INFECTION OF EXTERNAL EAR

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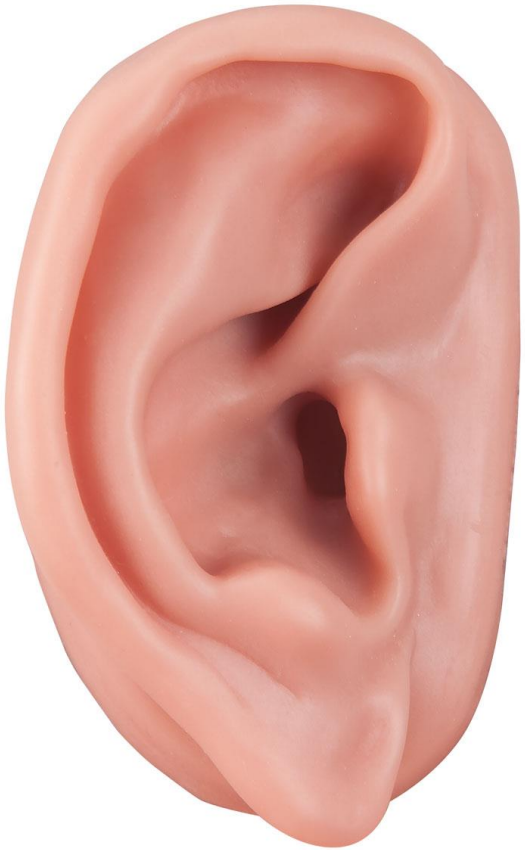
R1

HUSE 2017

ANATOMY



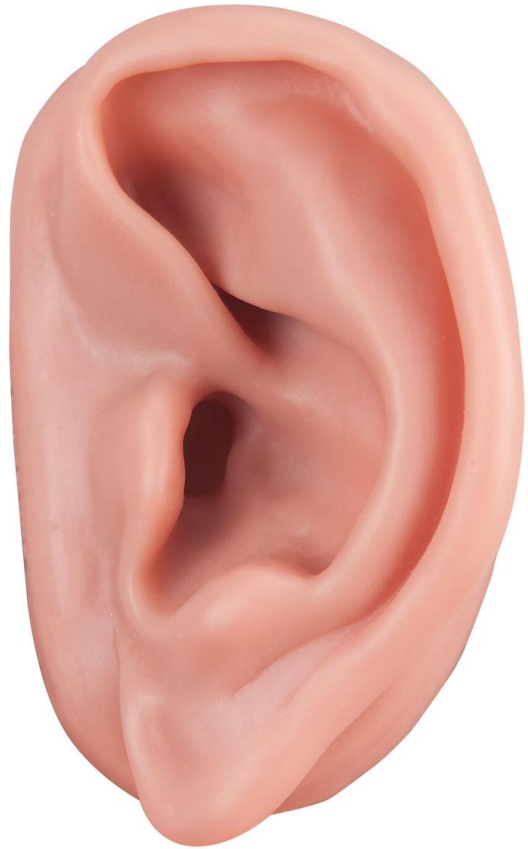
AURICLE

+

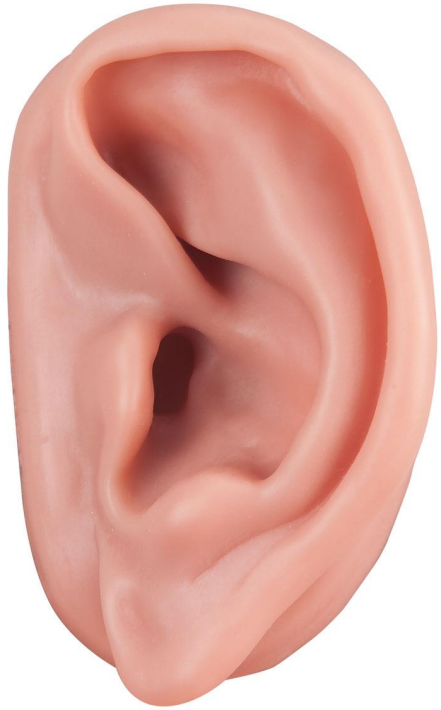
EXTERNAL AUDITORY CANAL (EAC)

+

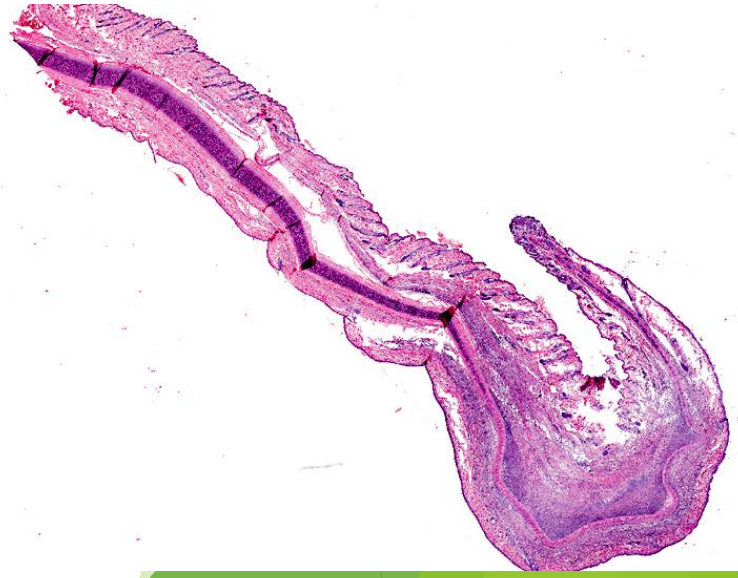
EPITELIAL SURFACE TYMPANIC MB



Auricle

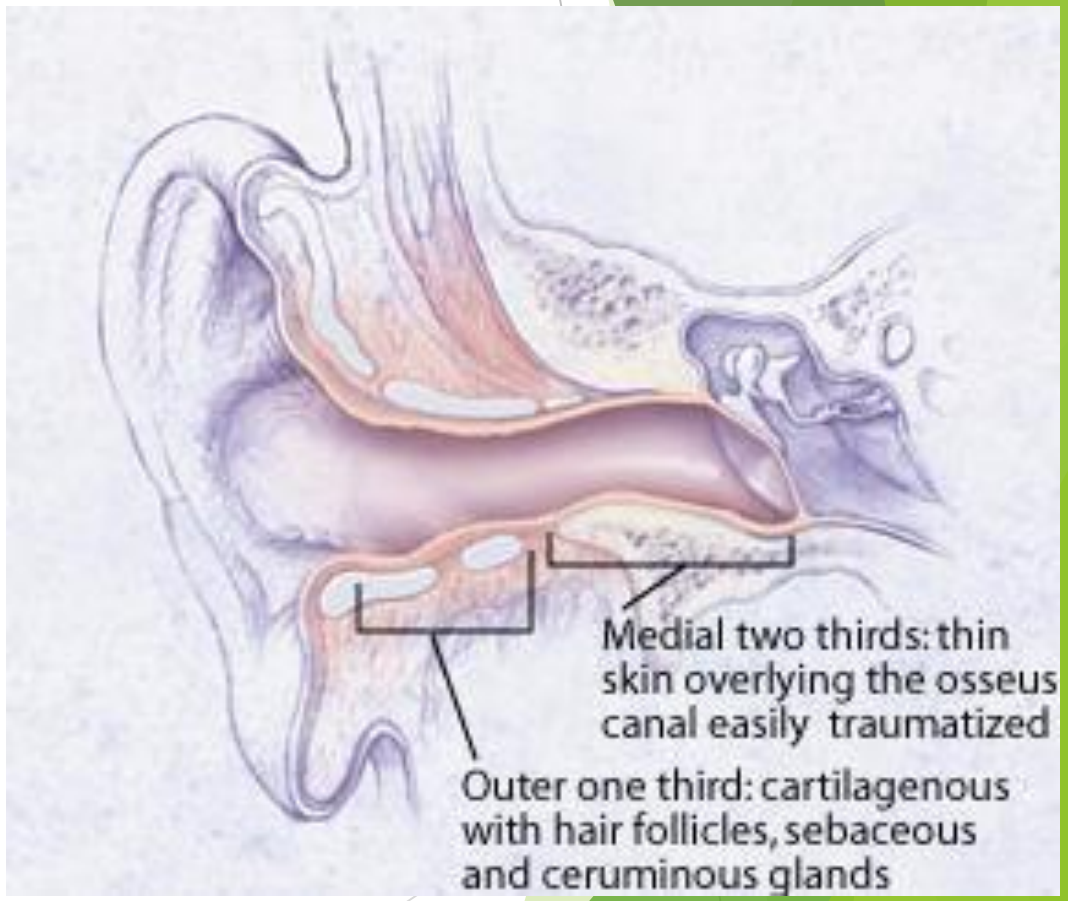


- Fibroelastic cartilage (except lobule) + perichondrium + keratinizing squamous epithelium
- Formed by ridges or grooves
- Elasticity
- Laterally, the skin is firmly attached to the cartilage
  - Painful when separated
  - Interference with perichondrium perfusion
- Medially, there is more subcutaneous tissue
- **Lobule**: NO cartilage + fatty tissue + fibrous tissue



