mild edema, debris & discharge → Luminal obliteration, purulent otorrhea.
+/- Involvement of periauricular soft tissue

Acute Diffuse Otitis Externa



Severe Acute Diffuse Otitis Externa



Acute Diffuse Otitis Externa

- Most common pathogens:
P. aeruginosa & S. aureus
- Four principles of treatment:
 - Frequent canal cleaning
 - Steroid-antibiotic ointment wick
 - Pain control
 - **Antibiotics:** oral & topical
 - Instructions for prevention



Chronic Otitis Externa (COE)

- Chronic inflammatory process, persistent symptoms for > 2 months
- Diffuse low grade infection of mixed etiology
- Bacterial, fungal, dermatological etiologies

Symptoms

- Unrelenting pruritus/ itching
- Mild discomfort
- Excessive dryness of canal skin

Chronic Otitis Externa

Signs

- Typically dry, flaky skin
- Somewhat atrophic
- Longstanding infection may lead to thickening of skin & narrowing of the lumen

Treatment

- ***Difficult to treat***
- Similar to that of AOE
- Frequent cleanings
- Long-term topical steroids/ antibiotic cream use
- Last resort is surgery (removal of skin with grafting)



Otomycosis

- Superficial fungal infection of the deeper EAC skin & TM
- Common in tropical and subtropical climates
 - Most common organisms:
 - *Aspergillus* (flavus/ niger/ fumigatus): yellow/ black, brown/ gray spores
 - *Candida albicans*
- Etiology
 - Swimming in dirty water, chronic ear discharge, use of ear drops, fungal infections elsewhere ,DM/ immuno-suppression.

Otomycosis

• Symptoms

- Pruritus deep within the ear, itching/ irritation
- Dull pain, severe pain if EAC wall is excoriated
- Often indistinguishable from bacterial OE
- Hearing loss (obstructive)

• Signs

- Blotting paper/ wet newspaper like material
- White, gray or black fungal debris
- Whitish cheesy material
- Excoriation of the underlying skin, red, edematous

Otomycosis



Aspergillus Otitis Externa



Candida albicans



Otomycosis Treatment

- Thorough cleaning of canal by dry mopping or gentle suction
- Topical antifungals
 - Clotrimazol
 - Gentian Violet
 - Sprit in Salicylic acid drops
- Analgesics & Antibiotics for mixed infection
- Avoid water
- Treat underlying cause

Malignant Otitis Externa or Necrotizing External Otitis (NEO)

- (NEO) is a potentially lethal infection that affects the external auditory canal and temporal bone
- infection begins as an external otitis that progresses into osteomyelitis of temporal bone
- Spread of the disease outside the external auditory canal occurs through the fissures of Santorini and the osseocartilaginous junction
- Typically seen in elderly diabetics and immunocompromised patients
- *Pseudomonas aeruginosa* is the usual culprit

