DIZZINESS & VERTIGO

A MULTIDISCIPLINARY APPROACH

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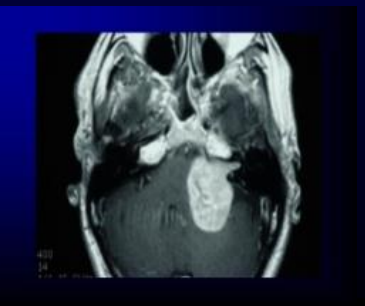
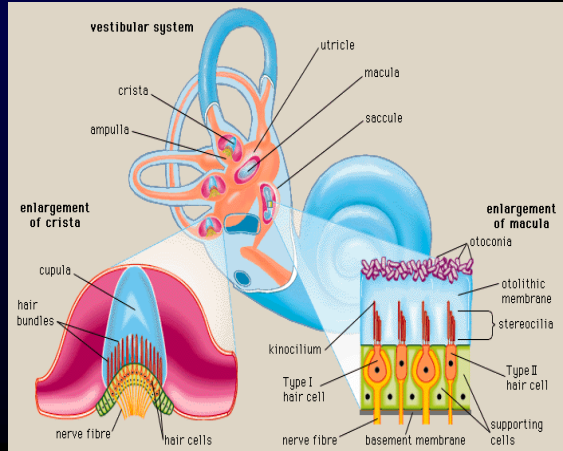


“Labyrinthine disturbance may make one feel like the end of the world has arrived... and in the acutest phase of the distress one may wish that it had!”

Sir Terence Cawthorne



DIZZINESS & VERTIGO

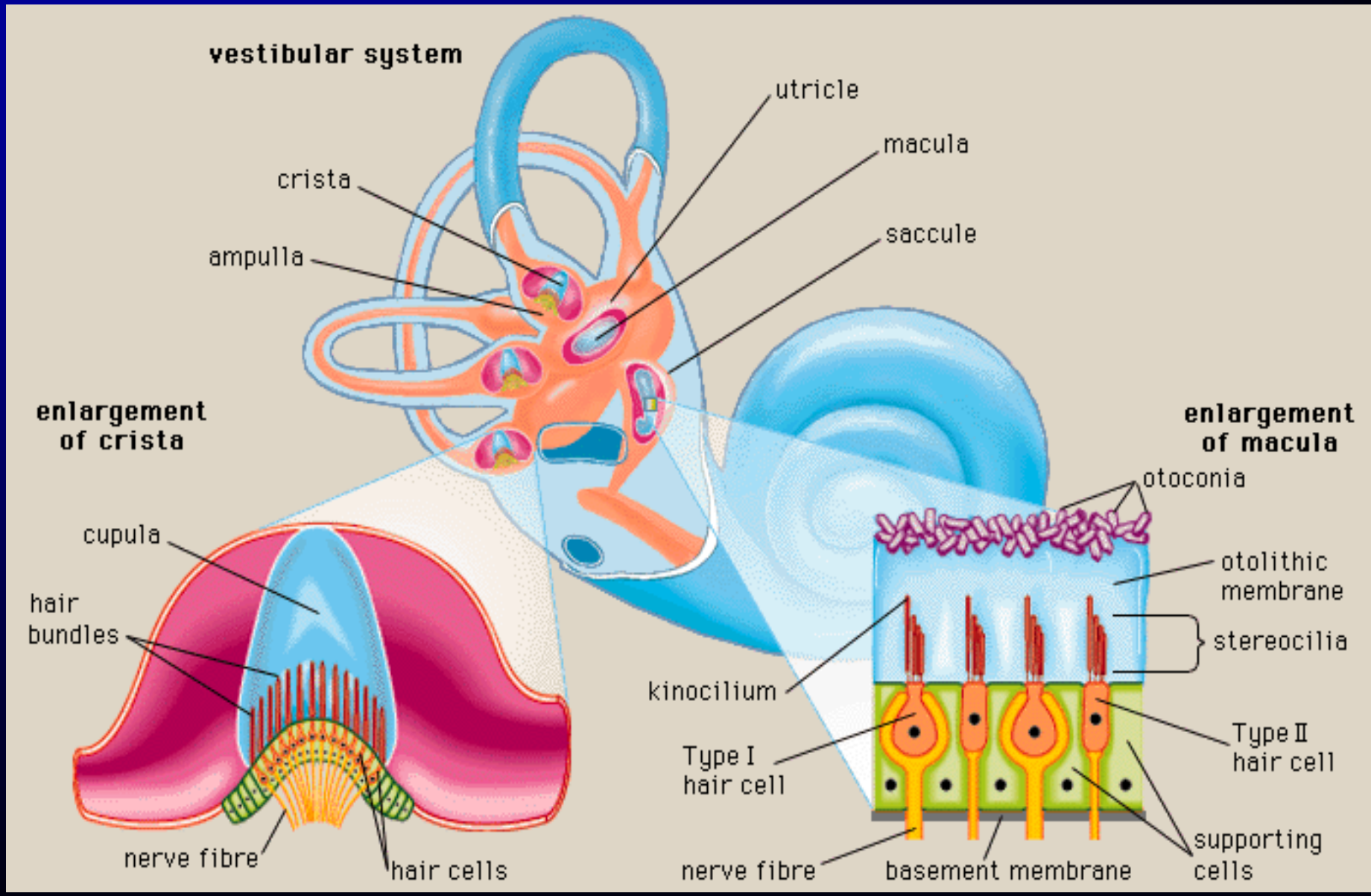
- Very common
- Some are life-threatening
- Others pose a threat to livelihood

