

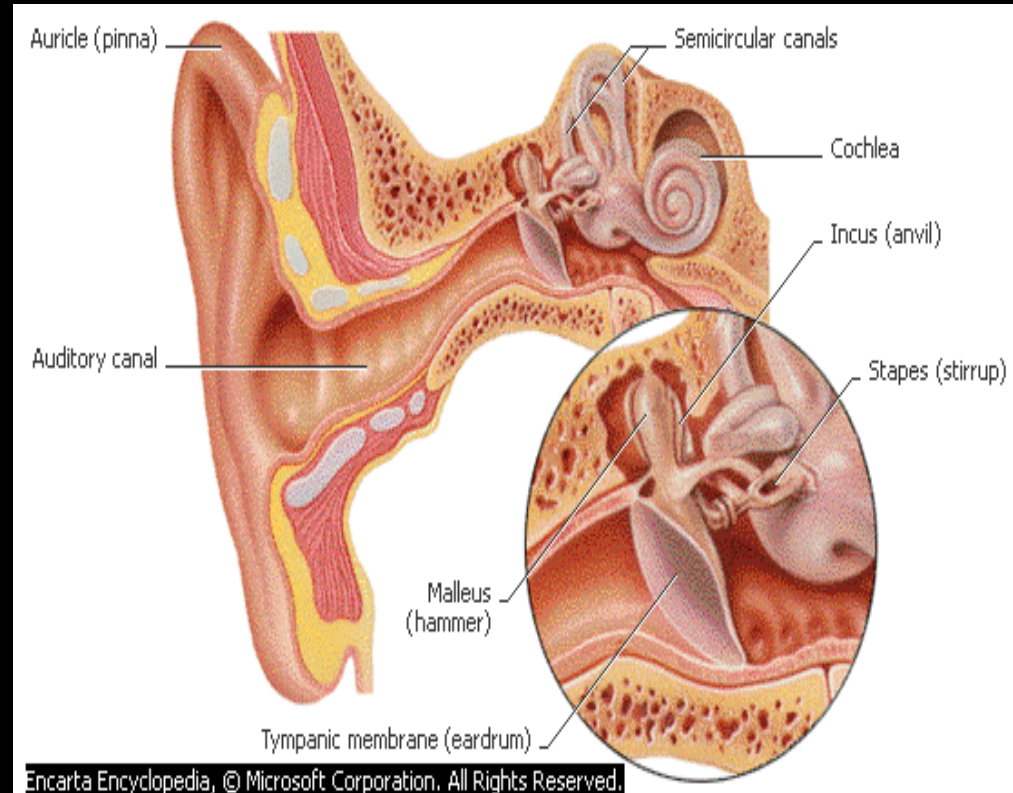
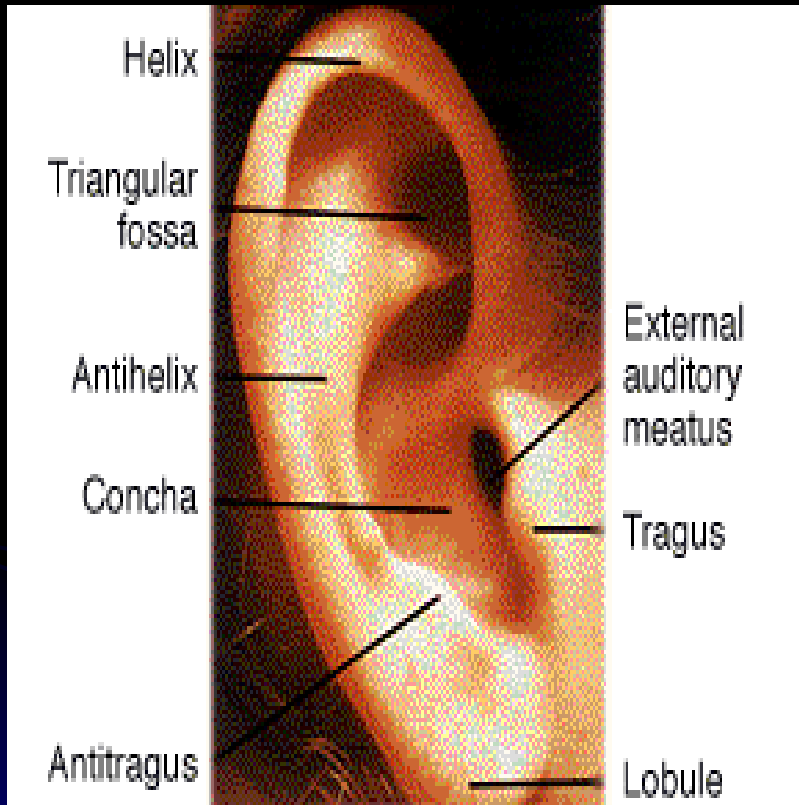
# *The Human Ear*



