

Vertigo

Clinical Work Up for Vertigo

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Introduction

- Balance disorders are common and may be encountered by a variety of specialists.
- Although rarely life threatening, they may be associated with significant morbidity.

- dizziness is one of the most common complaint
- four types

Vertigo (most prevalent type)

Lightheadedness

Pre syncope

Dysequilibrium

- It is important to make distinction between true vertigo from other dizzy sensation.

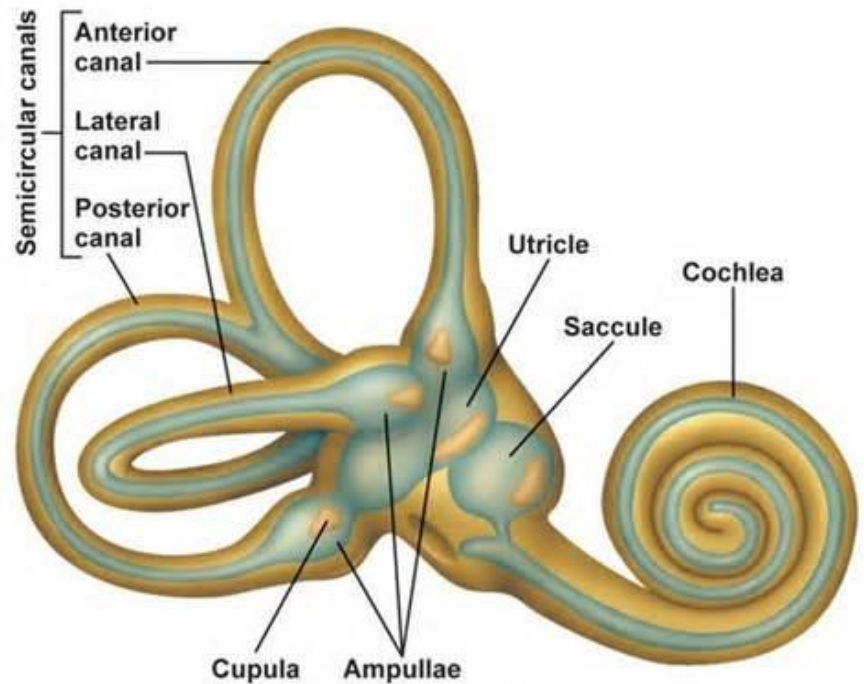
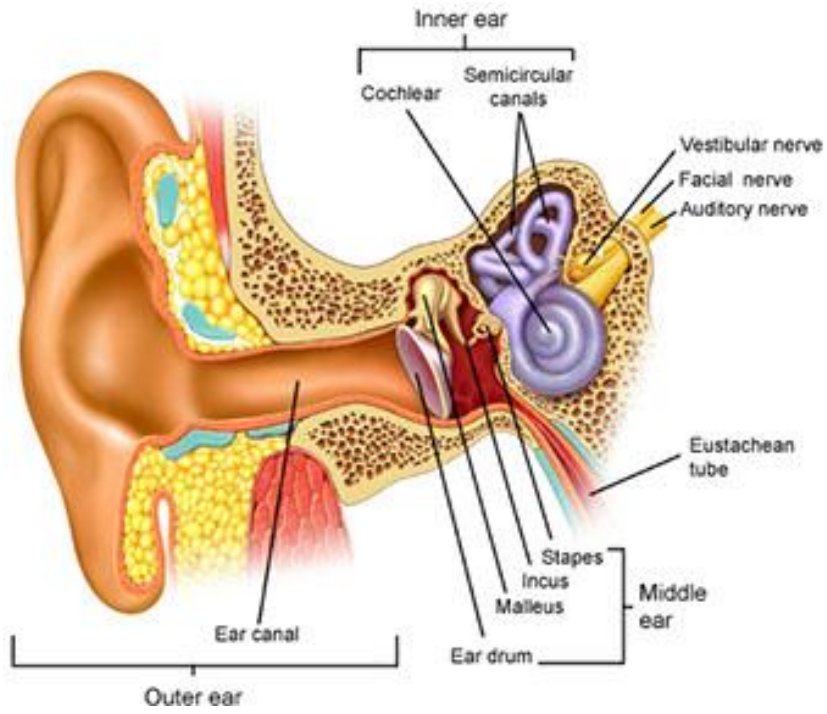
Vertigo

- **Vertigo** - derives from a Latin word ‘**vertex**’ that means ‘**to turn around**’.
- **Vertigo** - an illusion of movement either of self (**subjective vertigo**) or the environment (**objective vertigo**) due to disturbance in peripheral or central vestibular system