- Many go undiagnosed and untreated

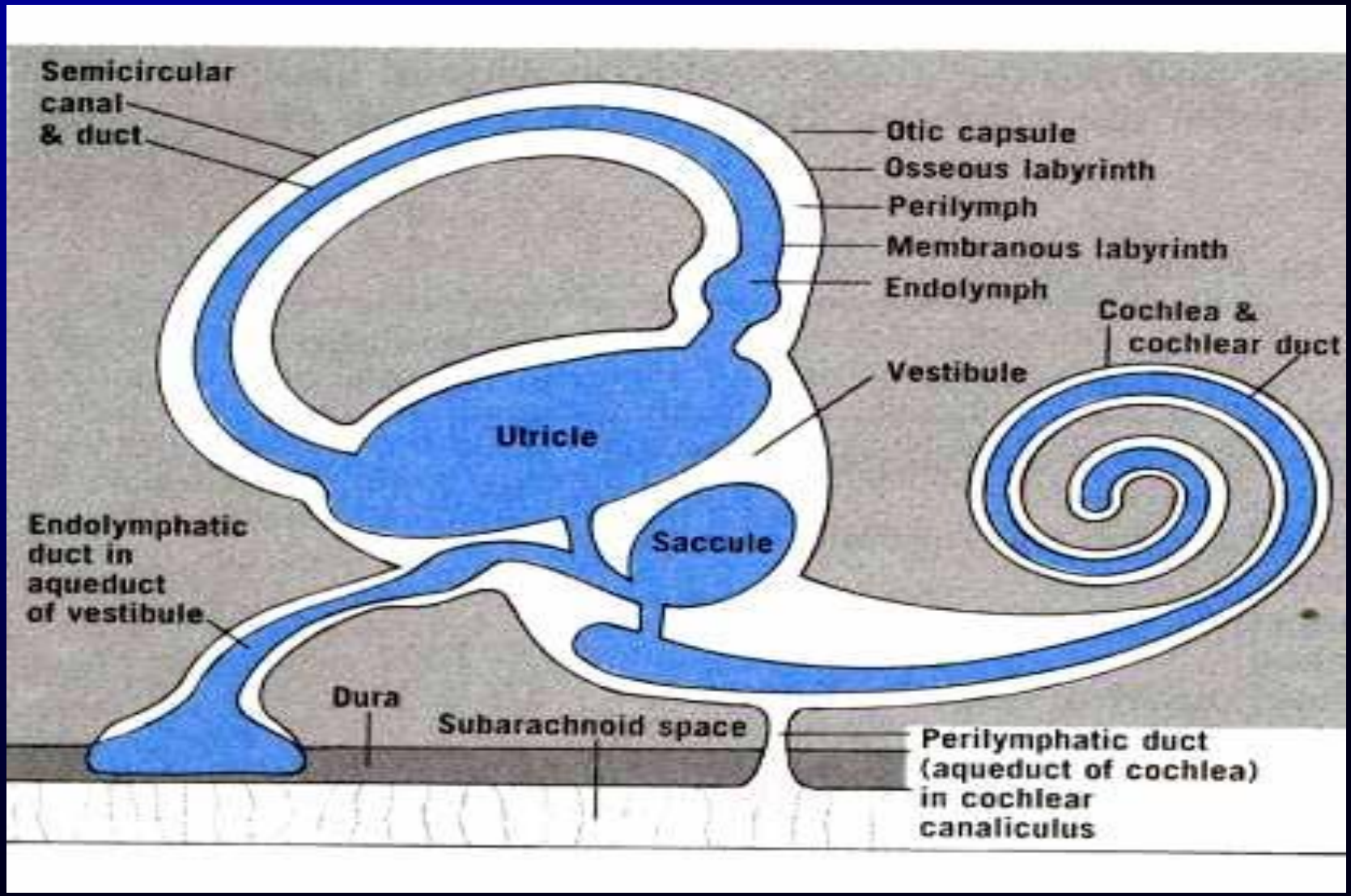
THE BALANCE SYSTEM

- **Ears - semicircular canals, saccule, utricle, cochlea**
- **Eyes**
- **Skin - light touch**
- **Musculoskeletal system - proprioception, muscle tone, reflexes**
- **Central nervous system - cerebellum, brainstem, cerebral cortex**
- **Cardiovascular system**
- **Respiratory system**
- **Endocrine system**