CEASAR GARDOSE, MD, FPCO-HNS  
West Visayas State University  
College of Medicine  
Dept. of EENT/ Section of Otolaryngology-  
Head and Neck Surgery

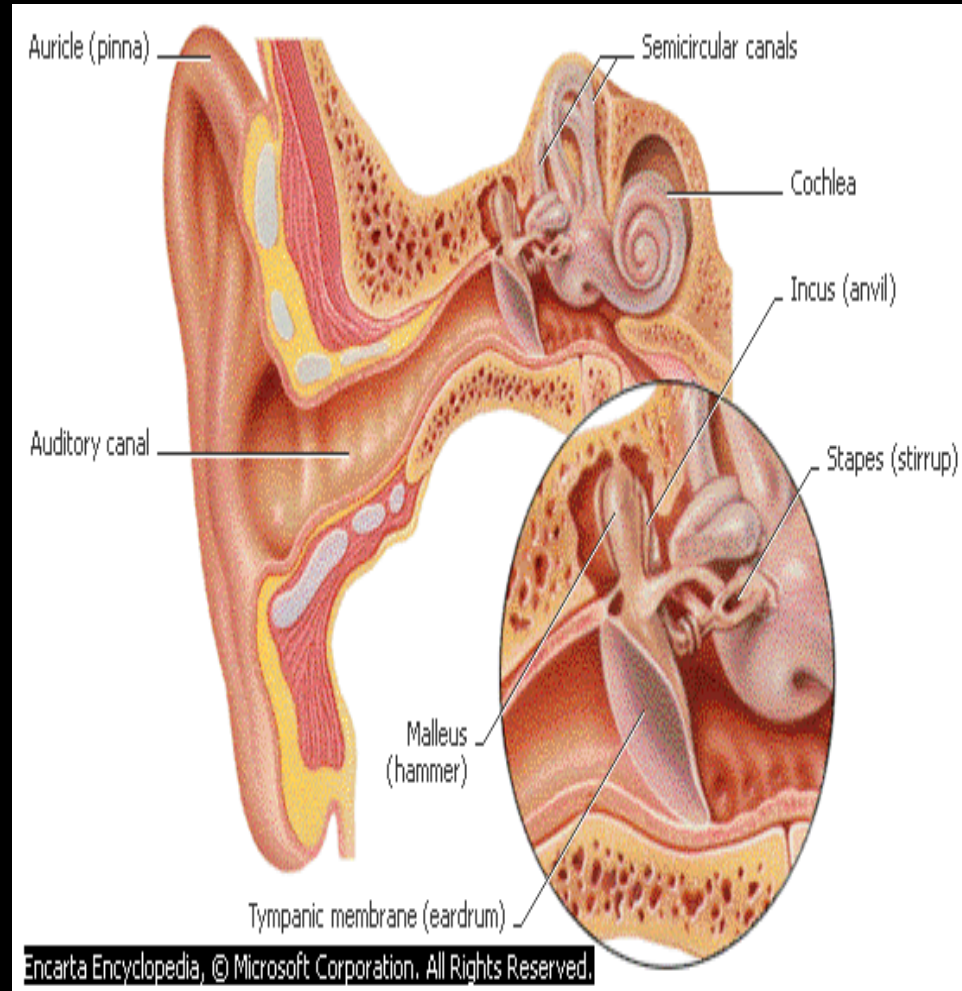


# Structure of the Ear



# Structures of the Ear

- External Ear
  - auricle
  - ext auditory canal
- > Middle Ear
  - tympanic cavity
  - tympanic membrane
  - auditory ossicles
  - Eustachian tube
- Inner Ear
  - cochlea/ labyrinth



