

A practical approach to Dizziness

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Objectives

- To get an idea about the balance.
- To elaborate more on the meanings of dizziness
- To differentiate peripheral from central vertigo
- To review the common causes of vertigo
- To review the treatment options of vertigo.

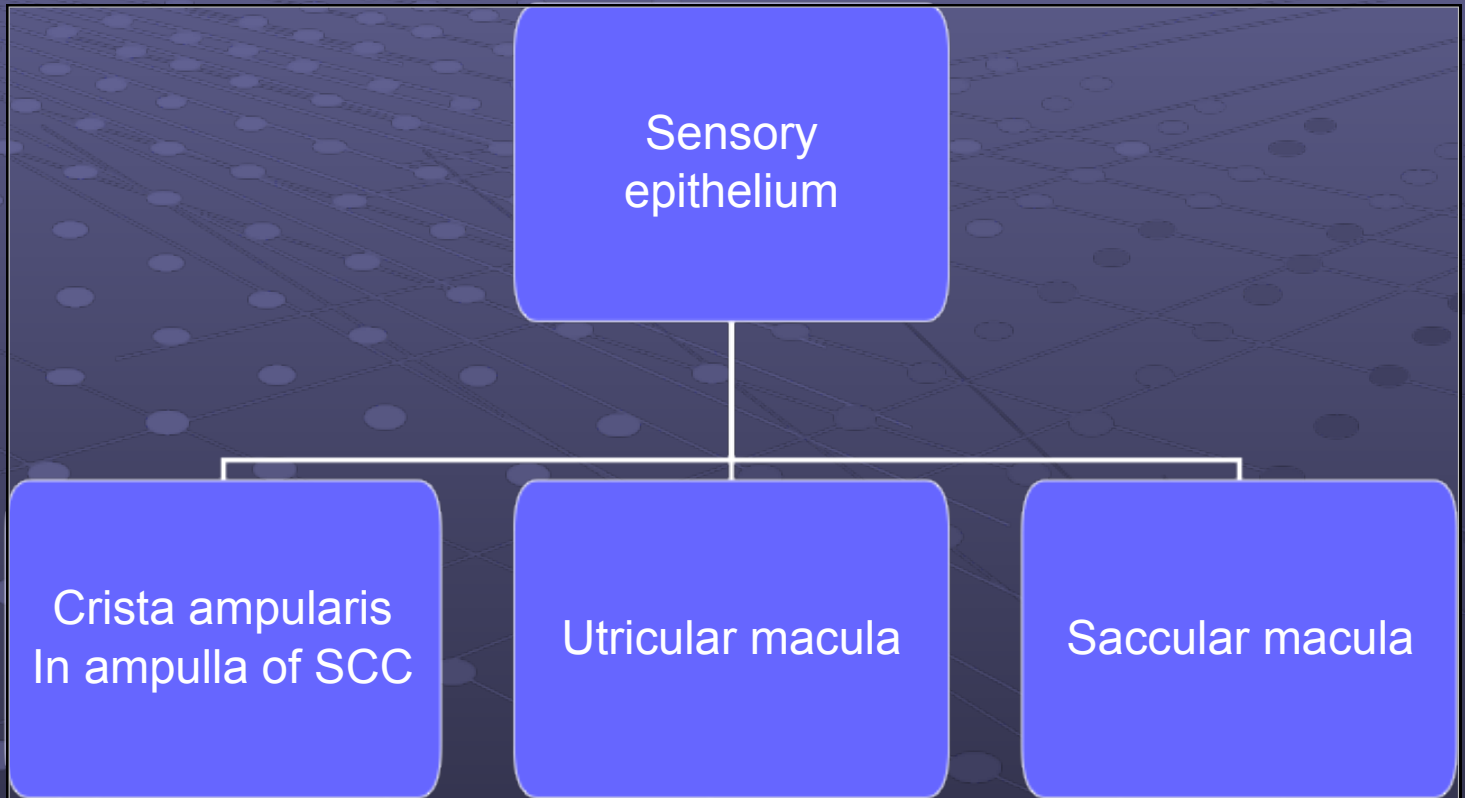
Balance (Equilibrium)

