

# Dizziness, Vertigo and Hearing Loss

Neurology Didactic Session 4

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# Definitions

- Tinnitus – A sensation of noise in the ear
  - Objective = Examiner can auscultate it (Think AVM)
  - Subjective = Only experienced by patient
- Vertigo
  - Illusion of motion
  - Does NOT mean “spinning”
- Hearing loss
  - Unilateral = Focal pathology distal to brainstem
  - Bilateral = Toxic-metabolic
    - STROKES HARDLY EVER CAUSE HEARING LOSS!

# Ear anatomy and definitions

- External ear
  - Tympanic membrane and everything distal
  - Includes the external ear
- Middle ear – Ossicles plus Eustachian tube
  - Malleus, Incus and Stapes –pierces oval window
  - Eustachian tube- pressure equalization
- Inner ear –Fluid filled labyrinth
  - Cochlea- Hearing
  - Vestibule for balance (saccule and utricle)
  - Semicircular canals for detecting rotation

# Posture

- Three main structures
  - Visual input most important
  - Posterior columns
    - Detect the floor
    - Allow for orientation with the environment
  - Inner ear (least important)
- Vertigo occurs when there is a mismatch

# Connections

- Medial longitudinal fasciculus
  - Yokes eyes together
  - Coordinates with vestibular system
- Cerebellum (Smooths out movements)
  - Flocculonodular lobe – Eye movements/vestibular system
  - Vermis and other midline structures – trunk coordination
  - Hemispheres- Controls the limbs

# Central vs. peripheral vertigo

	Peripheral	Central
Nystagmus	Combined horizontal and torsional; inhibited by fixation of eyes onto object-does not change direction with gaze to either side	Purely vertical, horizontal, or torsional; not inhibited by fixation of eyes onto object;
Imbalance	Mild to moderate-able to walk	SEVERE-unable to walk
Hearing loss/tinnitus	Common	Rare
Non-auditory neurological deficits	Rare	Common
Latency after provocative maneuver	Longer (up to 20 sec)	Shorter (up to 5 sec)

# Approach to the dizzy patient

- Have the patient define “dizziness”
  - Illusion of motion?
  - Lightheadedness?
  - Affected by postural changes?
- Examine for “neighborhood signs”
  - Nystagmus
  - Extraocular abnormalities
  - Facial weakness
- Examine for orthostatic hypotension
- Examine for “long tract signs”

# Common peripheral disorders

- Benign positional vertigo
  - Provoked by moving into ONE specific position
  - More common in older persons
- Acute labyrinthitis
  - Vertigo and eye movement findings
  - Position independent
- Acoustic Neuroma
  - Slowly progressive unilateral hearing loss
- Meniere's Disease
  - Dizziness, Vertigo and Unilateral hearing loss



# Imaging studies

- Indications:
  - ANY evidence of central nervous system involvement
  - Unilateral hearing loss
  - Cannot definitive determine lesion is peripheral
- Study of choice
  - Head CT to exclude hemorrhage
  - MRI if hemorrhage is excluded by CT

# Treatments summarized

- Benign positional vertigo
  - Epley Maneuver
  - <http://www.youtube.com/watch?v=ZqokxZRbJfw>
- Acute labyrinthitis
  - Sedative agents (e.g. clonazepam)
  - Rehabilitation
- Acoustic Neuroma
  - Surgical excision should be considered
- Meniere's Disease
  - Low salt diet
  - Diuretics