EAC

- 2,5 cm length
- “S” shape
- Cartilaginous portion + Bony portion
- **Isthmus**:
  - Between both portions
  - Narrowest part of EAC



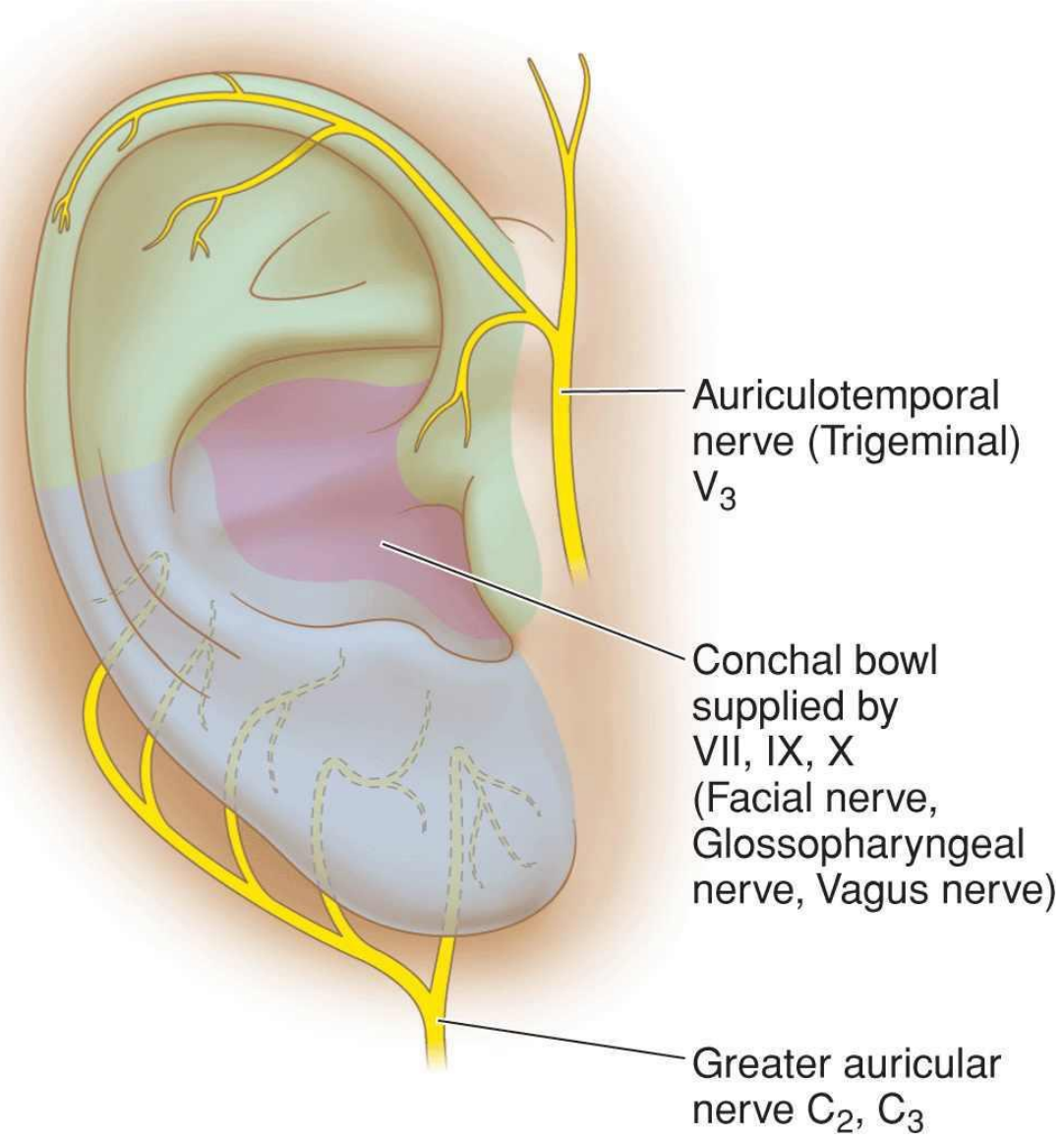
EAC – Cartilaginous portion

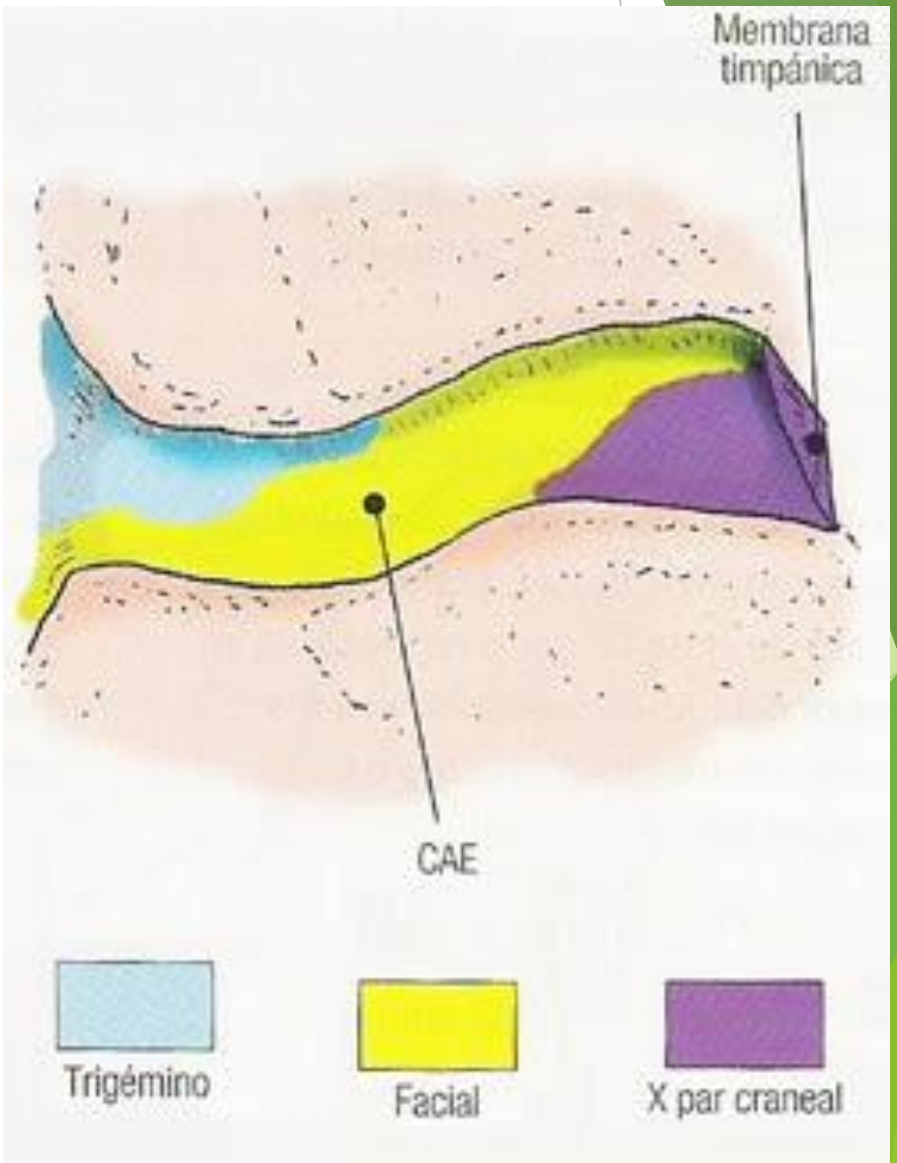
- 1/3 lateral
- Hair follicles + sebaceous/apocrine glands
  - Predisposed to have more infections
  - Cerumen
- >>> thicker
- True subcutaneous layer
- Fissure of Santorini → infection spreads

EAC – Bony portion

- 2/3 medial
- Skin >>> thinner
- Epithelium closely adhered to periosteum
  - Easily traumatized!!!
- **NO** glands/hair follicles **or** subcutaneous layer
- Continuous with the epithelial layer of **tympanic membrane**