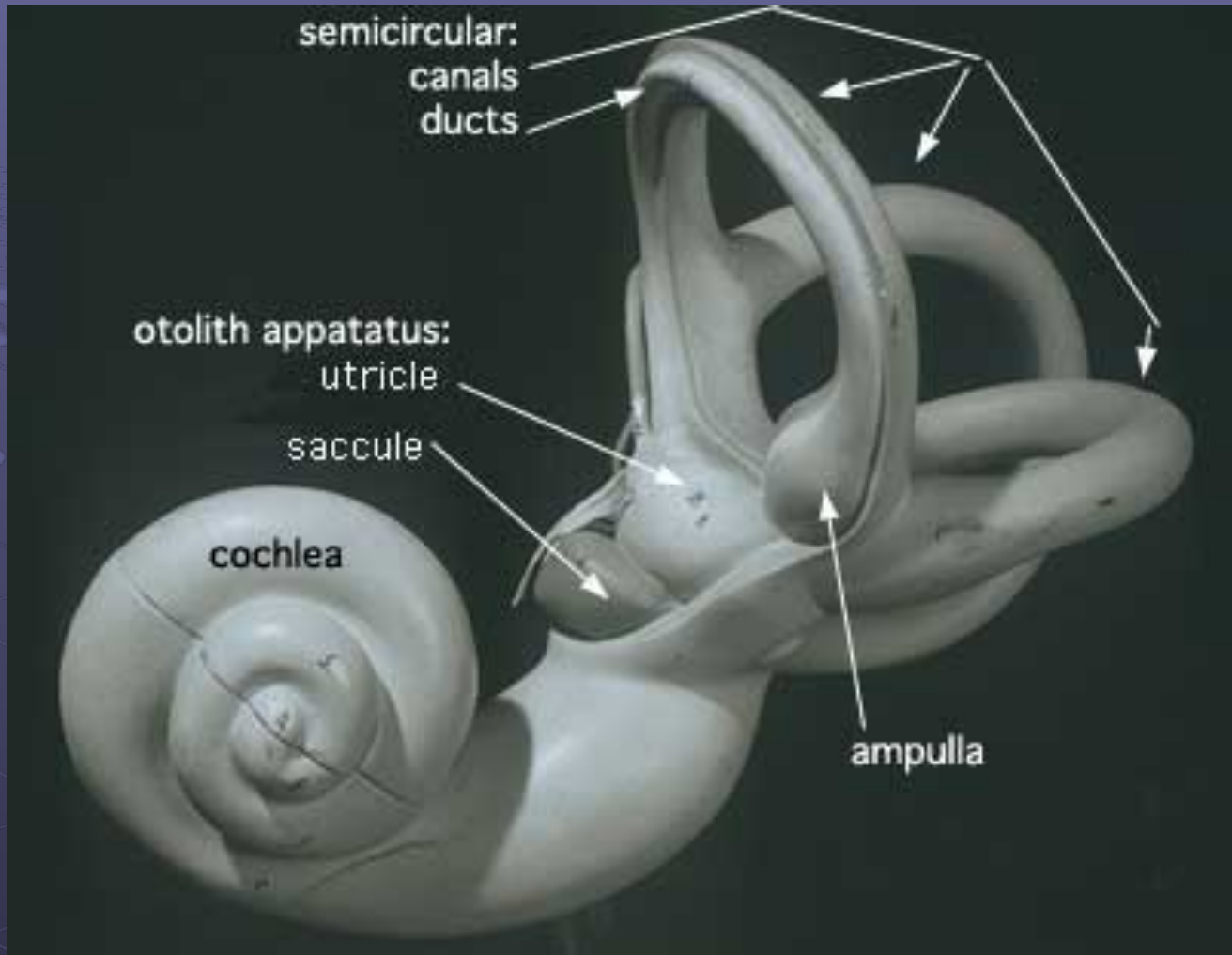
- It is a complex process, by means of which the body maintains its posture and coordinated movements, stable gaze as well as to keep the body oriented in the space.
- It is a reflex function, which means it has afferent, central integration and efferent parts.

Organs and Systems involved

- Afferent parts:
vestibular system of the inner ear, visual system, proprioceptive system (touch, vibration, tendons, ligaments and joint sensation).
- Central structures:
Reticular formation, cerebellum, thalamus, hypothalamus, corpus striatum and cortex.
- Efferent part;
ocular, cervical, and body muscles.