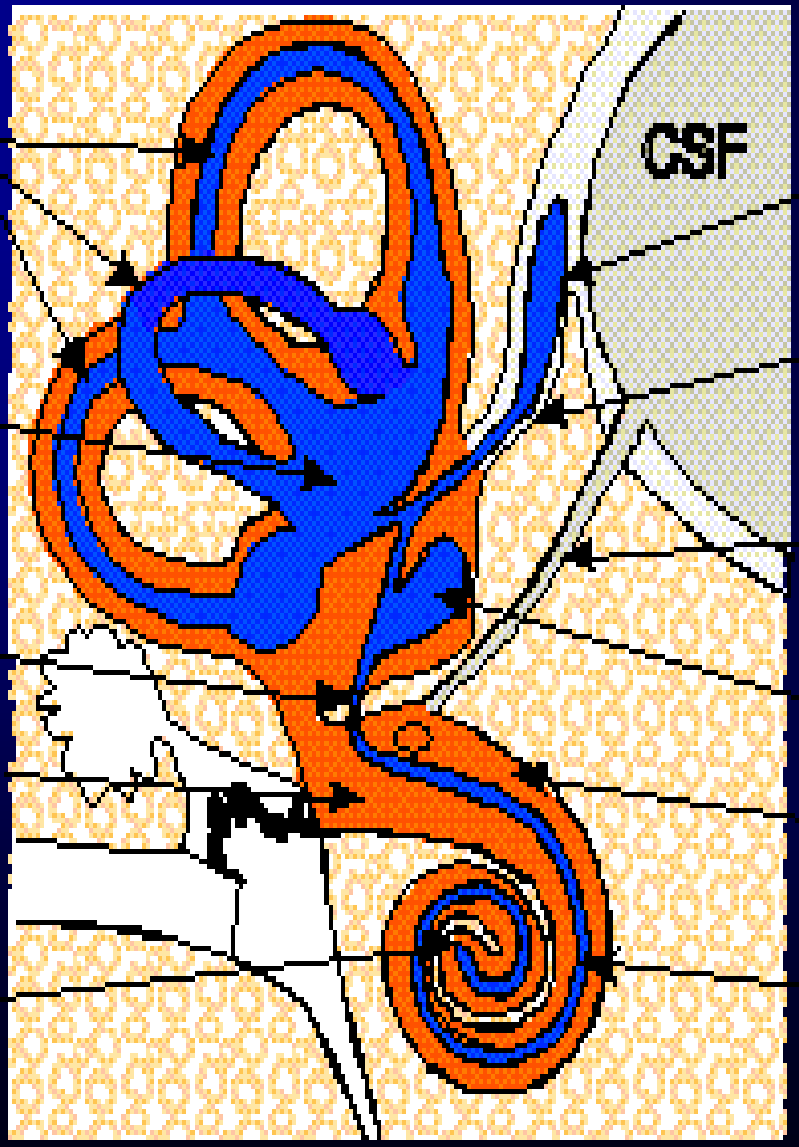
THE EAR


vestibular system
utricle
macula
crista
saccule
ampulla
enlargement of crista
enlargement of macula
otoconia
cupula
otolithic membrane
hair bundles
stereocilia
kinocilium
Type I hair cell
Type II hair cell
supporting cells
nerve fibre
hair cells
nerve fibre
basement membrane