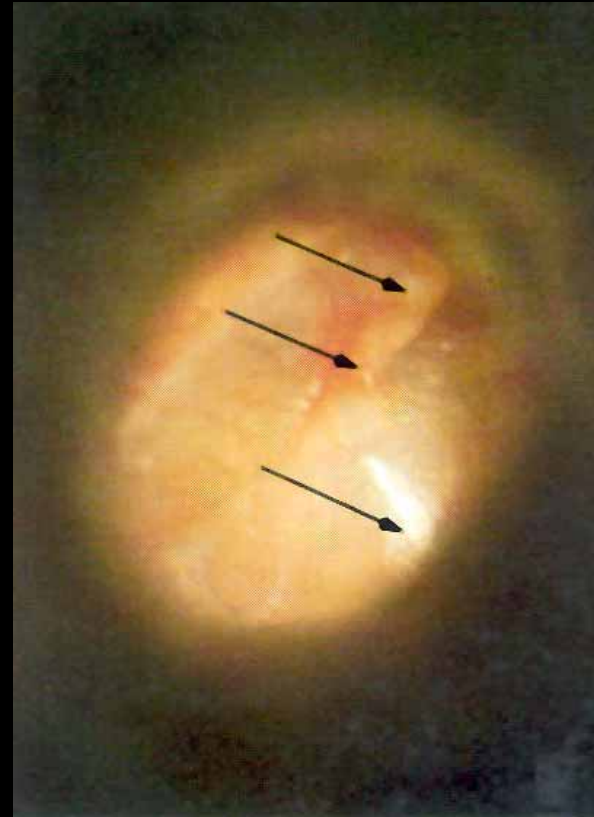


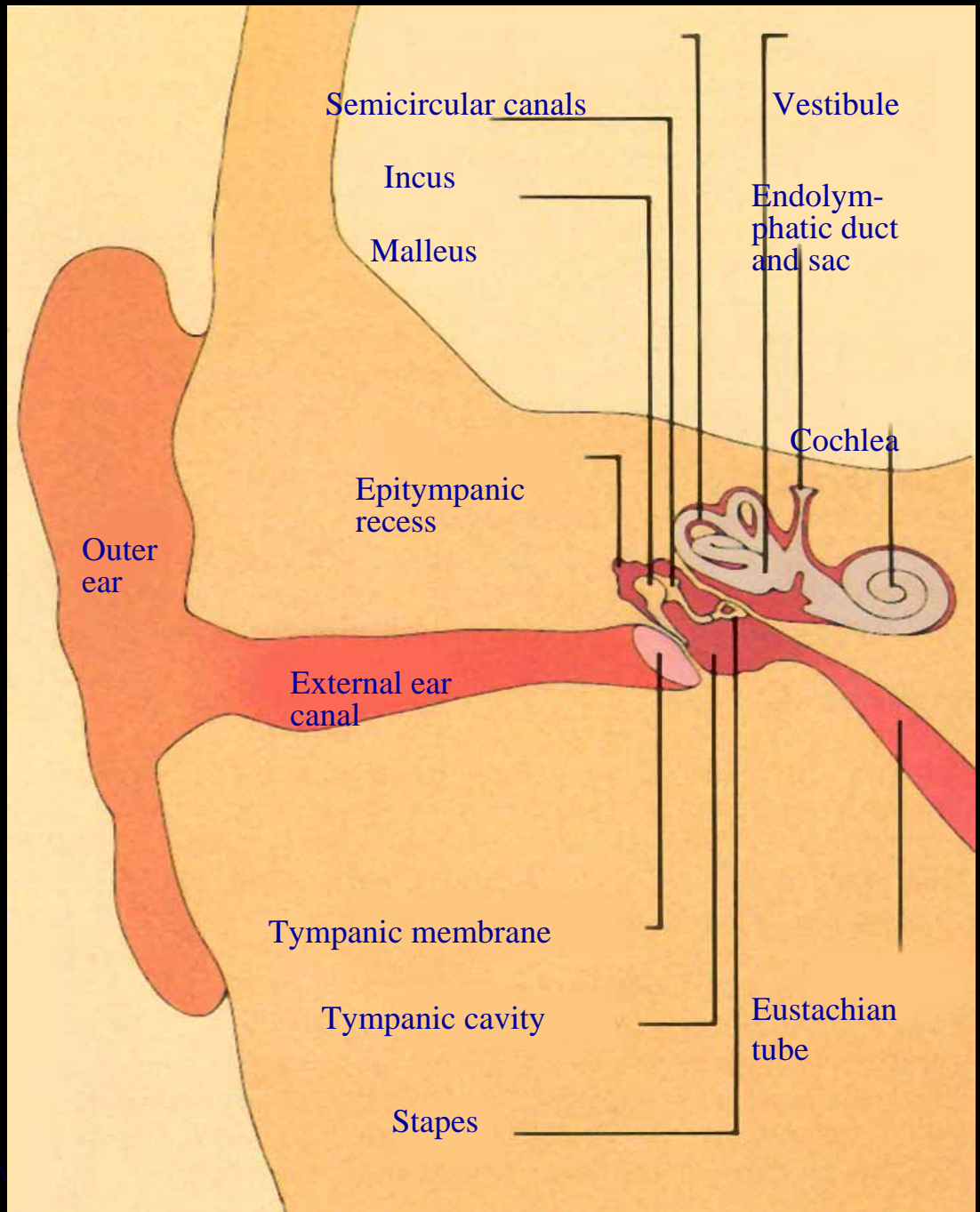
# Review of Anatomy

- Parts of the Ear
- Outer Ear – Auricle and EAC have very thin skin, rich sensory nerve supply
- EAC contains ceruminous glands and hairs
- Isthmus of the EAC is a sensitive area
- **The Tympanic Membrane** (the EARDRUM) is the most sensitive part of middle ear
- Three smallest bone – malleus, incus, stapes
- Eustachian Tube plays an important role in clearance, ventilation & protection of the ME

# The Eardrum

- Tympanic membrane/  
drumhead
- 3 layers at pars tensa/  
2 at pars flaccida
- Shape oblique, center  
attached to ossicles
- Two chief landmarks:  
handle and short  
process of the malleus
- *Cone of light* is just a  
light reflection (antero-  
inferior)





# Features of the Ear

- > Cerumen (ear wax) serves as protection
- > Curvature of the canal provides defense mechanism
- > The eardrum and ossicles provide an important role in the pathway of hearing
- > The Eustachian Tube serves 3 functions:
  - Ventilation/ Clearance/ Protection
- > Inner Ear/Auditory Nerve should be intact for sound conduction & interpretation by the brain
- > Labyrinth for balance



# How do we hear?

- Soundwaves are caught by the outer ear
- Eardrum vibrates as stimulus enters
- Auditory ossicles also vibrate and send impulses into the cochlea
- Hair cells inside the cochlea transform mechanical energy into electrical
- Electrical impulses are sent to the brain via the cochlear (8<sup>th</sup>) nerve
- Brain interprets stimulus

# Sound

- Sound is measured in decibels
- The environment consists of different kinds of sound at varying levels of intensity
- Pure tone do not exist in the surroundings
- Characters of sound – loudness, pitch, tone
- Noise will cause pain in the middle ear