Vestibular system





vestibular system

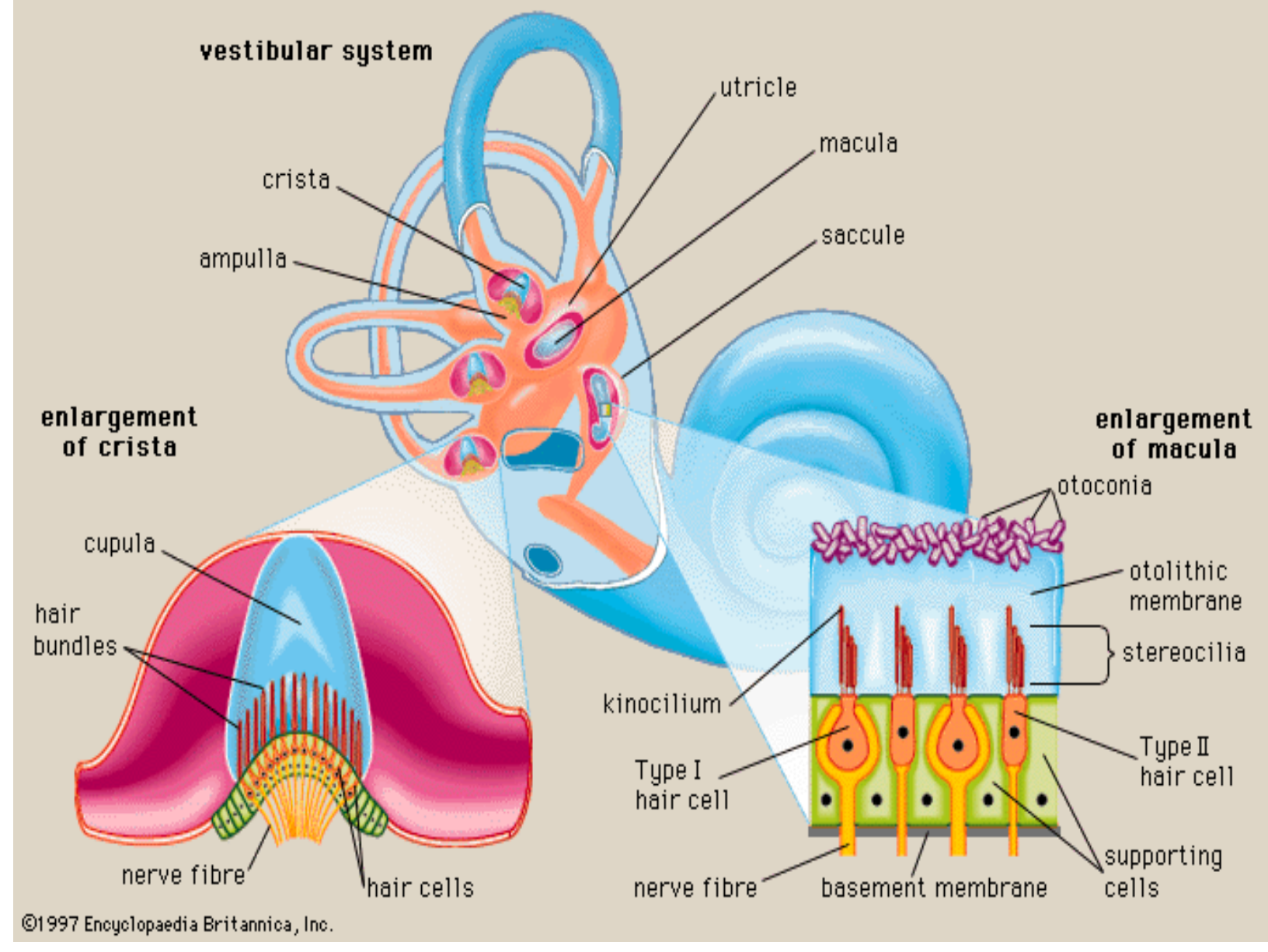
utricle
macula
sacculle
crista
ampulla

enlargement of crista

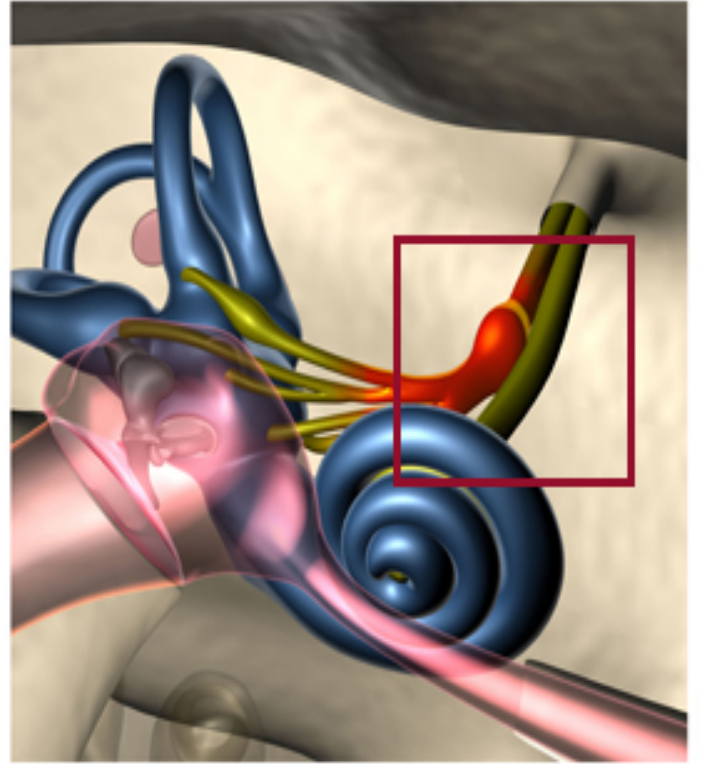
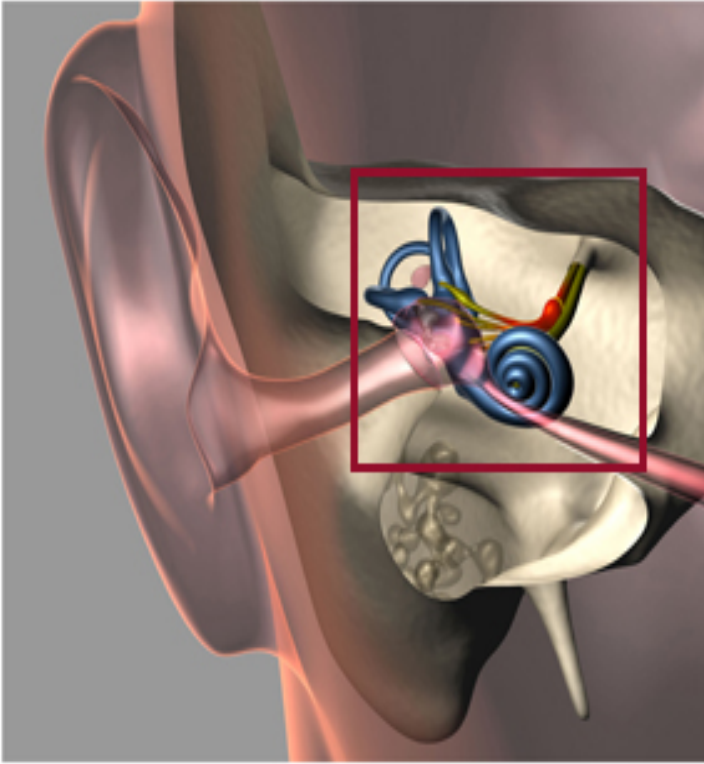
cupula
hair bundles
nerve fibre
hair cells

enlargement of macula

otoconia
otolithic membrane
stereocilia
kinocilium
Type I hair cell
Type II hair cell
nerve fibre
basement membrane
supporting cells