NEO

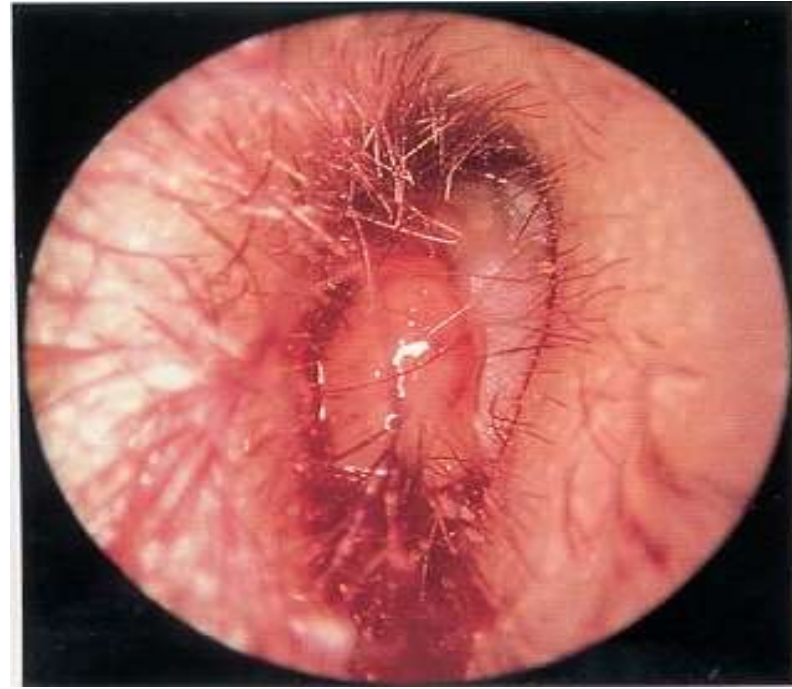
Symptoms

- Deep-seated aural pain, severe, throbbing
- Chronic otorrhea
- Aural fullness



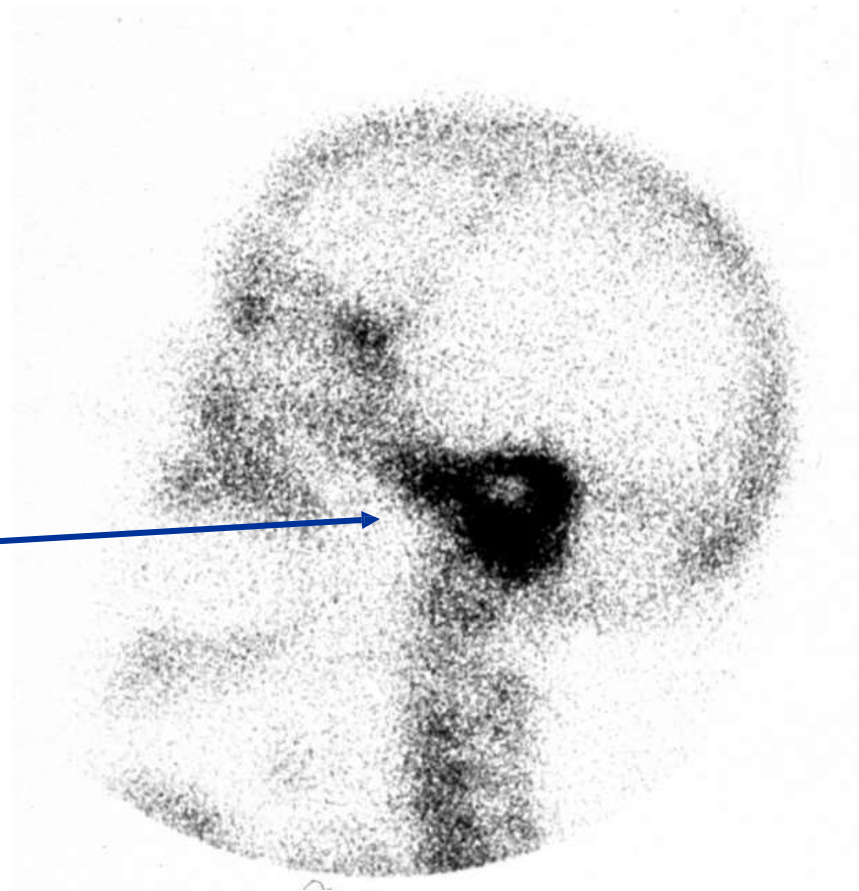
NEO Signs

- Inflammation and granulation
- Purulent secretions
- Occluded canal and obscured TM
- Cranial nerve involvement



NEO Imaging

- CT scan: most used
- Technetium-99 scan: reveals osteomyelitis
- Gallium scan – useful for evaluating Rx
- MRI



NEO

Treatment

- Meticulous glucose control
- Intravenous antipseudomonal antibiotics for (4-17) weeks – with serial gallium scans monthly
 - 3rd generation cephalosporins
 - Anti-pseudomonal penicillins
 - Quinolones
- Hyperbaric oxygenation
- Pain control
- Local canal debridement, removal of bony sequestra

Thank You
for your
attention