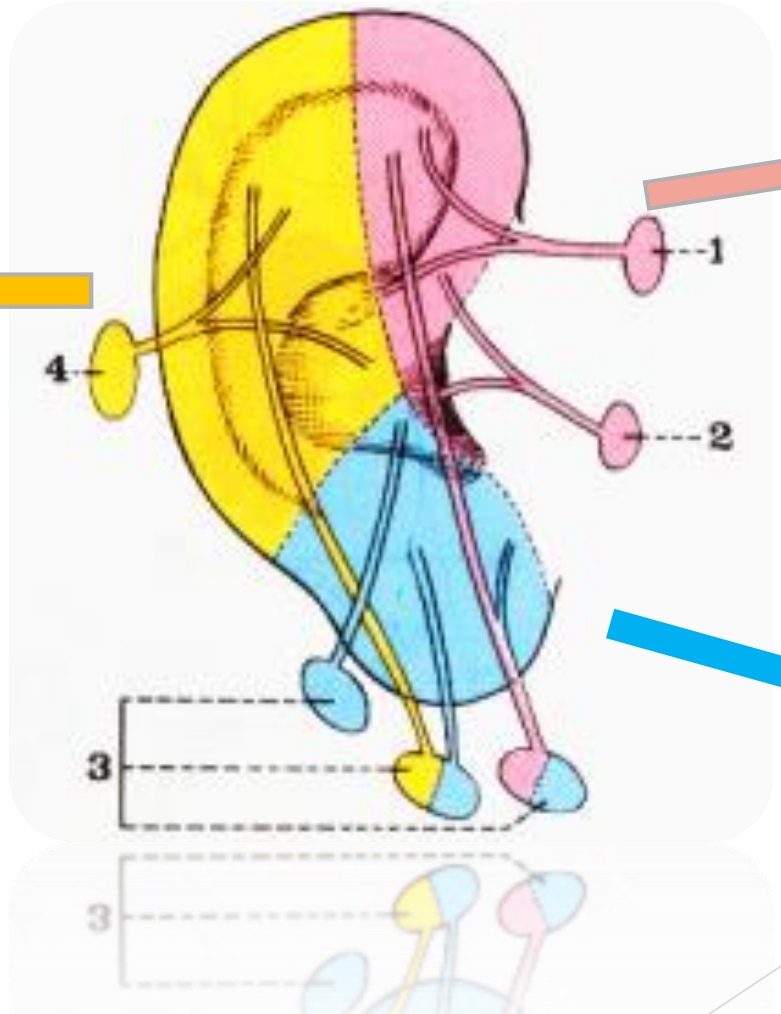
INNERVATION





LYMPHATIC DRAINAGE

POSTAURICULAR LYMPHATICS
+
SUPERIOR DEEP CERVICAL NODES



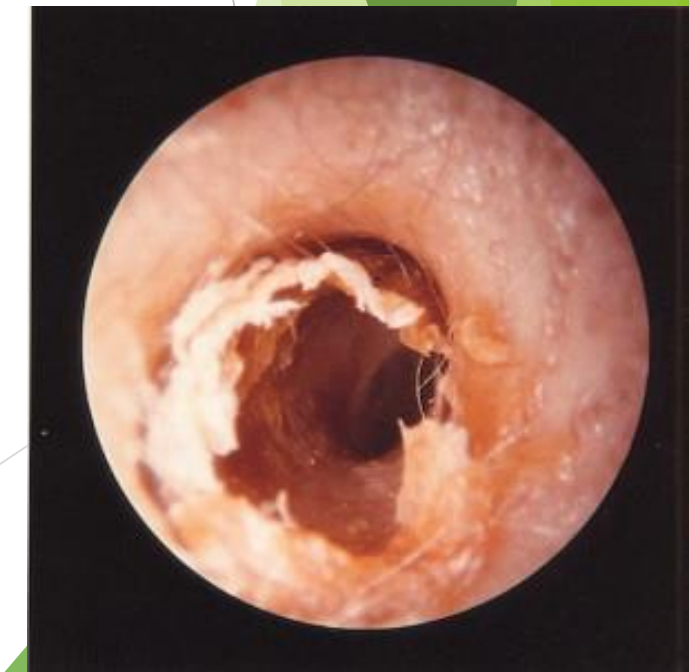
PREAURICULAR LYMPHATICS

INFRAAURICULAR LYMPHATICS

DEFENSE MECHANISM

- EAC anatomy:
  - “S” shaped
  - Tragus and antitragus
  - Isthmus
- Cerumen
  - Hydrophobic + acid
  - Glandular secretions + epithelium
- Hair follicles

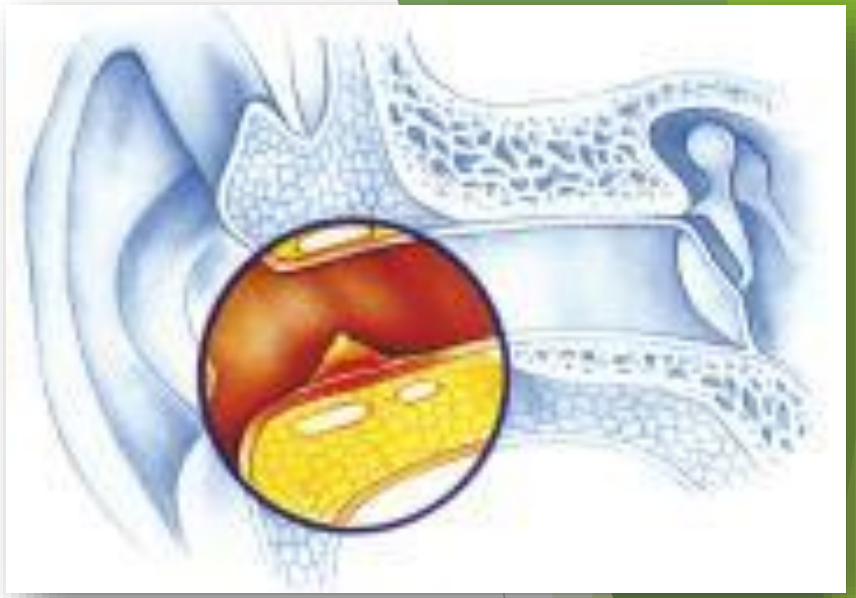
- Self-cleasing mechanism:
  - Centrifugal migration
  - From TM laterally
  - Joins to glandular secretions to be expelled as cerumen



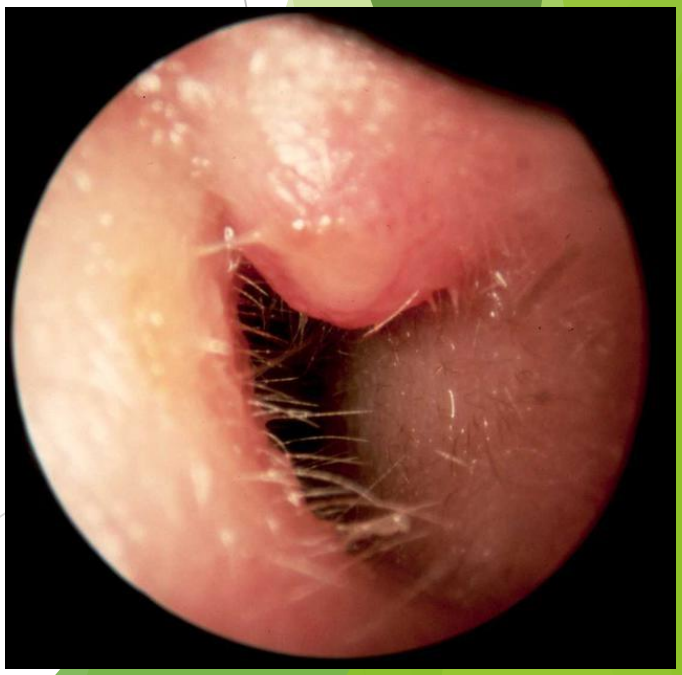
INFECTIONS

- **BACTERIAL**
  - Furuncle
  - Erysipelas
  - Chondritis/Perichondritis
  - Bullous Myringitis
  - Diffuse Otitis Externa
  - Necrotizing Otitis Externa
- **VIRAL**
  - Herpes Zoster virus
- **FUNGAL**
  - Candida
  - Aspergillus