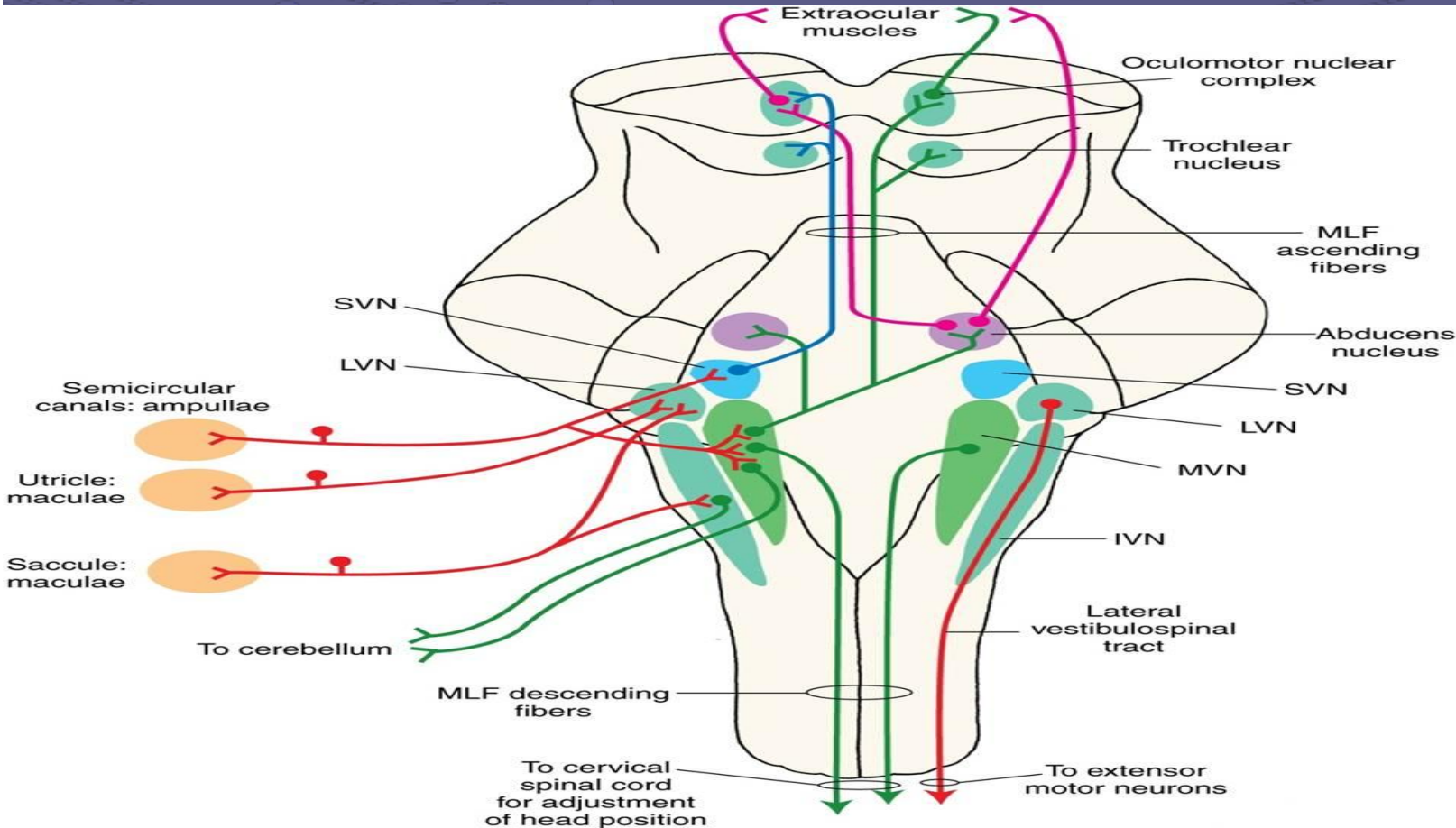


Vestibular nerve



Vestibular Nuclear Complex

Located in the Pons and Medulla



CENTRAL CONNECTIONS OF THE VESTIBULAR NUCLEI

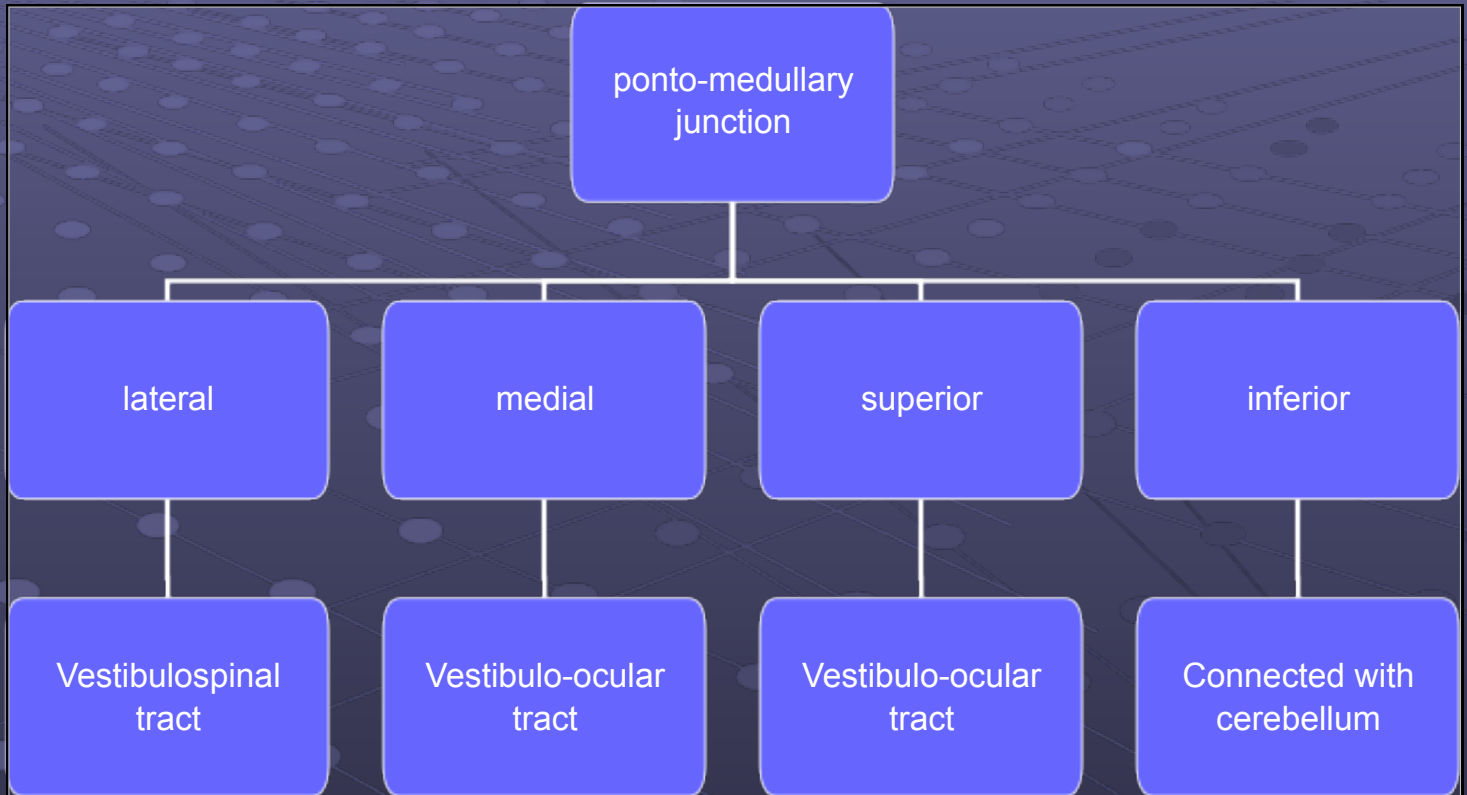
The vestibular nuclei have pathways to the:

