Hearing disorder

1. Sensory neural hearing loss (SNHL)

- ⇒ by deterioration of cochlea (loss of hair cells from organ of Corti), common in adult, gradual, progressive, high-f hearing loss of older age (presbyacusis), ototoxic drug, noise exposure, trauma, immune disorder, metabolic disease, acoustic neuroma, genetic
- Not correctable but corticosteroid may help w/ acute onset, hearing strategies, hearing aids, cochlear implant
- Test - audiometry (measure of bone conduction thresholds), tympanometry.

- Acoustic neuroma - benign tumor on the vestibular (balance) & cochlear (hearing) nerve from ear to brain
- Otitis media (middle ear infx)
- Ototoxic drug - abx (gentamicin), diuretics (Furosemide, Ethacrynic, Lasix), cisplatin, some anti-depressants, nicotine, caffeine, NSAIDs

- Audiometry - hearing acuity
- Tympanometry - test mobility of ear drum by creating vibration

① Tinnitus - sensation of sound w/o external sound source

- Cause: exposure to noise ⇒ damage to cilia & auditory hair cells or spontaneous auditory nerve fiber activity
  - associated w/ aging, infectious origin, metabolic disorder (anemia, thyroid disease, hyperlipidemia, B12 deficiency), autoimmune dz, trauma, ototoxic med, vascular, neurogenic
- DDx - Meniere's disease, acoustic neuroma, otitis media, otosclerosis, cerebral vascular disease, salicylate
- PE - include orthostatic VS, whisper test, Weber/Rinne test, pneumatic otoscopy

- AOM - acute otitis media
- OME - otitis media w effusion

- Otosclerosis - abnormal bone growth in the middle ear
- Aspirin (salicylate) ⇒ hearing loss

+ Weber - evaluate lateralization by placing tuning fork top/middle of head - ① SNHL - normal ear hear better
② conductive hearing loss (CHL) - defective ear hear better

* Rinne - evaluate air vs bone conduction by placing tuning fork ° AC → BC
1st on mastoid process the next to ear.
- normal - air conduction > bone conduction
- CHL - bone conduction > air conduction

° Tests - metabolic abnormalities (TSH, CBC, B12, lipid panel), audiometry, tympanometry, CT, MRI, venography
° Venography - x-ray of veins
° Tx - treat underlying cause, eliminate ototoxic meds (aspirin, NSAIDs), pt w/ otitis media → abx, not definitive but antidepressant may help, Nortryptyline (Elavil) 50mg @ bed time, meclizine (Antivert)

⑤ Meniere's disease - sensory disorder of labyrinth & cochlear
→ by possible inflammatory response in inner ear by trauma, viral infx, allergies, negative ear pressure, vascular/endocrine/lipid disorder, genetic, migraine, autoimmune, thyroid disease
° Sx - triad sx (vertigo, hearing loss, tinnitus), low f hearing loss
° DDx - otitis media, vestibular neuritis, benign paroxysmal positional vertigo (BPPU), acoustic neuroma, CVA lesion, acute vestibular labyrinthitis
° PE - otoscopic exam shows normal unless AOM present, Weber/Rinne, TSH, CBC, B12, lipid panel audiogram, electronystagmography, electrocochleography, vestibular evoked myogenic potential, MRI
° Tx - bed rest w/ eyes closed (prevent fall), mild diuretic (↓ lymphatic pressure & volume), Meclizine, promethazine

Labyrinthitis
=
° Vestibular neuritis - inflammation of inner ear or nerve (inner ear to brain)
° BPPU - episodes of dizziness, can be caused by Δ position of head
° Electronystagmography - record involuntary movement, can be used for dx cause of vertigo
° Electrocochleography - record electric potential of inner ear & nerve in response to sound

2. Conductive hearing loss (CHL)

- ⇒ by obstruction of ear canal by cerumen or impaction, foreign body in ear canal, otitis externa, chronic otitis media, middle ear effusion, otosclerosis, vascular anomaly or cholesteatoma
- Test - Weber / Rinne
- Treatment
  - ① Impaction - remove cerumen w/ detergent ear drops, mechanical removal, irrigation w/ body temp water,
  - ② Foreign body (mostly among children) - toys, crayons, beads, insects (use xylocaine to paralyze)
- TM rupture ⇒ by impact injury, pressure Δ by air travel, explosive acoustic trauma, infx of middle ear ⇒ ischemia of TM ↓ ↑ pressure of middle ear ⇒ TM rupture
  - ① Sx - sharp ear pain, drainage, ringing in the ear or hearing loss
  - ② Tx - Abx, ear drum patch
- Otitis externa - inflammation of ear canal, benign, self-limiting but painful
  - ① PE - hx of exposure, mechanical trauma (scratching), gram ⊖ infx (pseudomona or fungi)
  - ② Sx - pain, purulent ear, CHL, red/swollen external ear, purulent drainage, moving auricle ⇒ pain, red/swollen ear canal, difficult to visual TM
  - ③ Tx - prevent moisture/scratching, abx otic drops, resolve in 10 days, if not tx w/ initial tx ⇒ systemic abx, IV/PO abx

* using Q-tips

- Otitis externa - infx of ear canal
- Middle ear effusion - fluid build up fluid in the middle ear by blockage of Eustachian tube
- Otosclerosis ⇒ scarring of TM
- Cholesteatoma - abnormal skin growth in the middle ear, noncancerous

⇒ Avoid dizziness

- If rupture (perforation) doesn't heal, can ⇒ tympanic membrane residual (TM hole)

- Invasive otitis externa
  - malignant otitis externa
  - necrotizing otitis externa
  * can be fatal if not treated
- AOM w/ DM or immunocompetent pt → osteomyelitis of skull base → fatal!!!

- If TM is not visual → use fluoroquinolone drop (not ototoxic)

- Eustachian Tube disorder (ETD)

① cause - reflux of nasopharyngeal secretion, block tube by allergic rhinitis, sinusitis, URI, enlarged adenoids, pregnancy, air travel, scuba-diving

② Sx - ↓hearing, fullness in ear, tinnitus, disequilibrium, pain, TM appear retracted, effusion, prominent malleus

③ DDx - acute, serous or chronic otitis media, otitis externa, cerumen impaction, viral myringitidis, cholesteatoma, otosclerosis

④ Diagnosis - pneumatic otoscopy (affected TM → immobile), Weber / Rinne → CHL

⑤ Tx - treat underlying issue

- Cold - saline drop, neti pot
- AOM / sinus infx - abx
- Allergic rhinitis - nasal steroid, decongestant → contraindicated for <6 yr old & careful w/ CVD or HTN
- Comfort measure - acetaminophen, ibuprofen, yawning, chewing, sucking, ✱ Do not hold nose & blow → may cause TM perforation
- Tympanostomy tube

- Adenoids - glands in the roof of mouth, produce antibodies, WBC
- ETD w/ pregnancy - due to increasing mucosal edema → obstruction, ↓ OME
- Myringitis - form of AOM, vesicle development on TM by viral, bacterial infx