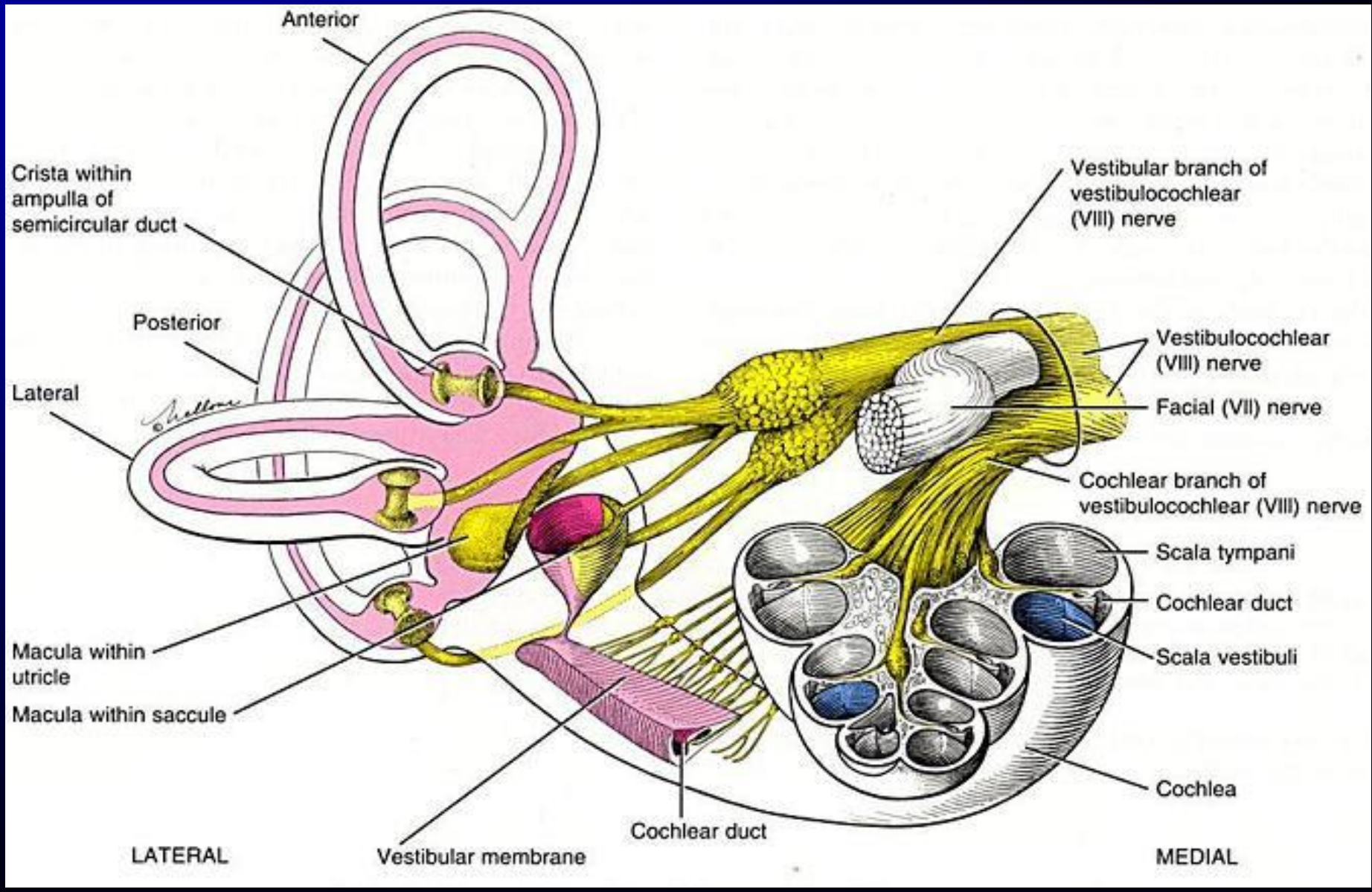
THE EAR


Semicircular canal & duct
Otic capsule
Osseous labyrinth
Perilymph
Membranous labyrinth
Endolymph
Cochlea & cochlear duct
Vestibule
Utricle
Saccule
Endolymphatic duct in aqueduct of vestibule
Dura
Subarachnoid space
Perilymphatic duct (aqueduct of cochlea) in cochlear canaliculus

THE EAR


Semi-Circular Canals
Utricle
Ductus Reuniens
Scala Vestibuli
Helicotrema
CSF
Endolymphatic Sac
Vestibular Aqueduct
Cochlear Aqueduct
Saccule
Scala Tympani
Scala Media

THE EAR


Anterior
Crista within ampulla of semicircular duct
Posterior
Lateral
Macula within utricle
Macula within saccule
Vestibular branch of vestibulocochlear (VIII) nerve
Vestibulocochlear (VIII) nerve
Facial (VII) nerve
Cochlear branch of vestibulocochlear (VIII) nerve
Scala tympani
Cochlear duct
Scala vestibuli
Cochlea
Cochlear duct
Vestibular membrane
LATERAL
MEDIAL

DEFINITIONS

- Vertigo is an illusion of movement
- Dizziness is a vague term
  - vertigo, unsteadiness, presyncope
  - non-specific symptoms (weakness, tiredness, lightheadedness, heavyheadedness, swimmy feeling, blurred vision, loss of memory, difficulty thinking, poor concentration, etc)

SYSTEMS INVOLVED

- **Vertigo – cardinal symptom of disturbance of the Vestibular System**

- **Dizziness – various systems**
  - **Vestibular**
  - **Cardiovascular**
  - **Respiratory**
  - **CNS and PNS**
  - **Musculoskeletal**
  - **Eyes & Visual Pathways**
  - **Endocrine**
  - **Metabolic**

TRADITIONAL APPROACH

Articulated in 1972
Still the gold standard

The first diagnostic question is

"What do you mean by dizzy?"