FURUNCLE

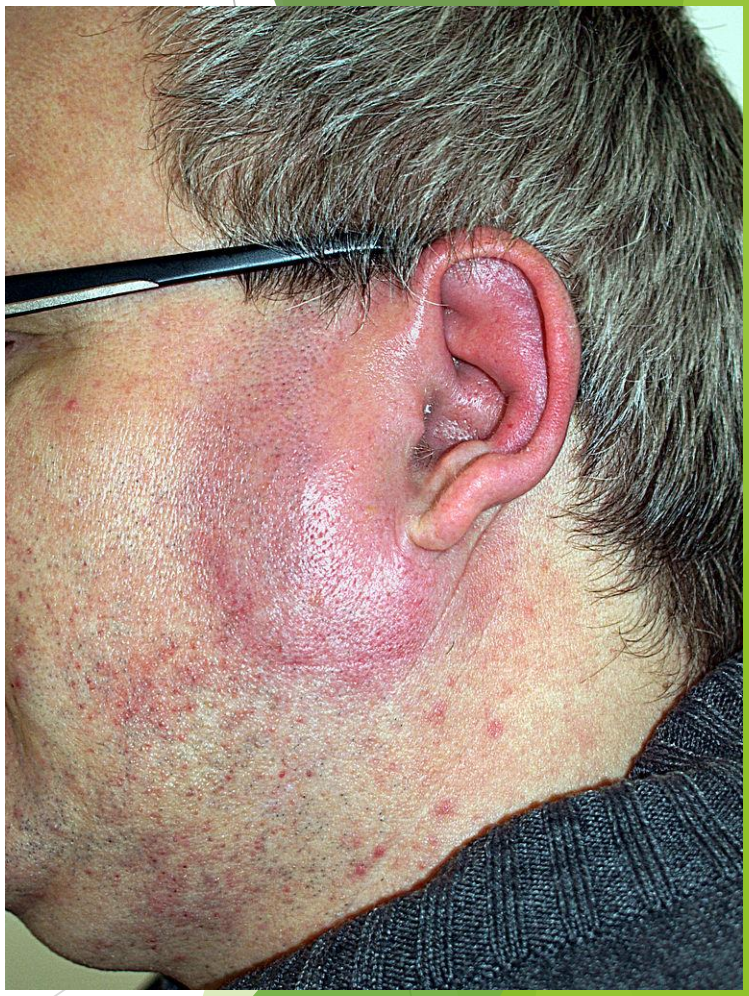


- Hair follicles infection
- Cartilaginous portion of EAC
- *S. aureus*
- Local trauma or contamination
- Localized pain (+ if swelling) + hearing loss (if occlusive abscess)
- Locally warm + topical and systemic antibiotics
- Drainage in case of abscess

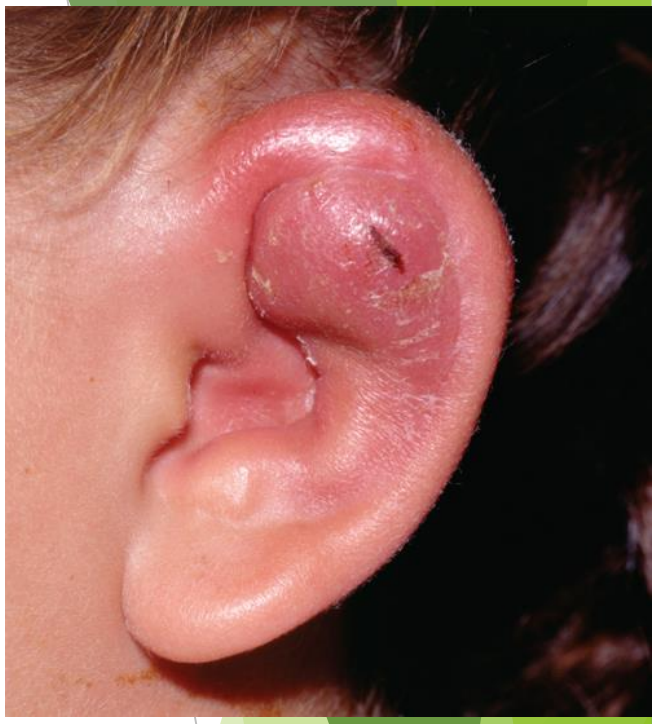


ERYSIPELAS

- Acute cellulitis (epidermis + dermis)
- *Streptococcus pyogenes*
- Constitutional symptoms
- Auricle erythema + indurated and elevated plaque
- **Well-demarcated spreading area**
- Oral penicillin G (high doses)
  - Severe cases: intravenous



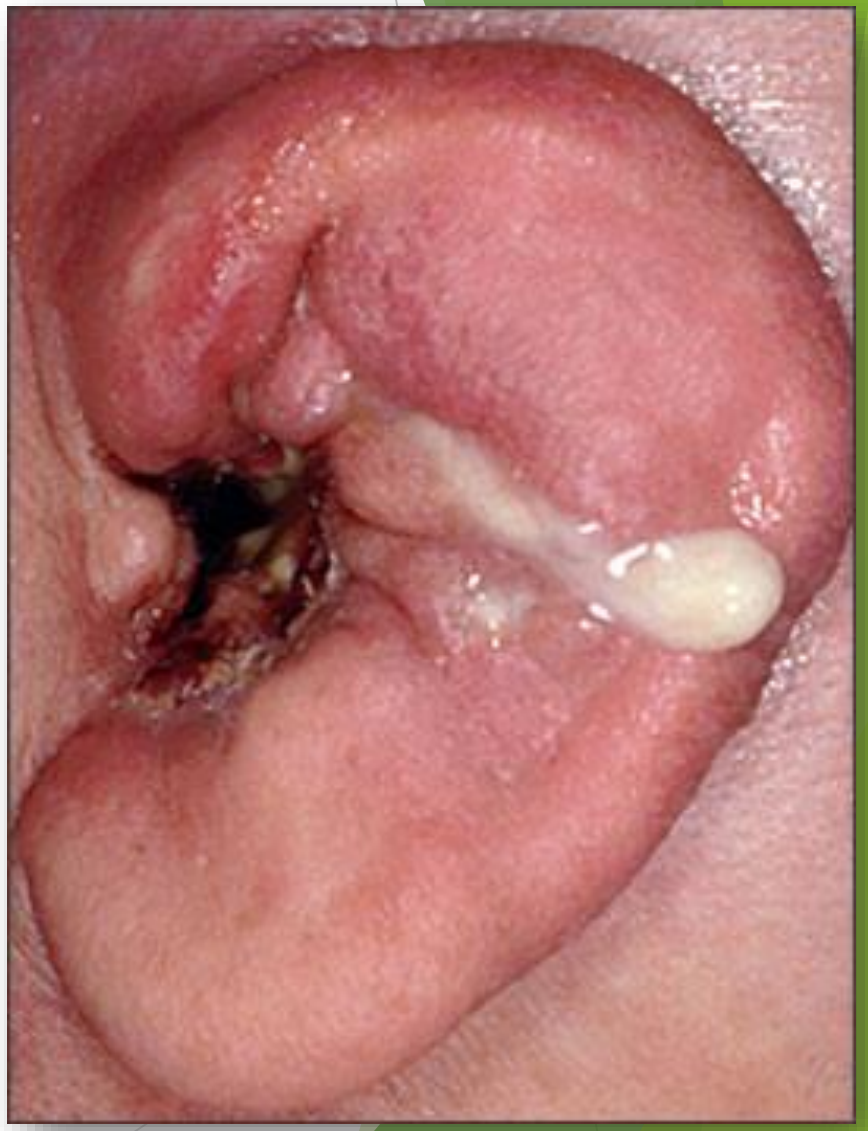
Perichondritis/Chondritis



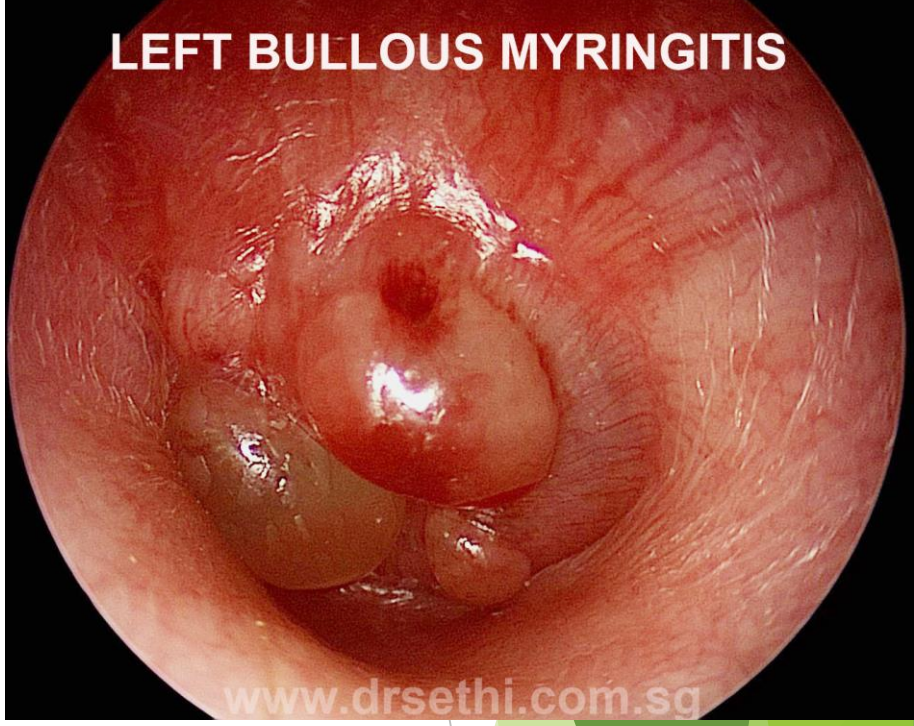
- Perichondrium and/or cartilage inflammation
- Does NOT affect the lobule
- Penetrating trauma (surgical procedures, ear piercing, bites,…)
- *S.aureus*, *P. aeruginosa*
- Signs/Symptoms:
  1. Painful, erythematous and indurated auricle
  2. Fluctuance → Abscess
  3. If not correctly treated → "Cauliflower ear"