# Sound

*(intensity of sound in diff situations)*

- *Soft whisper 20 dB*
- *Quiet room 30 dB*
- *Ordinary speaking voice 50 dB*
- *Average street traffic 60 dB*
- *Heavy traffic 70-80*
- *Pneumatic hammer 80-90 dB*
- *Discomfort for pure tones 90-100 dB*
- *Thunder 120 dB*
- *Aircraft engine (close) 130 dB*
- *Air raid siren 140 dB*

# History

- Take note of the following:
  - genetics, intrauterine problems, birth trauma, prematurity
  - infections of the brain, kernicterus, mumps, congenital anomalies, structural abnormalities
- Occupation
- Drug intake
- Habits

# Common ear complaints

- Hearing loss
- Otagia (ear pain)
- Otorrhea (ear discharge)
- Ear fullness
- Tinnitus
- Vertigo

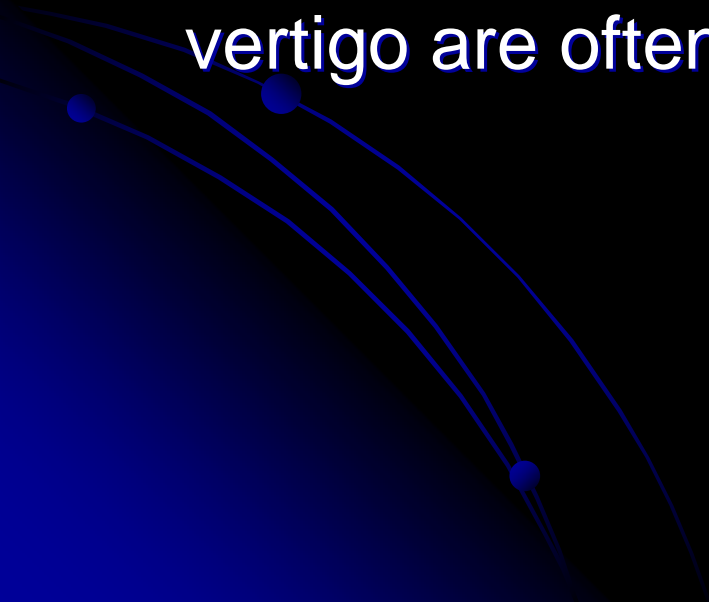




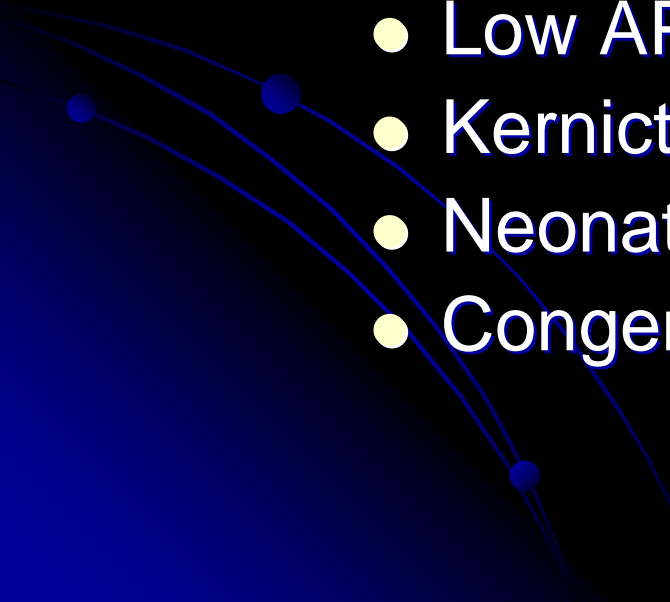
# Definition of Terms

- **OTALGIA** is Ear Pain
  - may be Primary or Localized
  - Secondary or Referred
  - usually related to infections of the external ear, cerumen, foreign bodies, tumors
- **OTORRHEA** is Ear Discharge
  - may be Acute or Chronic
  - usually associated with middle ear infections, trauma, URTI