The response directs subsequent diagnostic inquiry

- **vertigo - vestibular causes**
- **presyncope - cardiovascular causes**
- **unsteadiness - neurological causes**
- **non-specific dizziness - psychiatric**
  - metabolic causes

NEW APPROACH

More reliable in the Emergency Setting

- **IS THIS PATIENT'S LIFE IN DANGER?**

  Check Vital Signs

  – **Pulse, BP, Temp, RR, O2 Saturation, GCS**

- **IS THERE ANY PAIN, HAEMORRHAGE, SEPSIS?**

  Head, Neck, Chest, Abdomen, Back

Dr David Newman-Toker, PhD Thesis

The Johns Hopkins University, Baltimore

DETAILED HISTORY

Describe the very first attack

Severity, duration, frequency

Precipitating and alleviating factors

Associated symptoms

- Ears, Eyes, CVS, CNS/PNS, Endocrine, Neurovegetative, Psychological

Falls / loss of consciousness / Head injury

Past Medical History – DM, ↑BP, IHD, migraine, epilepsy, CVA, meningitis, otitis media, syphilis

Drug History – aminoglycosides, macrolides, itraconazole, fluoxetine withdrawal

Social History – occupation, substance abuse

Family history – migraine, Meniere's disease

EXAMINATION

- General Examination
- Cardiovascular - pulse, BP (sitting and standing), murmurs, neck bruits
- Ears and Hearing - need full view of eardrum, tuning fork tests, fistula test
- Eyes - acuity, range of movements, field defects, nystagmus, pupillary reactions, fundoscopy
- Neurological - cranial nerves, cerebellar signs (inc. truncal ataxia), tone, power, reflexes, sensation (inc. proprioception - Romberg), coordination (finger-nose, dysdiadochokinesia, heel-shin)
- Gait
- Special Tests - Hallpike-Dix Test
- Other tests - Unterberger, Head Shake/Thrust