Perichondritis/Chondritis

- Treatment:
  - Incision and drainage (Penrose)
  - Antibiotics:
    - Moderate: oral and topic
    - Severe: intravenous
  - Pain control



Bullous Myringitis



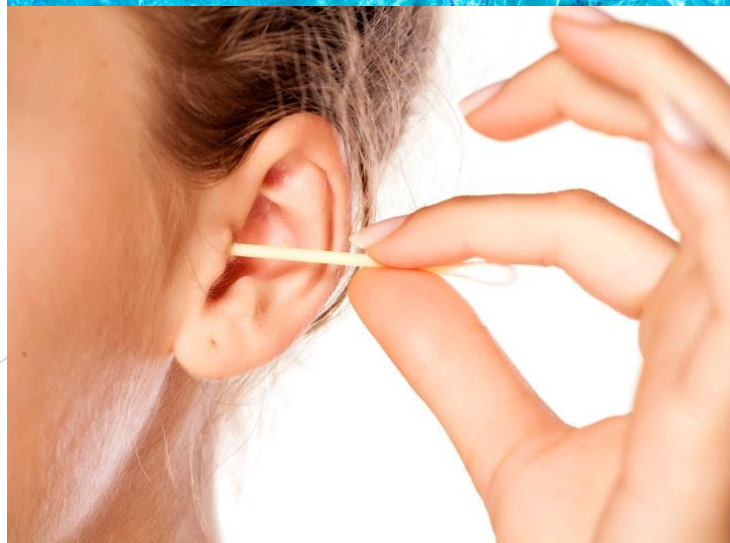
- Infection of the tympanic membrane
- Upper respiratory infection
- *Viral, Mycoplasma pneumoniae, H. influenzae, S. Pneumoniae*
- Blisters on tympanic membrane
- Serosanguineous otorrhea + sensorineural hearing loss + otitis media

Bullous Myringitis

- TREATMENT:
  - Pain control
  - Topic antibiotic + steroids ear drops (superinfection)
  - Oral antibiotic + oral steroids (if hearing loss or otitis media)

Diffuse Otitis Externa (DOE)

- Infection of EAC
- + P. aeruginosa > Proteus mirabilis, S. aureus,…
- Break in the normal skin or cerumen protective barrier
- Predisposing factors:
  - Traumas
  - Water exposure
  - Humid climate
  - Skin conditions (eczema, psoriasis,…)
  - Narrowed canal

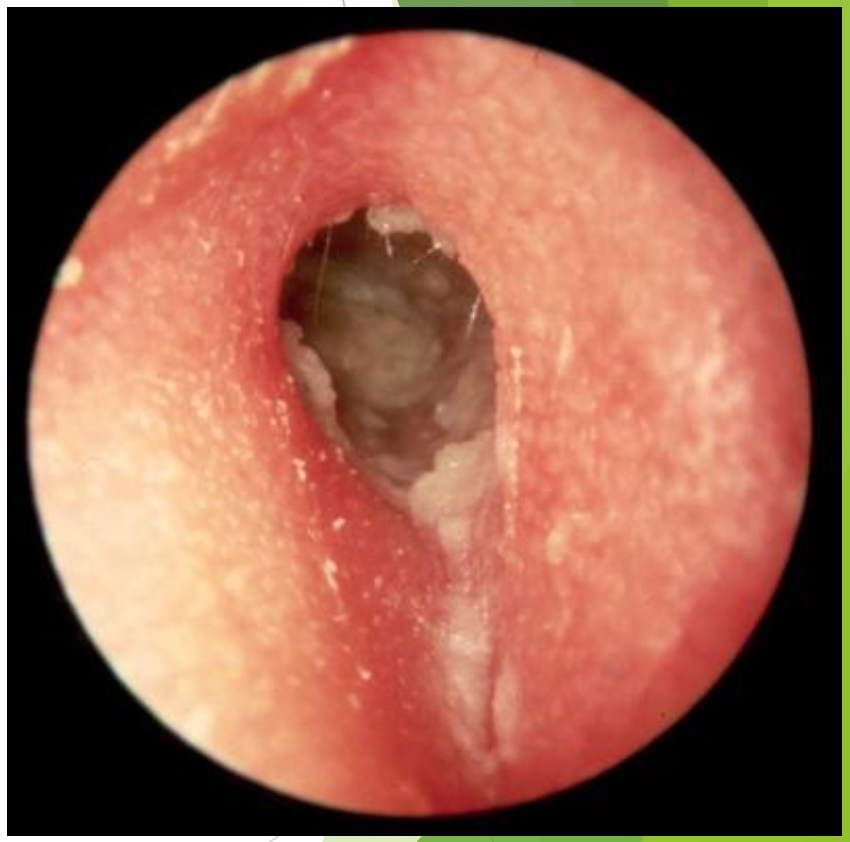


DOE – Signs/Symptoms

- Severe otalgia + painful auricle manipulation + otorrhea + EAC oedema
- Tragal sign +
- If the canal is obstructed: fullness + hearing loss
- Distinguished 3 phases:
  - Preinflammation
  - Acute inflammation: mild, moderate and severe
  - Chronic inflammation

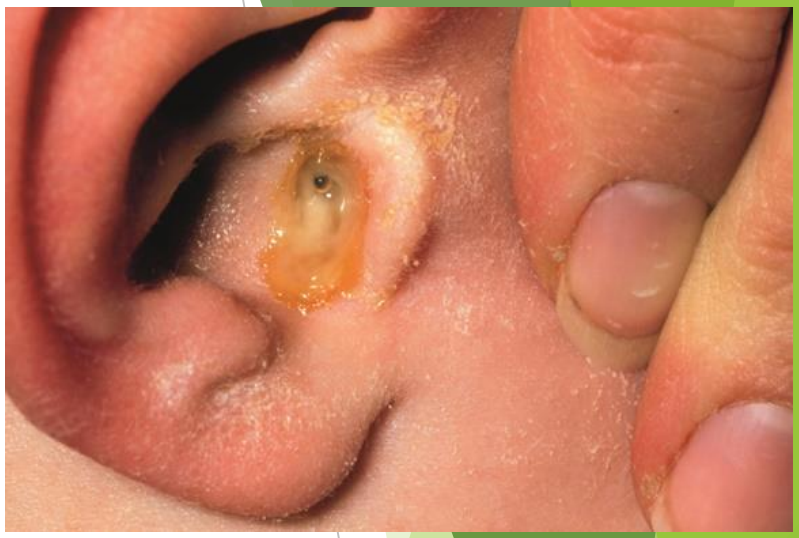
DOE - Stages

- PREINFLAMMATION
  - Lipid layer removed
  - Oedema + itching
- MILD-MODERATE ACUTE INFLAMMATION
  - Invasion of bacteria
  - Mild erythema + minimal EAC oedema + discharge

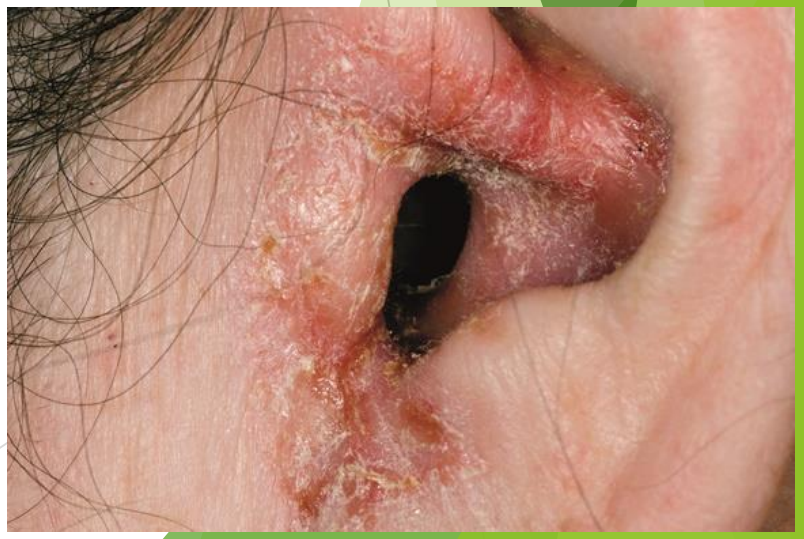


DOE - Stages

- SEVERE ACUTE INFLAMMATION
  - Infection progresses if not adequately treated
  - ↑↑ pain and oedema + purulent otorrhea + obliteration of the EAC lumen
  - **Surrounding soft tissues + cervical lymph nodes**