A. Extraocular muscles - to coordinate eye movements with head movements (vestibule-ocular reflex)

B. Spinal cord - to maintain upright posture and balance (vestibule-spinal reflex)

C. Cerebellar cortex - to perceive spatial orientation and motion (vestibule-colic reflex)

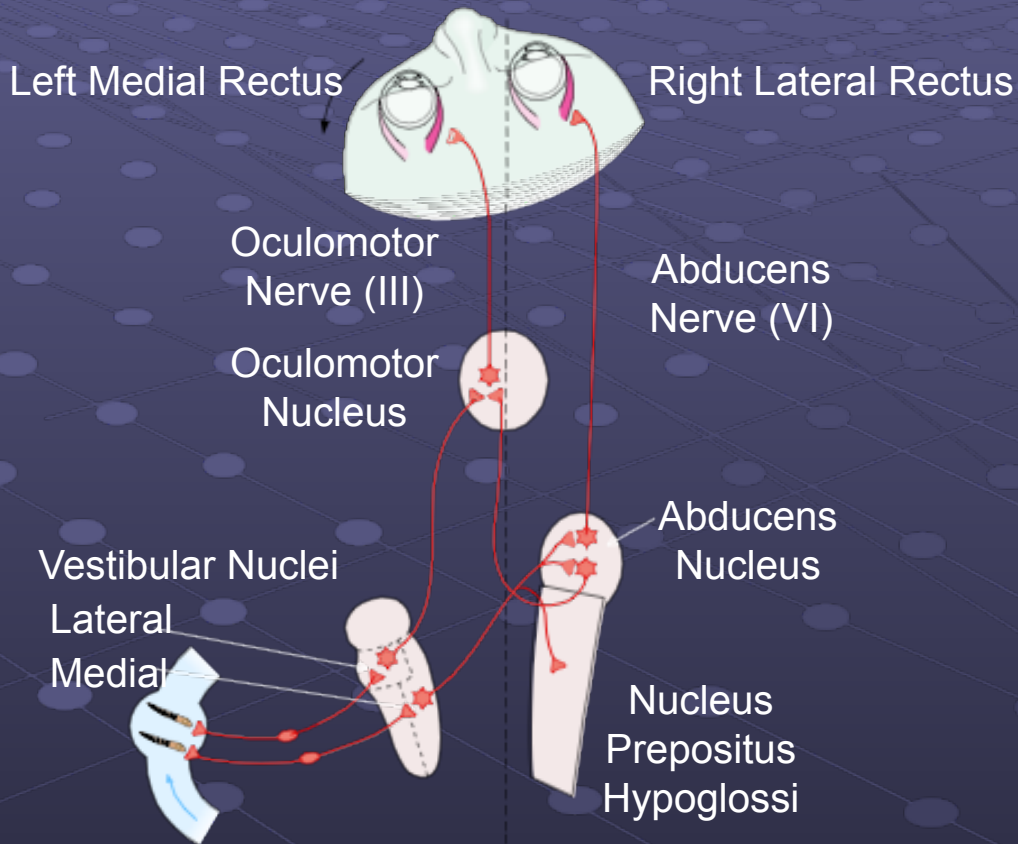
Vestibular Nuclei



Vestibulo-Ocular Reflex

- It maintains stable vision during head movement.
- This is the key to understand how nystagmus develops .
- It is the most important for ENT surgeon to understand.

The horizontal vestibulo-ocular reflex (VOR)



Dizziness

- It is an altered orientation in space.
- It is an extremely common symptom:
2.4% of visits to physicians
30% of people by the age of 60 years have suffered from dizziness
- More than 60 different disorders may result in dizziness, which includes; peripheral and central NS, Cardiovascular, ears, eyes.....
- 12% of patients have more than one cause.

Continue Dizziness...

- One third of dizzy patients have psychiatric disorders .
- Dizziness may be **physiological (motion sickness)** or **pathological**.
- Multisensory dizziness is due to partial or multiple sensory systems loss.
- Criteria, which help to differentiate dizziness: type, course and relation of dizziness to motion and age of patient.

Types of Dizziness

Syncope (cardiovascular problems).

Imbalance (unsteadiness).

Light headedness.

True vertigo.

Vertigo

- It is an **illusory sensation of rotation**.
- It is always temporary, but longstanding nonspecific vertigo is of psychogenic nature.
- **The only serious cause of vertigo is cerebellar infarction**
- Vertigo is always made worse by head movement.
- 80-85% of vertigo is **peripheral means in the inner ear**
- Bilateral vestibular disorders usually do not produce vertigo, because of minimal imbalance of tonic activity.

Types of Vertigo

- Peripheral vertigo:

lesion of the **vestibular system below** (peripheral) to the vestibular nuclei.

- Central vertigo:

lesion of the **central parts of the vestibular system and central nervous system.**

Peripheral Vs Central Vertigo

peripheral

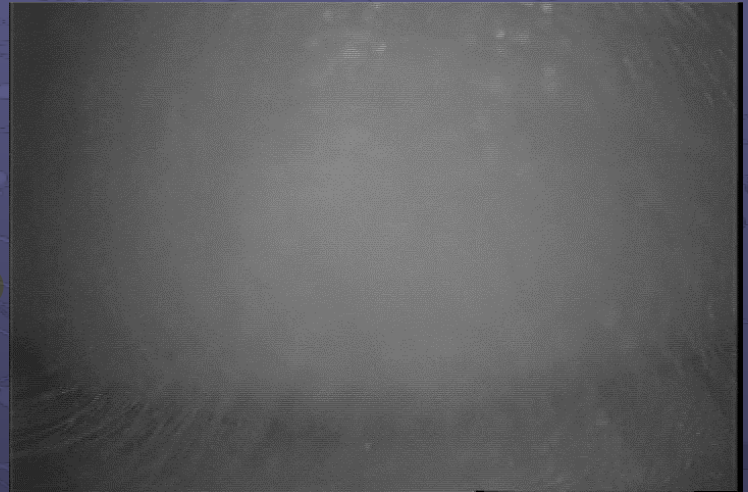
- Usually more severe
- Short duration
- Associated with **ear symptoms**
- Precipitating factors present; head movement, position, sneezing...
- Type of nystagmus
- Normal walk

Central

- Less severe
- Long duration
- Associated with **central symptoms**
- Precipitating factors; stress, anxiety, exertion
- Type of nystagmus
- Walk is difficult.