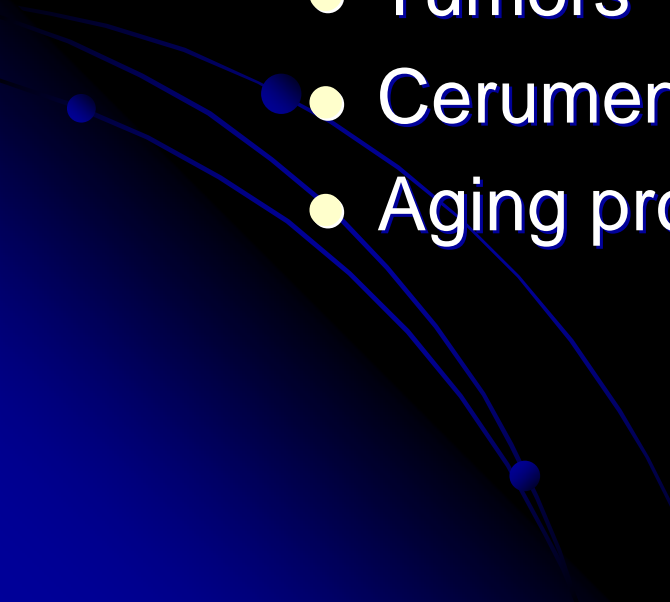
# Common S/S

- Ear fullness is usually associated with fluid in the middle ear or due to congestion of the Eustachian tube 2' to URTI (common colds)
  - Tinnitus (ringing of the ear), dizziness and vertigo are often related to inner ear pathology
- 

# Causes of Congenital Hearing Loss

- Hereditary/ genetic
  - Maternal infections – rubella, syphilis
  - Birth trauma
  - Drug effects
  - Prematurity
  - Low APGAR score
  - Kernicterus
  - Neonatal infections- meningitis
  - Congenital anomalies
- 

# Causes of Acquired Hearing Loss

- Ear infections
  - Noise induced
  - Traumatic perforation of the TM
  - Aerotitis – diving and flying
  - Tumors
  - Cerumen/foreign bodies
  - Aging process (Presbycusis)
- 

# Physical Examination Techniques

- Inspection
- Otoscopy
- Pneumatic otoscopy
- Tuning fork test
- Audiometry
- Tests for vertigo