- CHRONIC INFLAMMATION
  - ↓ pain + ↑ itching
  - Thickening of EAC
  - Auricle changes (eczema, lichenification, ulceration,…)



DOE – Treatment

- TREATMENT
  - Cleaning of EAC
  - Fluoroquinolone topic drops + steroids for 5 days
  - Oedematous EAC: antibiotic + steroids impregnated gauze
  - Severe cases: oral antibiotics (anti-Pseudomona)
  - Avoid water entry

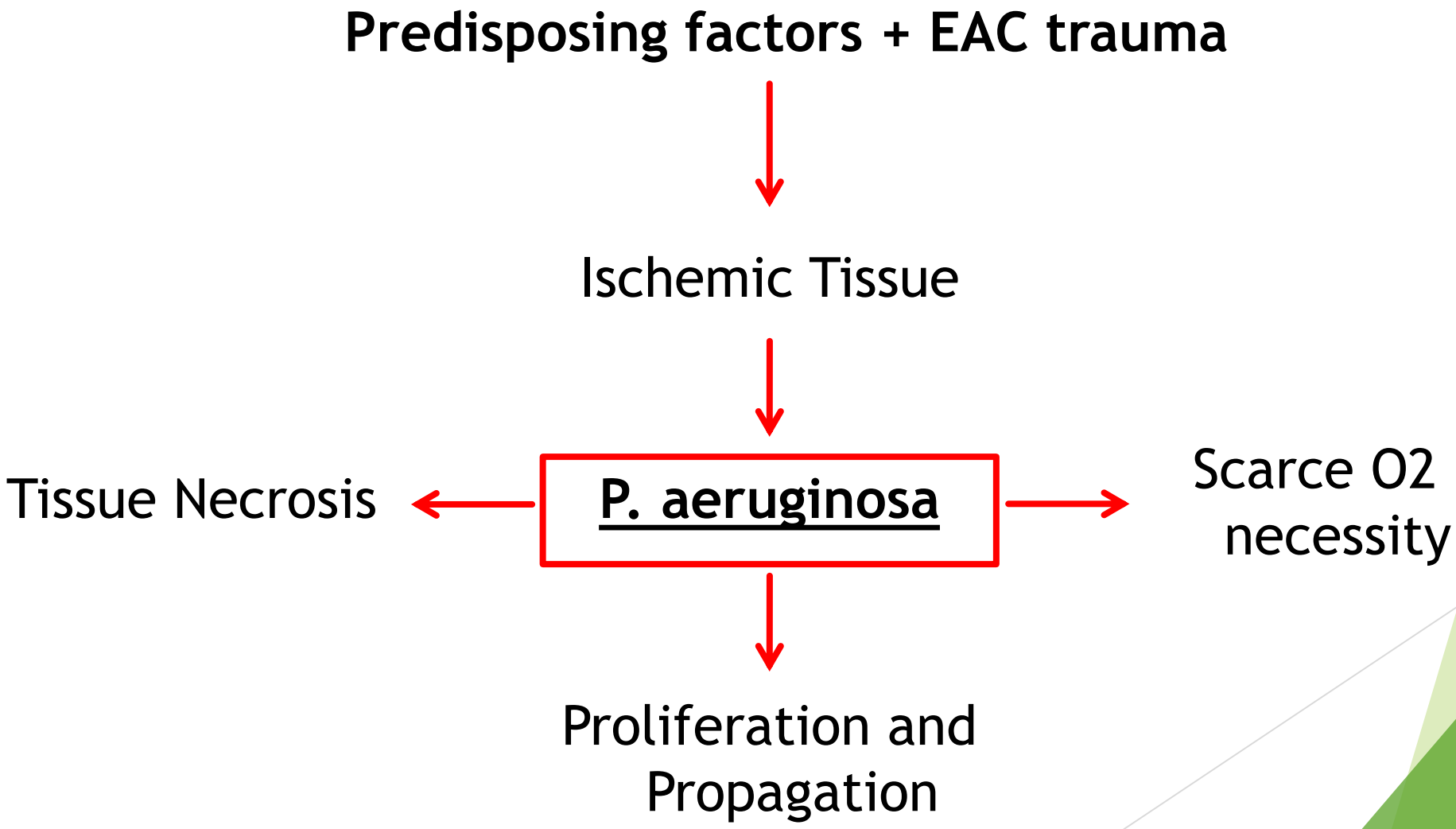
- PREVENTION
  - Avoid any object or instrument into the canal
  - Keep EAC Dry
  - Alcohol and vinegar solution to acidify

Necrotizing Otitis Externa (NOE)

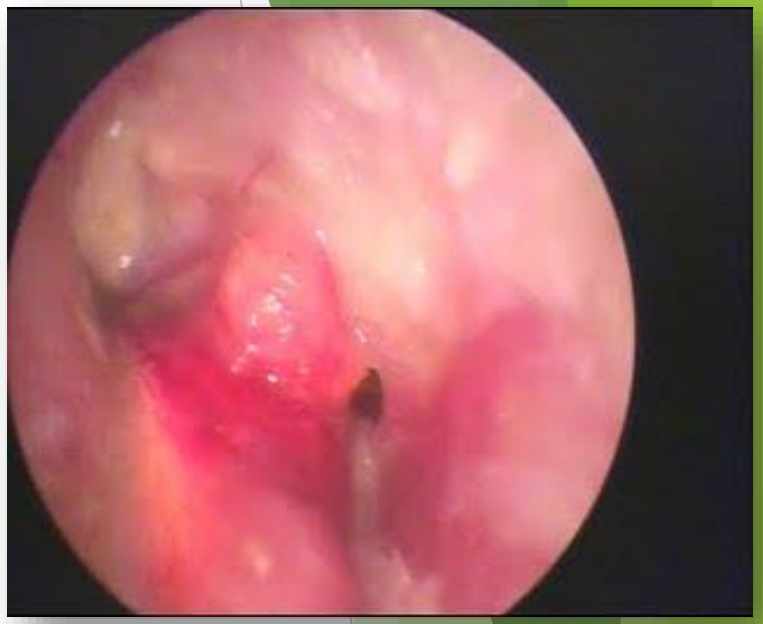
- Aggressive infection of EAC, mastoid and skull base
- “An acute external otitis that does not resolve despite medical therapy”
- Predisposing factors:
  - >>DM
  - Immunocompromised
  - Elderly
- *P. aeruginosa (*96-98%) !!!! S.aureus, S.epidermis, Proteus mirabilis, Klebsiella oxytoca

- **Fungal MOE**: > *Aspergillus fumigatus* + >> *immunocompromised* + > *aggressive*

NOE – Pathophysiology

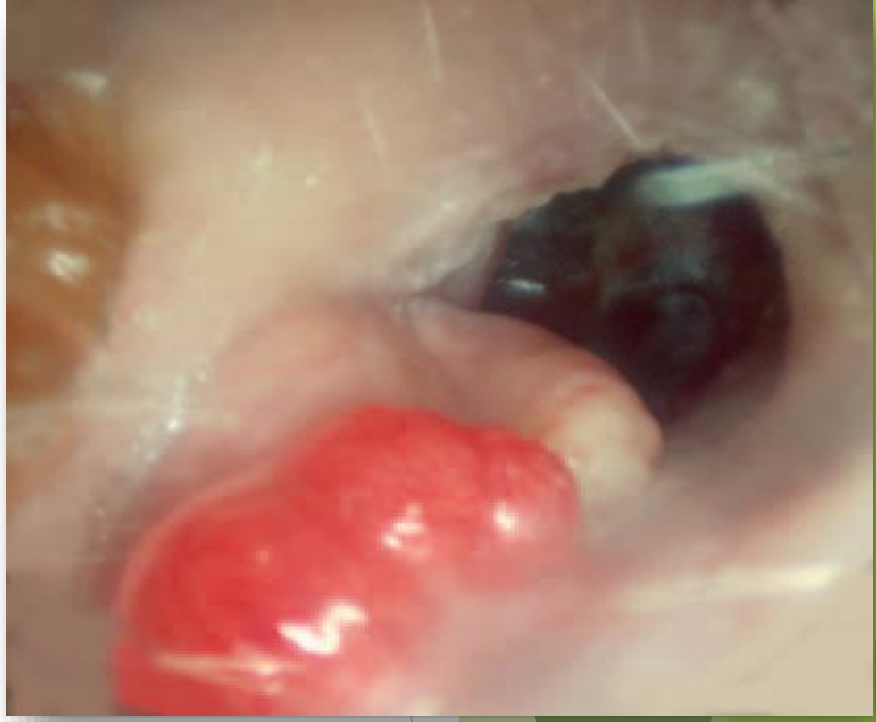


NOE – Signs/Symptoms



- Persistent otalgia
- Purulent otorrhea
- **Granulation tissue at the isthmus**
- VII + lower cranial nerves
- Severe EAC oedema + lumen obstruction
- Temporomandibular joint dysfunction