INVESTIGATIONS

- **Should be guided by the history and examination**
- **Laboratory - Glucose, FBC, biochemistry, TSH, syphilis serology, lipids**
- **Radiology - CT, MRI, MRA, Doppler**
- **Cardiology - ECG, Echo, Holter**
- **Audiovestibular - Pure tone audiometry, posturography, caloric, rotating chair**
- **Ophthalmology**

TREATMENT

- Depends on cause
- Referral to appropriate specialist
  - Cardiologist, Neurologist,
    ENT Surgeon, Ophthalmologist,
    Psychiatrist, Orthopaedic Surgeon
- Involve the patient's GP
- Health-allied professionals
  - Audiologist, Optometrist,
    Physiotherapist, Psychologist
- TEAM WORK

CASE SCENARIOS

Case 1

60 year old male

Brief lightheadedness and unsteadiness on getting up

Nausea

Occasional confusion

Fainted once - no injury sustained

Orthostatic (postural) Hypotension

Case 2

65 year old hypertensive male smoker

Sudden rotatory vertigo and unsteadiness

Diplopia

Dysarthria

Paraesthesia

Full recovery in 10 minutes

Vertebrobasilar Insufficiency
or
Transient Ischaemic Attack

Case 3

30 year old female

Sudden onset of vertigo at 5 am

Room spins for about 30 seconds

when she turns over in bed

Very reluctant to look up or bend down

Nausea

No vomiting

Benign Paroxysmal Positional Vertigo (BPPV)

Case 4

50 year old female

Sudden onset of rotatory vertigo and unsteadiness while at work

Associated aural fullness, tinnitus, deafness

Vomiting

Returned to normal the next morning

Ménière's Disease

Case 5

30 year old overweight female

Room moves for a few minutes to hours

Low frequency humming tinnitus

Mild hearing loss

Deterioration of memory

Dull headache

Benign Intracranial Hypertension

Idiopathic Intracranial Hypertension

Pseudotumour Cerebri

Case 6

55 year old male

Admitted 2 weeks ago with an infected hip prosthesis

Complains of severe dizziness and deafness

Oscillopsia

Wheelchair bound

Iatrogenic Ototoxicity

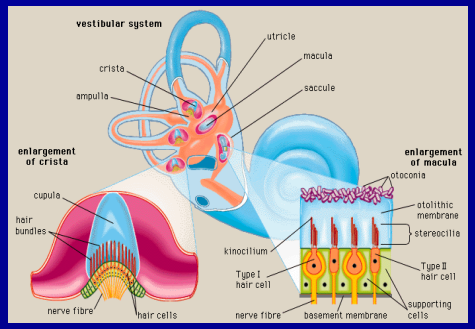
(Gentamicin + Vancomycin)

Case 7

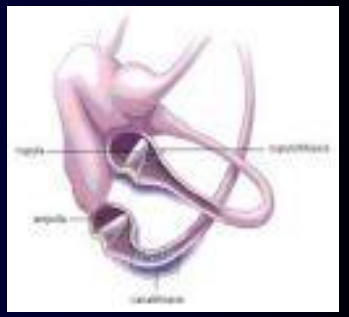
- 7 year old boy
- Frequent episodes of foul smelling otorrhoea for 1 year
- Dizziness provoked by noise exposure and nose-blowing (Tullio's phenomenon)

Cholesteotoma causing horizontal semicircular canal fistula

BENIGN PAROXYSMAL POSITIONAL VERTIGO

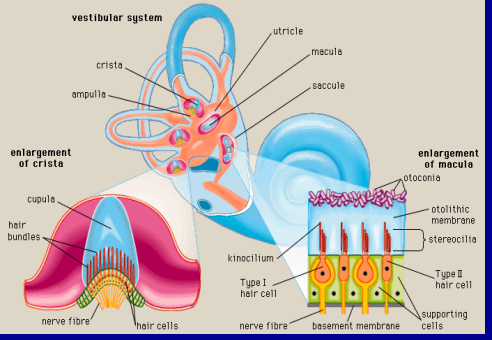


BPPV



- Most common peripheral vestibular disorder
- Utricular damage - head injury, viral
- Free floating otoconia
- Posterior semicircular canal (93%) - most dependent canal - of those 9% bilateral
- Horizontal SCC (5%)
- Superior SCC rare