Nystagmus of peripheral type

- Latent period up to **30 seconds**.
- **Usually horizontal**
- Fatigable
- **Increases in darkness** or with Frenzel glasses and suppressed by visual fixation.
- **Unidirectional**



Nystagmus of central type

- No latent period
- Usually **vertical** or **changing direction**
- Non fatigable
- **Increases in visual fixation and decreases in darkness**
- **multidirectional**



Causes of central vertigo

- Vascular diseases.
- Migraine.
- Tumors.
- Multiple sclerosis.
- Trauma.
- Epilepsy.
- Infections.
- Parkinson.
- Hydrocephalus.
- dementia

Causes of peripheral Vertigo

Benign paroxysmal positional vertigo.

Meniere's disease.

Vestibular neuritis.

Perilymph and labyrinthine fistulae.

Vascular disease of inner ear.

Acoustic neuroma?

Post-traumatic.

Others: metabolic, ototoxic drugs, alcohol, autoimmune and others.

Multisensory Dizziness

- Psycho physiologic.
- Diabetes mellitus.
- Aging.
- Systemic vasculitis.
- Adverse drug reaction.

Differential diagnosis of vertigo based on time course

- Vertigo lasting seconds:
BPPV, perilymph fistula
- Vertigo lasting minutes and hours:
Meniere's disease, transient ischemia of vertebrobasillar system, labyrinthine fistula, migraine, seizures.
- Vertigo lasting days:
vestibular neuronitis, labrynithitis, cerebellar infarction, multiple sclerosis, vestibulopathy, psychogenic, vestibular schwannoma.

Diagnosis of vertigo

- **Depends mainly on history taking:**
 - Nature of complaint
 - Duration of vertigo
 - Triggering and alleviating factors
 - Associated symptoms
 - Onsets
 - Severity of vertigo
 - Other factors

Continue Diagnosis

- **Physical Examination:**

- ears, head and neck,
- cranial nerves, eyes,
- rest of the body.

- **Cerebellar tests:**

- finger to nose, Romberg, Unterberger, rapid alternating movements,

- gait.

- spontaneous and gaze nystagmus

Head shake, Dix-Hallpike, fistula test, head thrust.

Continue Diagnosis

- **Investigations:**

- Laboratory

- Radiological

- Audiovestibular:

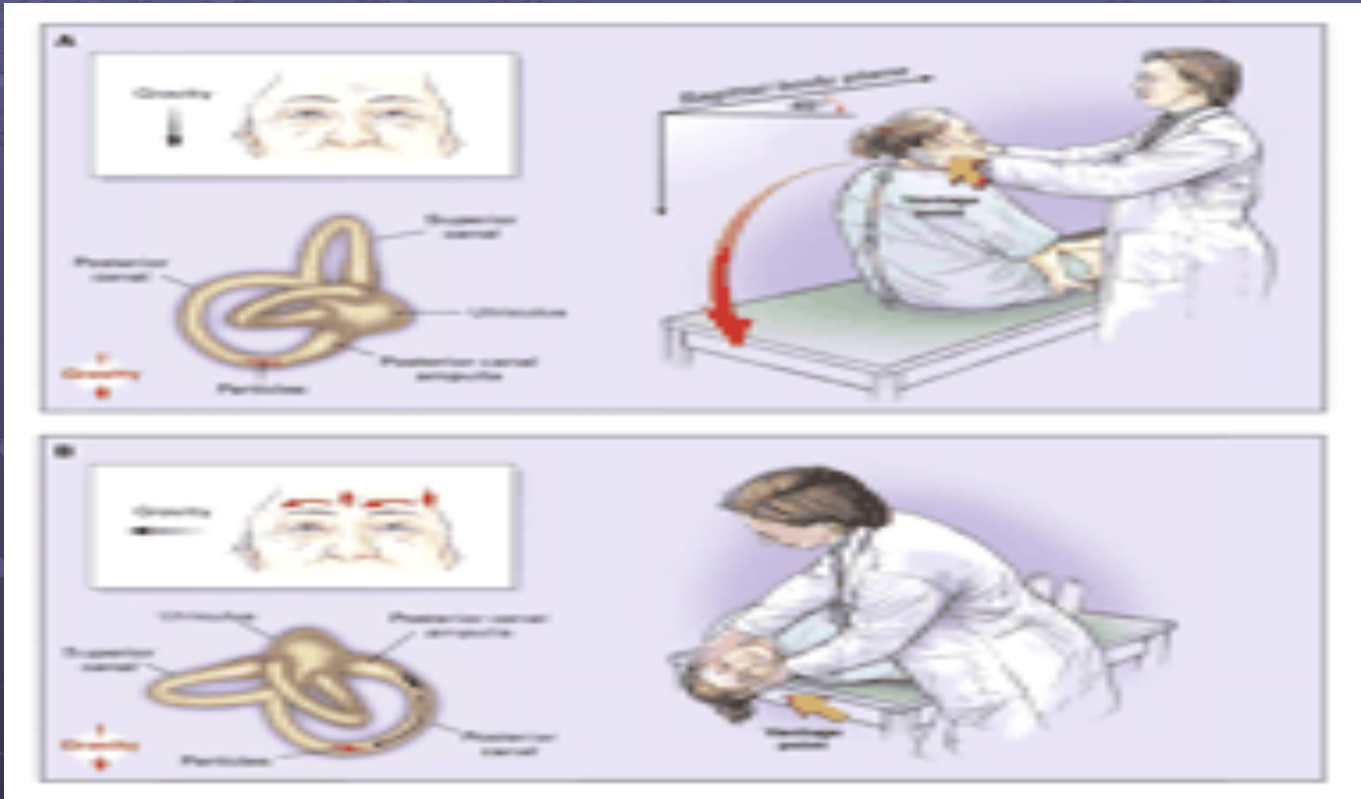
Audiogram, ABR, Rotatory chair, caloric test, Electronystagmography, vestibular evoked myogenic potential (VEMP) and others