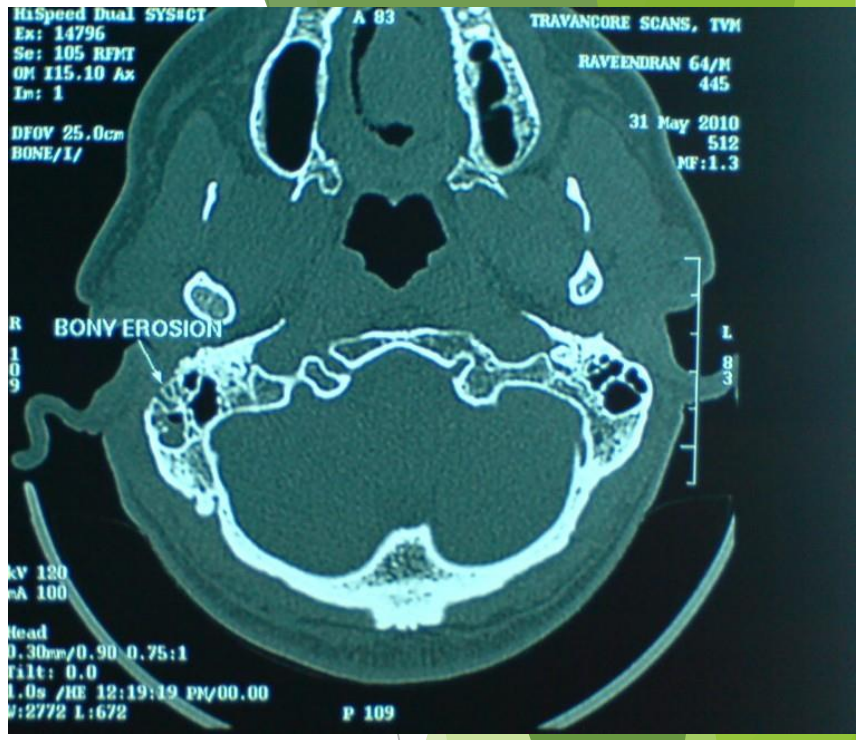
NOE – Diagnosis



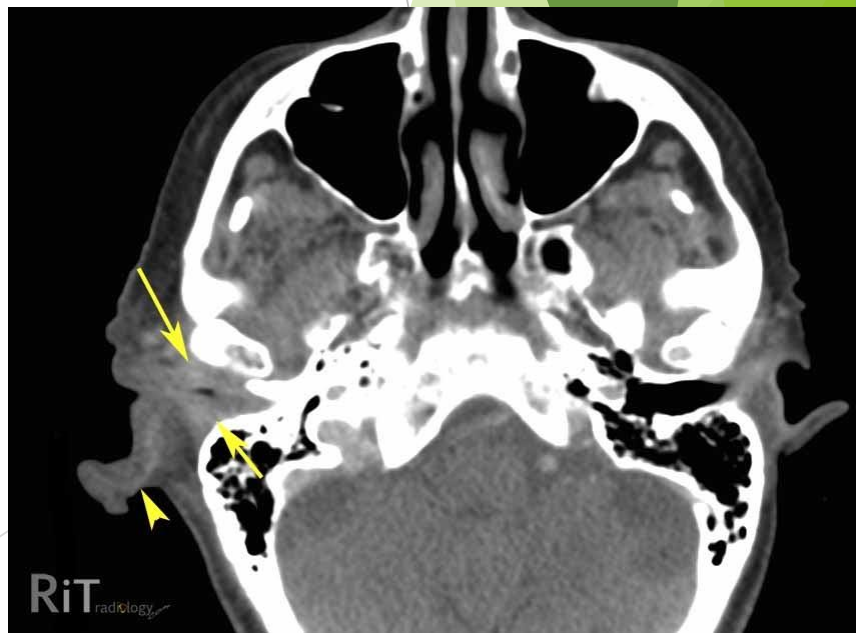
- **Clinical exploration**
- **Otoscopy**
- **Bacterial/fungal culture + biopsy**
  - Suspicious of malignancy
  - DD: Wegener, severe acute otitis externa, cholesteatoma,…

NOE – Diagnosis

- **CT scan**
  - Bone erosion
  - Poor information about soft tissue
  - Does not distinguish infection vs malignancy

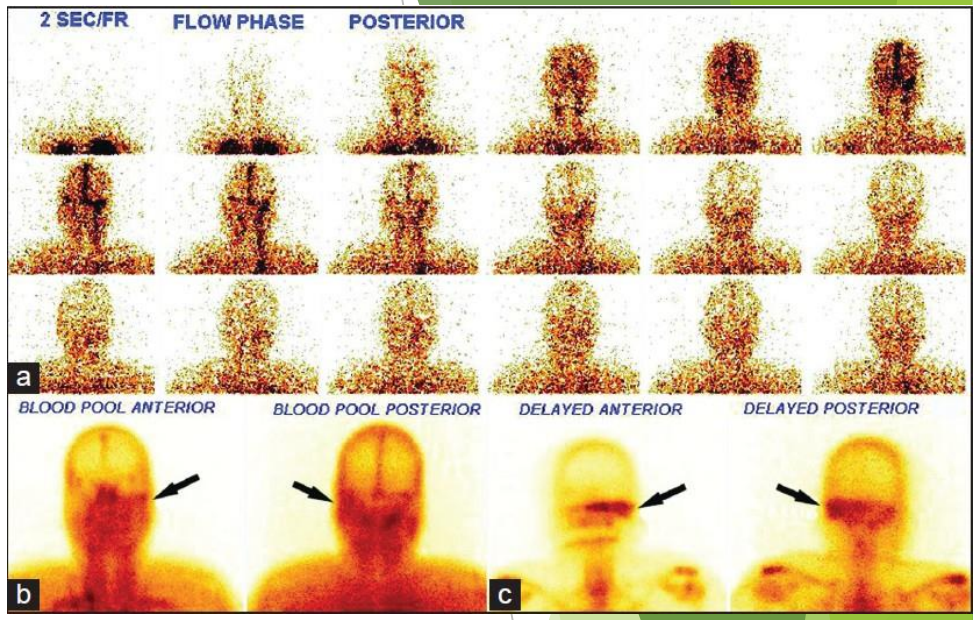


- **MRI**
  - Detects soft tissue changes
  - Evaluates soft tissue extension
  - NOT useful in clinical course follow-up

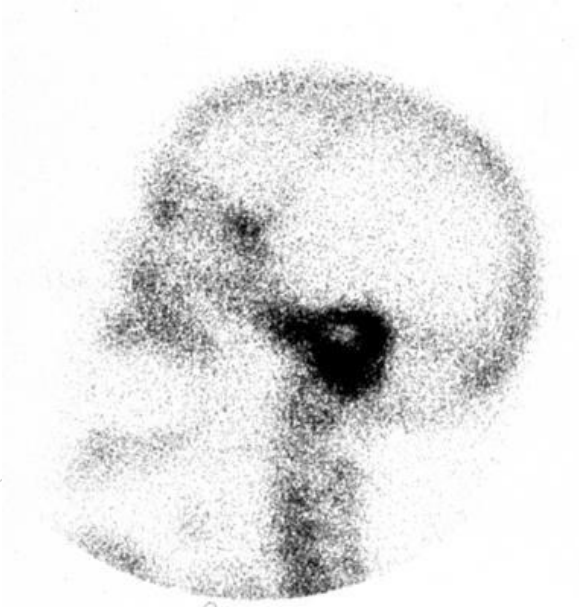


NOE – Diagnosis

- **Technetium-99m bone scan**
  - Unspecified osteoblastic activity
  - Detects acute and chronic osteomyelitis
  - Poor information about bone structure