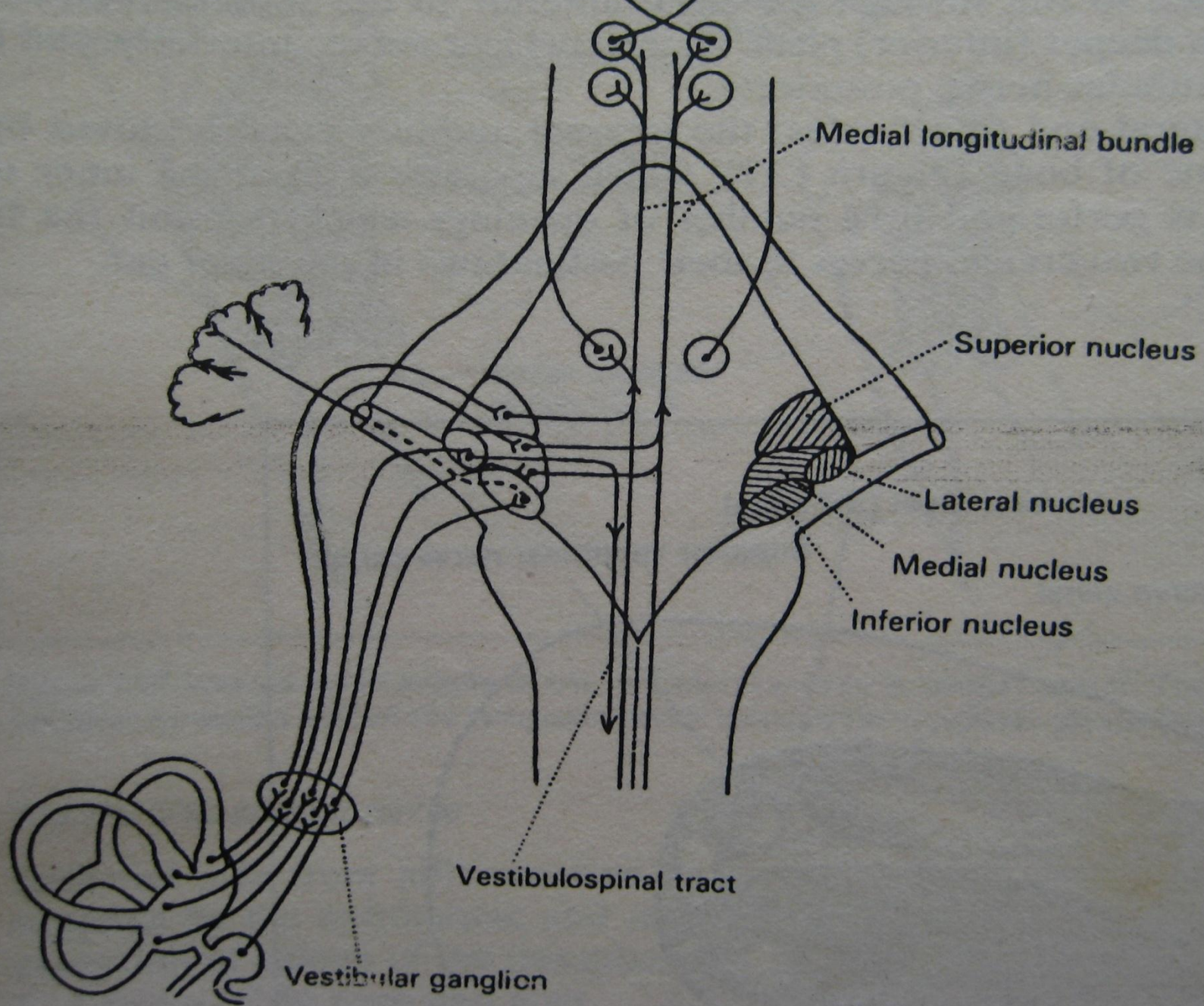
- **Dizziness** - a lay term & means non specific lightheadness, faintness, or giddiness & is common in many general medical disorders s/a CVS, anemia, GI d/s & endocrine d/o.

Anatomy & Physiology

- Vestibular sense o/g consists of three semicircular canals, the saccule & utricle.
- These are membranous tubes within the dense temporal bones.
- The membranes are fluid filled & have cells with cilia which bends as the fluid moves relative to them.



- This excites or depresses the nerve cells & alters the tonic input into the brain.
- Semicircular canals are at right angles to each other & detect changes in **angular acceleration**.
- Utricle & saccule have otoconia embedded in a gel overlying the cilia & detect **linear acceleration**.



Central connection of vestibular N

- Balance - visual input 70%
 - proprioception 15%
 - vestibular system 15%
- The brain stem computerized these three inputs & with the help of **cerebellum** maintains the balance & coordination of head & body.