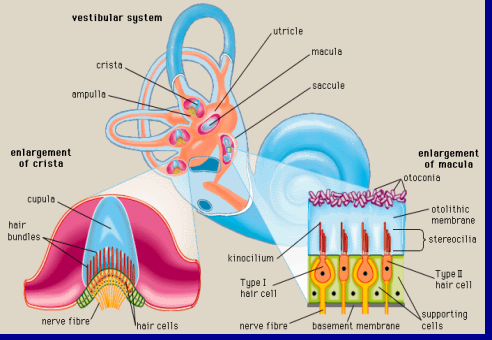
Honrubia V, Baloh RW, Harris MR, Jacobson KM (1999) Paroxysmal positional vertigo syndrome. Am J Otol, 20:465-470



BPPV Features

- Generally adults
- M = F
- Incidence increases with age

- Shortlasting rotatory vertigo
- Provoked by looking up or down, turning over in bed, sitting up
- Nausea is frequent, vomiting is uncommon

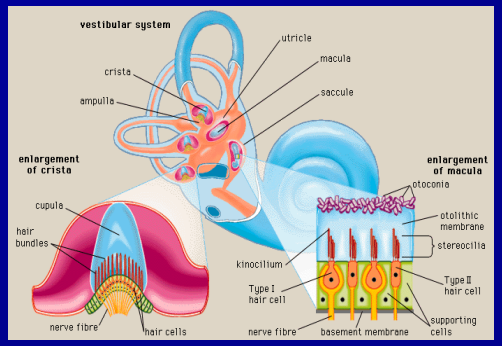


BPPV Diagnosis

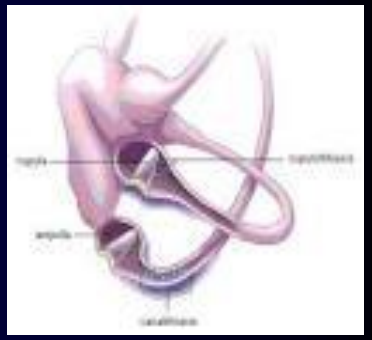
- **Hallpike-Dix Test**
  - **Pathognomonic nystagmus (downbeating nystagmus with torsional component - latency, fatiguability, adaptability)**
  - **More obvious with Frenzel's Glasses or Infra-Red Video Goggles**
  - **Less obvious after taking vestibular sedatives e.g stemetil, cinnarizine**

SIGNIFICANCE OF HALLPIKE-DIX TEST FINDINGS

FEATURE	PERIPHERAL	CENTRAL
ONSET	Delayed up to 25 sec	Immediate
FATIGUABILITY	Dies down in 5-30 secs	Continuous over 30 secs
REPEATABILITY	Reduced response for about 30 min	Repeatable immediately
OCCURRENCE	Often in one position only	Often in more than one position
DIRECTION	Often towards the undermost ear. May be rotatory	Often towards the uppermost ear in each position
STABILITY OF DIRECTION	Constant for a given position	May change direction even within one test position
VERTIGO, NAUSEA, VOMITING	Frequent	Seldom