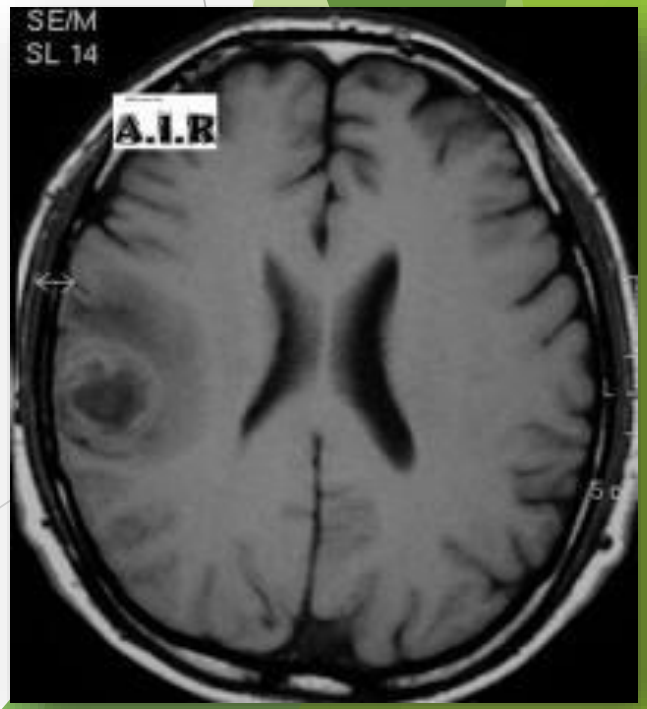


- **Gallium-67 scan**
  - Unspecified inflammatory activity (polymorphonucleocytes)
  - Does not distinguish soft tissue from bone
  - To monitor the therapy´s response



NOE – Complications

- Skull base Osteomyelitis
- Cranial nerves palsy
  - VII → Stylomastoid foramen
  - IX + X + XI → Jugular foramen
  - VI, XII
- Optic neuritis
- TMJ osteomyelitis
- Meningitis
- Cerebral abscess
- Septic thrombophlebitis of the sigmoid sinus



NOE – Treatment

- URGENCY
- Hospitalization (intravenous treatment)
- Ciprofloxacin/Ceftazidime iv.
- For 8-6 weeks: until Gallium scan becomes negative
- Fungal NEO → Voriconazole / Amphotericin B

NOE – Treatment

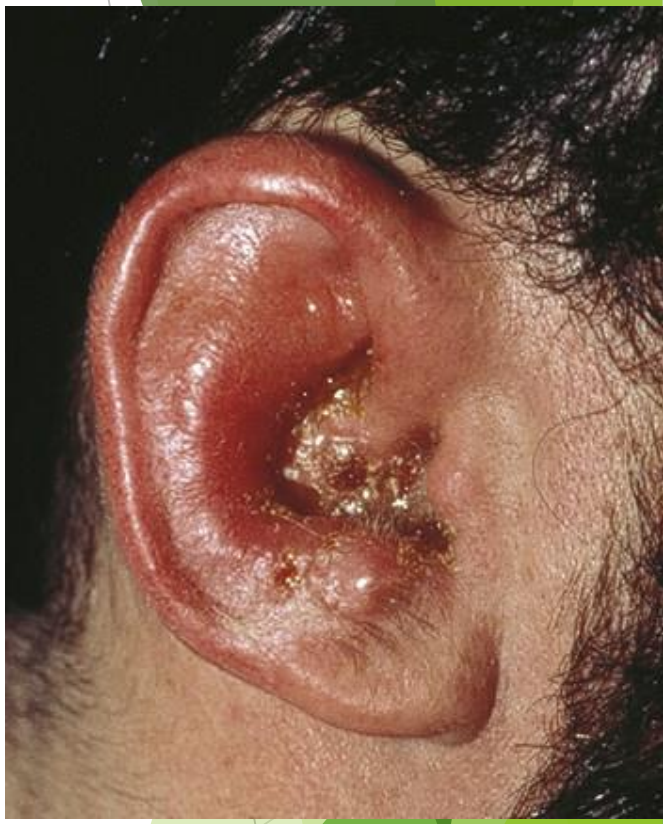
- **SURGERY**
  - Remove necrotic tissue and replace it with vascularized tissue
  - Mastoidectomy in case of complications
  - Facial nerve decompression

- **HYPERBARIC OXYGEN**
  - Neovascularization
  - Osteoneogenesis
  - Advanced disease with significant skull base or intracranial involvement

- **DIABETES management!!!!**

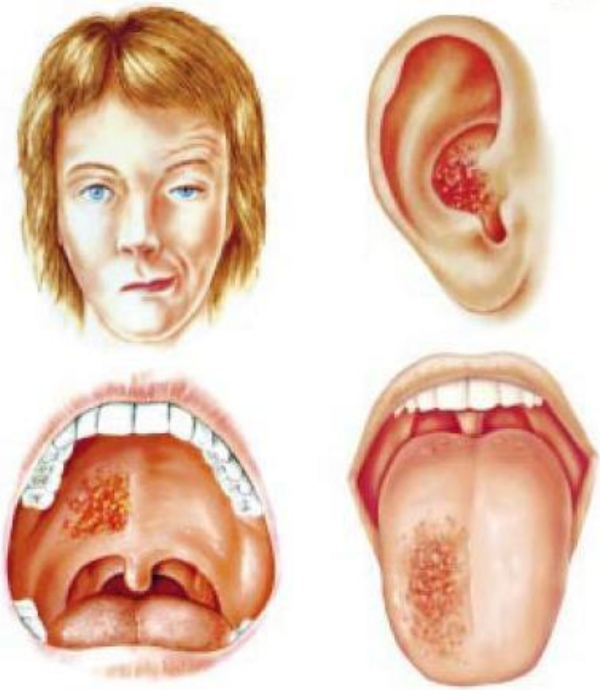
Herpes Zoster

- Varicella zoster virus
- +virus affecting the external ear
- Sensory ganglion
- Reactivates when immune competence decreases
- Dermatome distribution



Herpes Zoster – Signs/Symptoms

- Otalgia/burning
- Vesicular eruption (Facial nerve sensorial area – Ramsay Hunt)
- Crust (when vesicles disrupt)
- Ramsay Hunt syndrome → VII palsy + vesicular rash
  - 2nd cause of nontraumatic peripheral facial palsy
  - Ramsay Hunt area + anterior 2/3 of the tongue + soft palate
- Cochlea-Vestibular affection: tinnitus, sensorial hearing loss, dysacusis, vertigo,…
- Postherpetic Neuralgia

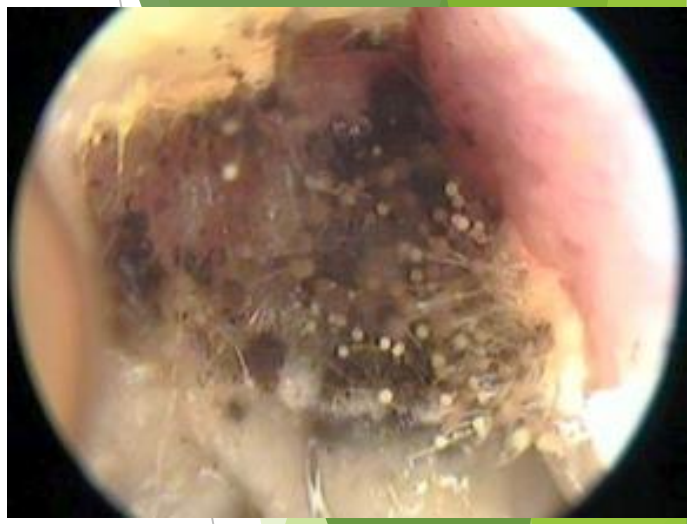


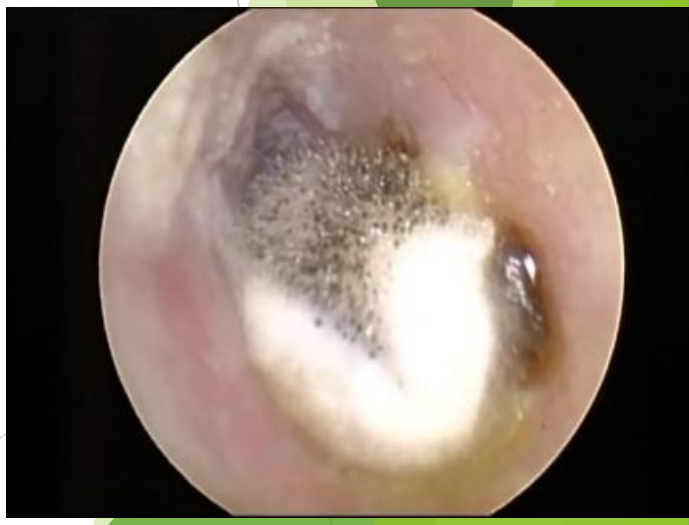
Herpes Zoster – Treatment

- Drying agents for vesicles
- Oral valacyclovir + oral corticosteroid
- Parenteral acyclovir in case of severe disease
- Eye care in case of facial palsy
- Gabapentin in case of postherpetic neuralgia

Otomycosis

- *Aspergillus, Candida*
- Patient with otitis externa treated with a antibiotic and steroid drops for a long time
- SIGNS/SYMPTOMS
  - Pruritus
  - Otorrhea + conductive hearing loss
- DIAGNOSIS:
  - Black, grey or white fungal growth on the canal skin
- TREATMENT:
  - Cleaning
  - Antimycotic (clotrimazole) ear drops
  - Drying agents






MERRY
CHRISTMAS