- **No single diagnostic test that determine the source of vertigo**

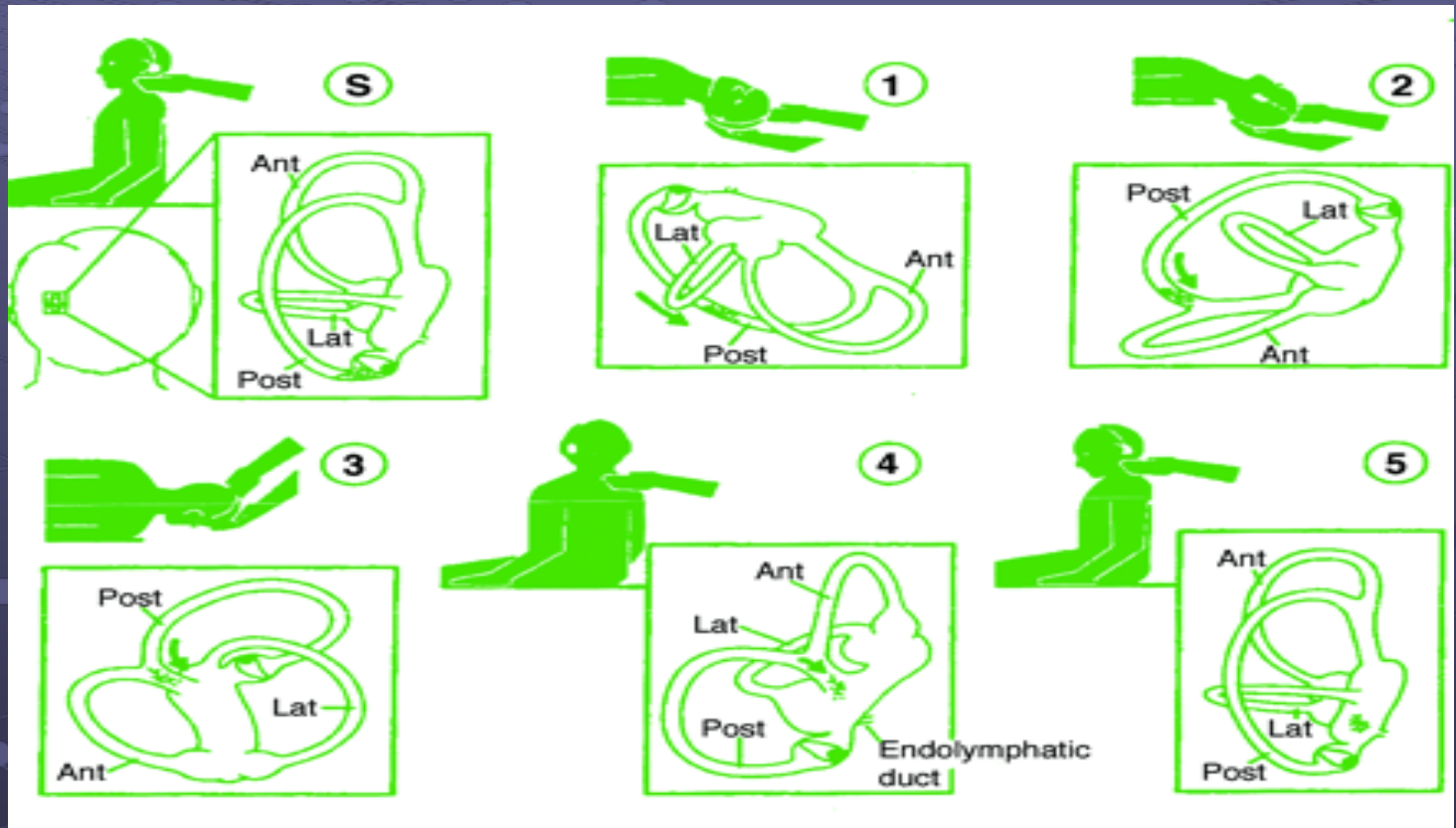
Benign Paroxysmal Positional Vertigo

- Accounts for more 50% of all causes of vertigo.
- It is the most common cause of vertigo.
- Incidence 1 per 1000 per year. No gender bias, and the mean age is 5-th decade.
- Etiology is not known.
- Pathogenesis; due to free floating particulate matter (debris or crystals) in the PSCC or other canals.
- Clinical picture; vertigo lasting seconds in changing head position.
- Diagnosis; history and Dix-Hallpike test.
- Treatment; Epley maneuver (exercises).