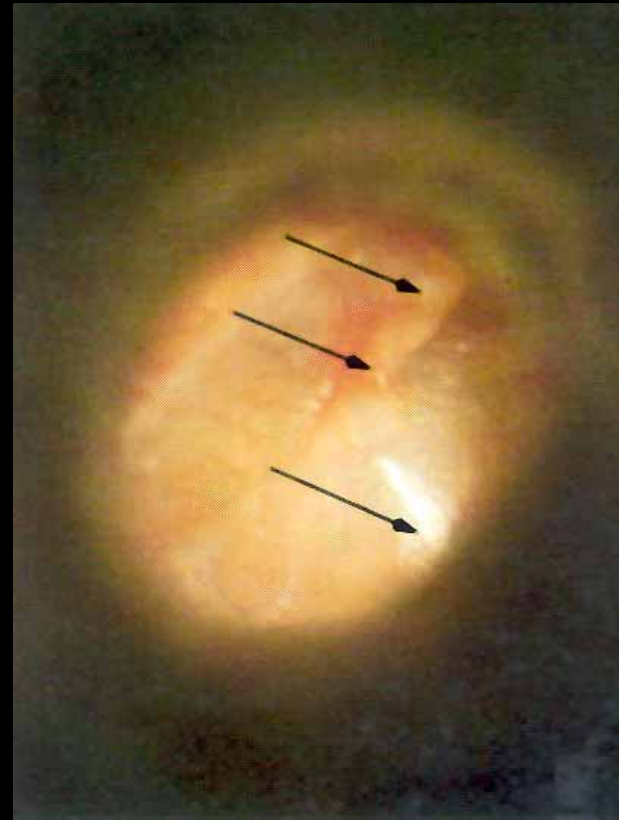




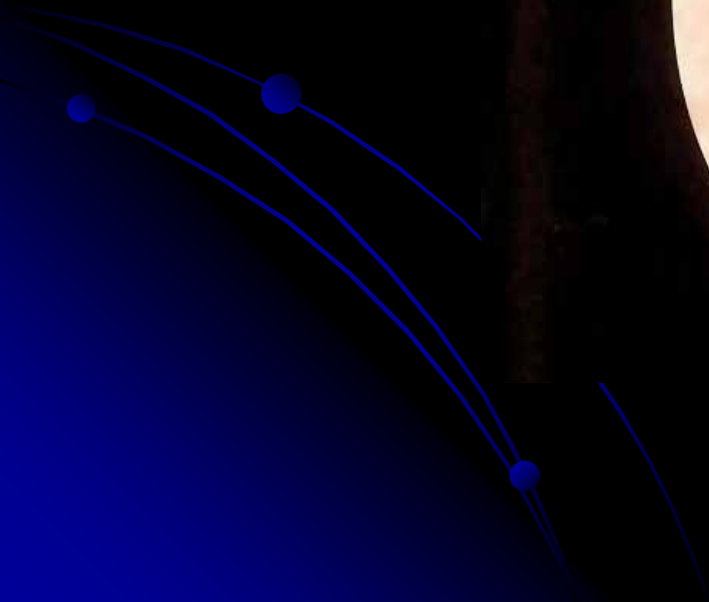
# How to conduct an otoscopic examination (OTOSCOPY)

- Inspect entrance to ear canal
- Choose largest speculum which can be COMFORTABLY inserted.
- Straighten the outer ear canal.
  - pull upward and outward in adults
  - pull downwards in children
- Adjust the line of sight and position of speculum for a composite view of ear canal and tympanic membrane.

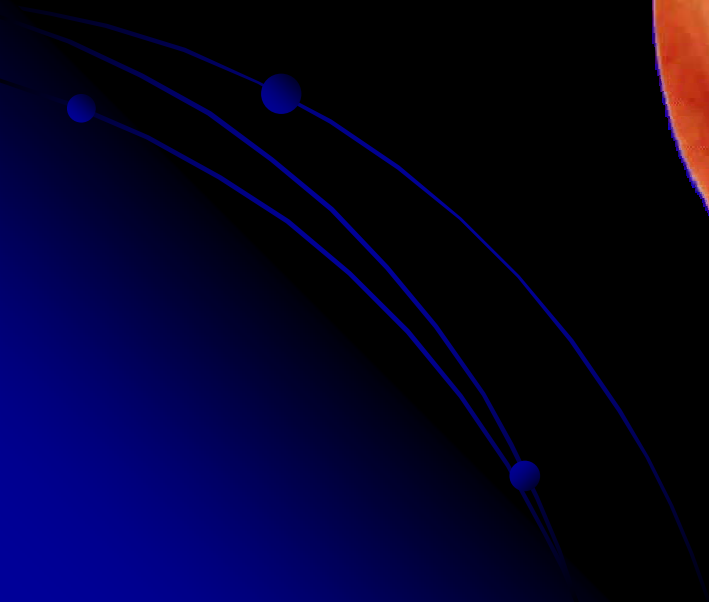
# Normal Tympanic Membrane



# Otitis Externa



# Otitis Media with Effusion



# OE vs. OM

## ● *Otitis Externa*

- Tragus sign
- Ear canal swollen
- Normal TM
- + discharge
- Fever
- Normal hearing

## ● *Otitis Media*

- (-) tragus sign
- Ear canal normal
- Bulging/perforated TM
- + discharge
- Fever
- Impaired hearing