BPPV Treatment



- **EPLEY MANOEUVRE**

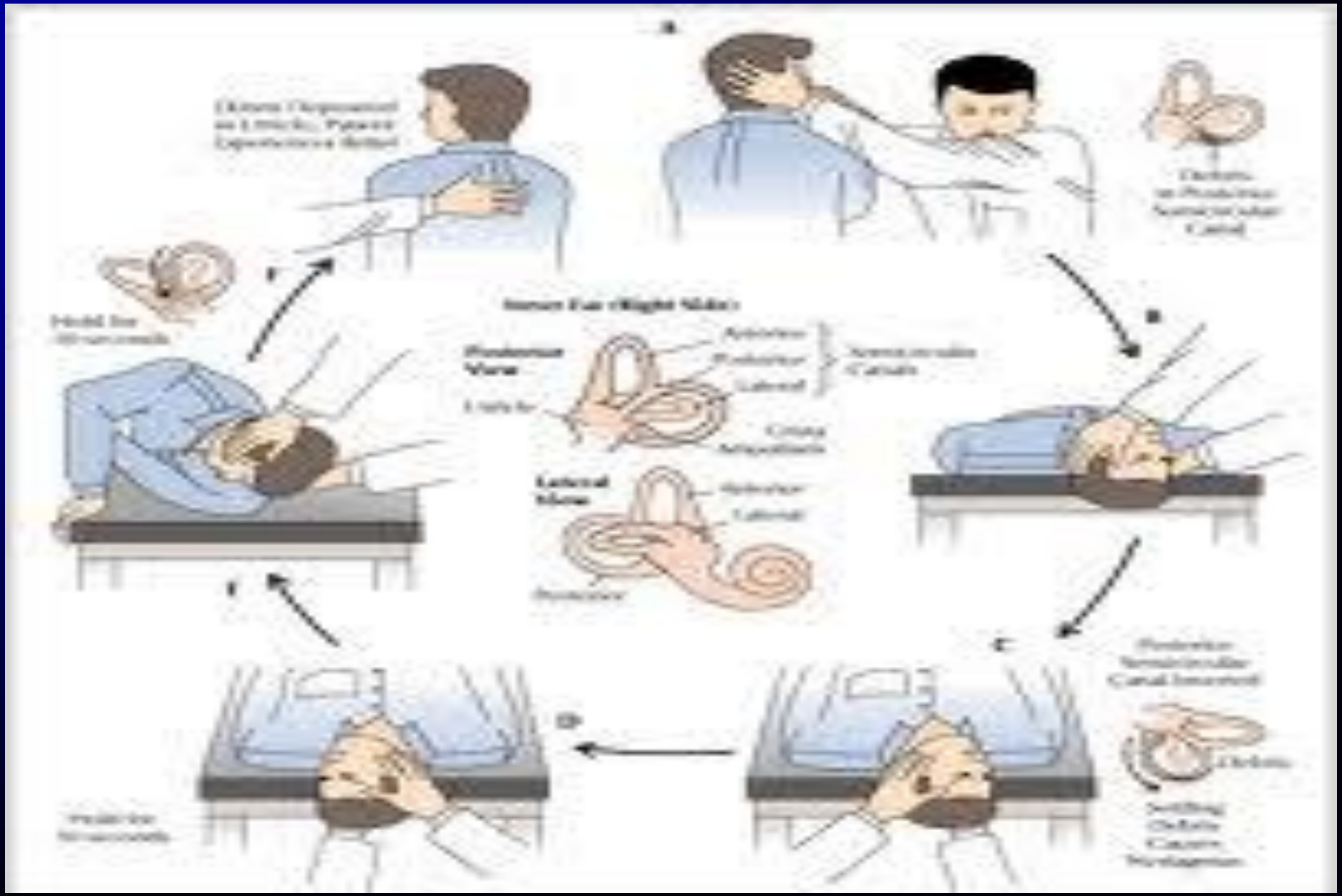
  75 % cure rate 1st time

  > 90 % cure rate after 2nd treatment a week later

- **Post-manoeuvre advice**
  - **Not to drive home**
  - **Sleep propped up with pillows 3 days**
  - **Avoid vertical head movements, exercise, hairdresser for 3 days**

Epley JM (1995) Positional vertigo related to semicircular canalithiasis. Otolaryngol Head Neck Surg, 112:154-161

Epley Manoeuvre



Ménière's Disease

MÉNIÈRE'S DISEASE

- 1995 AAO-HNS classification

  Possible, Probable, Definite, Certain

- First attack - MRI IAM, exclude other causes

- Treatment of acute vertigo attack - stemetil, cinnarizine (Diziron 25 mg tds), anxiolytics, calcium antagonists, IV fluids, acetylleucine
- Prevention of recurrent episodes - diuretics, low salt diet, Stop 4 C's + MSG, betahistine

DEMONSTRATION OF

HALLPIKE-DIX TEST
&
EPLEY MANOEUVRE

Thank You