Dix-Hallpike Test



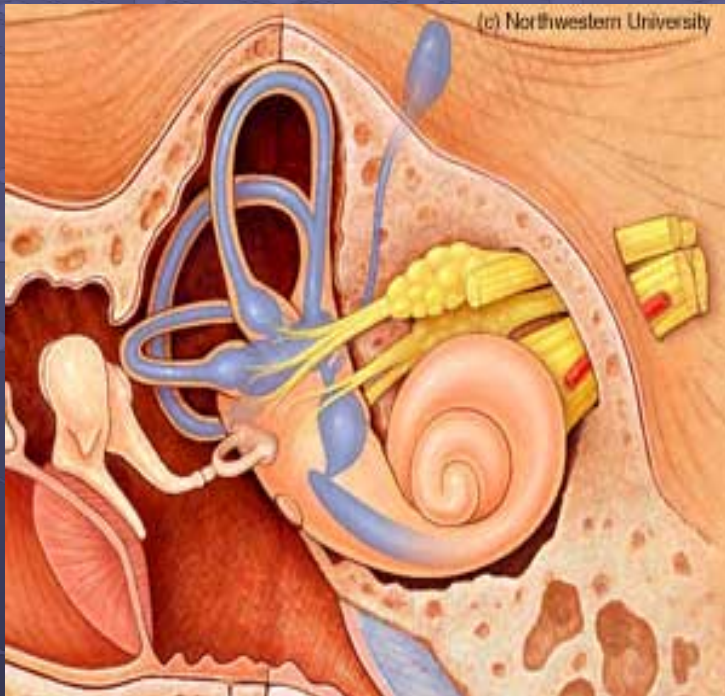
Epley Maneuvre



Meniere's Disease

- Incidence is 1-10 per 1000 per year.
- Equally affect both sexes.
- Age of onset is 3-6th decade.
- disease is bilateral in 50% of cases.
- Etiology; unknown.
- Pathogenesis; **endolymphatic hydrops** (increase in the endolymphatic pressure).
- Clinical picture; **vertigo (lasting minutes to hours), tinnitus, fluctuating hearing loss and ear fullness.**

Comparison between normal and abnormal endolymphatic space (blue spaces)



Continue Meniere's

- Diagnosis; history, physical examination and investigation: audiogram, caloric, glycerol dehydration test, electronystagmography, electro-cochleography.
- Treatment options; placebo, medical, dietary, physiotherapy and surgical. None of these is curative
- The most popular method of treating Meniere's nowadays is either betahistine or intratympanic gentamycin or dexamethasone injection.

Surgical options for Meniere's

- Grommet.
- Endolymphatic sac surgery.
- Vestibular nerve section.
- Sacculotomy.
- Ultrasound.
- Cervical sympathectomy.
- Labyrinthectomy

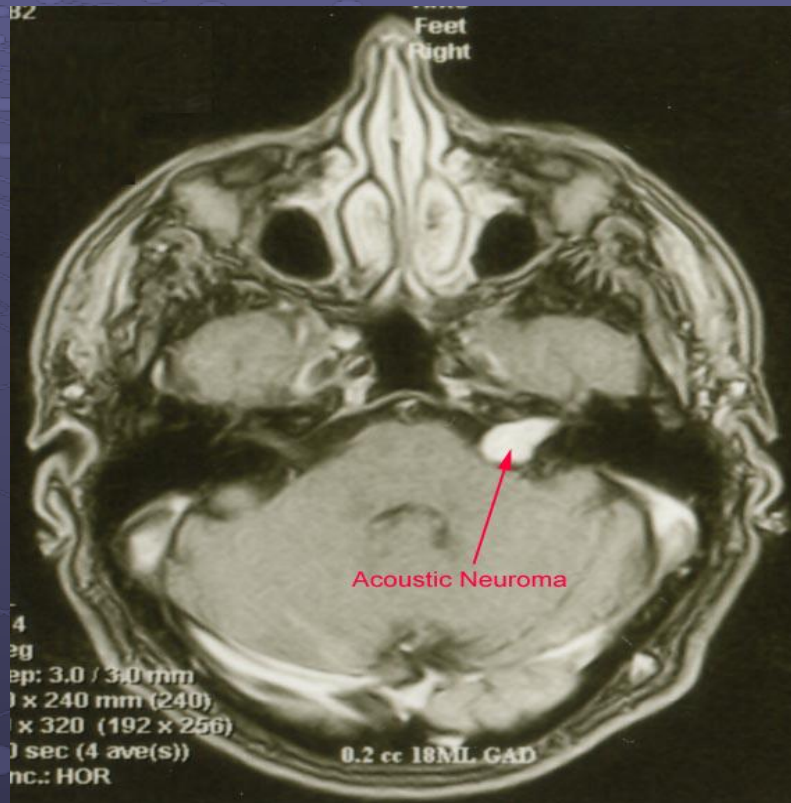
Vestibular Neuritis

- First described by Ruttin in 1909.
- No gender bias and affects middle age people.
- It is believed a **viral etiology** but no definite proof of viral etiology,
the pro factors of viral nature are:
viral prodrome, occurs in epidemics, affect several members of the same family and most commonly occurs in spring and early summer.
- **Clinical picture: vertigo lasting days with nausea and vomiting.** postural instability.
- **Diagnosis; history and the main thing to exclude cerebellar stroke.**
- **Treatment; symptomatic** (bed rest, betahistine, **antiemetics**, sedatives).

Acoustic Neuroma

- **Benign tumor of the vestibular nerve.**
- **Clinical picture; slowly progressive hearing loss and tinnitus.**
- Vertigo usually does not occur until late stage due to adaptation and central compensation.
- Occasional sudden vestibular failure occur, resulting in imbalance and tendency to veer to one side in darkness.
- **Treatment** depends on age, general condition of patient and the size and growth rate of tumor

MRI for Acoustic Neuroma



Perilymph Fistula

- It is **abnormal communication between the perilymph space of inner ear and the middle ear.**
- **Etiology;** trauma, spontaneous.
- **Clinical picture;** imbalance, positional vertigo and sudden hearing loss
- **Diagnosis;** history, clinical picture and exploration of middle ear when suspected.
- **Treatment;** **resolve spontaneously, if not surgical repair.**

treatment of acute vertigo

- **General principles:**
 - Reassurance
 - Therapy must be directed to the underlying cause.
 - Relieve anxiety and depression
 - Exercise therapy is helpful
 - No definite cure by using antivertigenous drugs
 - Drugs only reduce the severity of vertigo
 - **Antiemetics should be used when there is nausea or vomiting**

Medications usually used in Treatment of vertigo

- **Antihistamines** (H1 antagonist): meclizine, dimenhydrinate, cyclizine, promethazine.....
- **Histamine analog: betahistine**
- **Anxiolytics**
- **Antiemetics**: promethazine, prochlorperazine, ...
- **Tranquilizers**: diazepam, oxazepam, haloperidol
- **Diuretics**
- **Diet (low salt and fluids)**
- **Chronic vertigo: vestibular rehabilitation**

Conclusions

- Vertigo is difficult for both physician and patient.
- Very careful history is essential for diagnosis.
- In the majority of cases no drug can cure vertigo.



THANK YOU