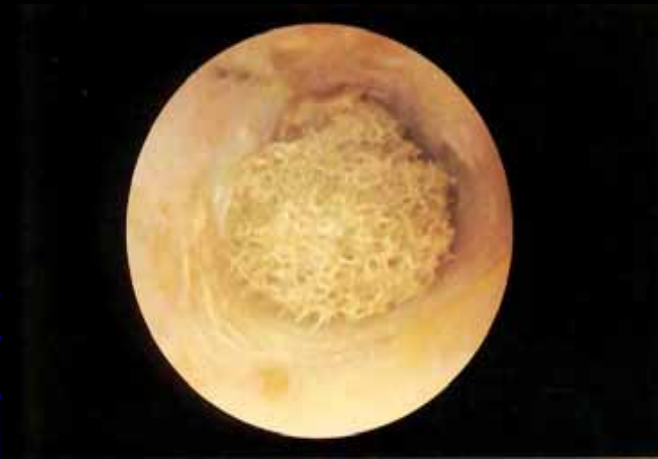
# Clinical Problems

- Hearing impairment, congenital/ acquired
- Ear infections
- Structural deformities
- Eustachian tube dysfunction
- Impacted cerumen; foreign bodies
- Occupational hazards
- Peripheral vertigo
- Tinnitus
- Drug induced
- Iatrogenic, trauma (TM perforation)

# Chronic Suppurative Otitis Media CSOM



# Foreign Body (cotton)



# Impacted Cerumen



# Otoscopic Findings





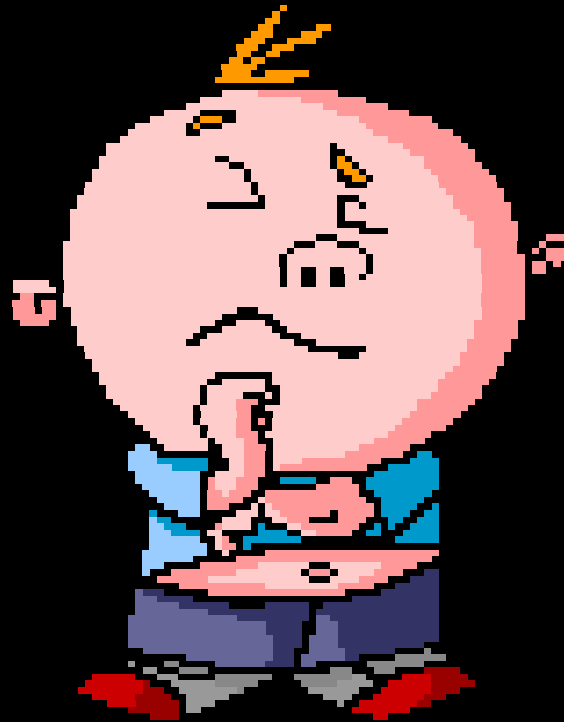
Thank you for  
lending me your ears!







*Well, well, well...*



# Management

- Treatment of infections with appropriate antibiotics
- Treatment of nasal congestion/ colds
- Analgesics
- Office/bedside procedures – irrigation, suctioning, manual removal of cerumen
- Aural hygiene – use baby oil, alcohol, or hydrogen peroxide
- Limit manipulation
- Avoid swimming
- Surgery for deformities and chronic infections

# Management

- Impacted Cerumen – soften with ceruminolytics/ mineral oil then remove by the following methods
  1. irrigation with warm water
  2. suctioning
  3. manual removal using ear instrument
- Foreign bodies – animate (insects) and inanimate (seeds, beads, stones, foam, paper, cotton)
  - SEEDS = Do not irrigate with water

# Management

## *For the Hearing Impaired:*

- Accurate diagnosis
- Treatment of underlying cause
- Amplification – use of hearing aids
- Surgery
- Sign language/ speech rehabilitation

# Management

## *Precautions:*

- Do not clean your ears everyday!
- If you have to clean them, do not use sharp or hard objects/ instruments
- Avoid very loud sounds/ noise
- Consult your ENT doctor for pain, ear discharge, hearing loss and vertigo
- Take medications properly
- Avoid too much blowing of nose

# Listen to this. . .

- *Create moments of stillness in your day.*
- *Whether you're at home, in school or at the office, in a park, in a traffic jam, even the busiest days will offer some opportunity for a moment of stillness.*
- *As you rest in stillness, ask God to help you attend to your worries and thereby to put them to rest.*

**THANK YOU VERY MUCH!!!**