Causes of Vertigo

- Peripheral vestibular causes
- Central vestibular causes
- Other causes

Peripheral vestibular causes

- acute labyrinthitis
- acute vestibular neuronitis
- BPPV
- cholesteatoma
- otosclerosis
- herpes zoster oticus
- Ménière's disease
- perilymphatic fistula

Central vestibular causes

- CP angle tumour
- CVA
- Migraine, Epilepsy
- Multiple sclerosis

Other causes

- cervical vertigo
- drug-induced vertigo
- psychological

Epidemiology

- Studies show that about one third of cases of dizziness are vertigo.
- Prevalence estimate for vertigo are 4.5%.

- because patients with dizziness often have difficulty in describing their symptoms, **determining the cause** can be challenging
- an evidence-based approach using knowledge of key historic, physical examination and radiologic findings for the causes of vertigo can help establish a diagnosis and consider appropriate treatments in most cases

History

- It is often difficult to describe their sensation
eg. spinning sensation
- must determine whether pt truly has vertigo versus
another type of dizziness
- next task is to determine whether pt has a
 - peripheral (or)
 - central cause of vertigo

- Full description of sensation
 - timing & duration
 - provoking factors
 - associated symptoms
 - previous H/O trauma, medical d/s, drug h/o & alcohol ingestion

Typical duration of symptoms for different causes of vertigo

<i>Duration of episode</i>	<i>Suggested diagnosis</i>
A few seconds	Peripheral cause; a/c vestibular neuronitis, Ménière's disease
Several seconds – few minutes	BPPV, perilymphatic fistula
Several minutes – 1 hr	TIA, perilymphatic fistula
Hours	Ménière's , perilymphatic fistula, Migraine, Acoustic neuroma
Days	A/c vestibular neuronitis, stroke, migraine, multiple sclerosis
Weeks	Psychogenic

Provoking factors for different causes of vertigo

<i>Provoking factors</i>	<i>Suggested diagnosis</i>
Changes in head position	A/c labyrinthitis, BPPV, CP angle tumour, multiple sclerosis, perilymphatic fistula
Recent upper resp viral illness	A/c vestibular neuronitis
Stress	Psychiatric, migraine
Immunosuppression	Herpes zoster oticus
Changes in ear pressure, head trauma, straining, loud noise	Perilymphatic fistula

Associated symptoms for different causes of vertigo

<i>Symptom</i>	<i>Suggested diagnosis</i>
Aural fullness	Acoustic neuroma, Ménière's d/s
Ear or mastoid pain	Acoustic neuroma, acute middle ear d/s
Facial weakness	Acoustic neuroma, herpes zoster oticus
Focal neurological findings	CVA, CP angle tumour, multiple sclerosis
Headache	Acoustic neuroma, migraine
Hearing loss	Ménière's d/s, perilymphatic fistula, acoustic neuroma, cholesteatoma, otosclerosis, CVA, Herpes zoster oticus
Imbalance	A/c vestibular neuronitis, CP angle tumour
Nystagmus	Peripheral or central vertigo
Photophobia	Migraine
Tinnitus	A/c labyrinthitis, acoustic neuroma, Ménière's d/s

Causes of vertigo associated with hearing loss

<i>Diagnosis</i>	<i>Characteristics of hearing loss</i>
Acoustic neuroma	Progressive, unilateral, sensorineural
Cholesteatoma	Progressive, unilateral, conductive
Herpes zoster oticus	Subacute to acute onset, unilateral
Ménière's d/s	Sensorineural, initially fluctuating affecting lower frequencies, later – progressive, affecting higher frequencies
Otosclerosis	Progressive, conductive
Perilymphatic fistula	Progressive, unilateral
TIA	Sudden onset, unilateral

Distinguishing characteristics of peripheral versus central causes of vertigo		
<i>Feature</i>	<i>Peripheral vertigo</i>	<i>Central vertigo</i>
Nystagmus	Combined horizontal and torsional inhibited by fixation of eyes onto object	Purely vertical, horizontal or torsional, not inhibited by fixation of eyes
Imbalance	Mild to moderate, able to walk	Severe, unable to stand still or walk
Nausea, vomiting	May be severe	Varies
Hearing loss & tinnitus	Common	Rare
Non auditory neurologic symptoms	Rare	Common
Latency following provocative diagnostic maneuver	Longer (up to 20 seconds)	Shorter (up to 5 seconds)

Physical examination

- An otological & neurological exam: is mandatory in all cases of vertigo.
- A general medical exam: may be required if the symptoms dictate.

Specific clinical exam of vestibular pathology

- Exam of ext ear & TM together with clinical T of auditory acuity & tuning fork T
- Vestibulo-ocular T
- Vestibulo-spinal T

Vestibulo-ocular T

Most essential part of investigation of vestibular system

- Caloric Test
- Hallpike maneuver
- Electronystagmography (ENG)
- Rotation Test

Vestibulo-ocular T

Caloric T

- Corner stone of Ivt for any vestibular pathology
- Classic bithermal calorics utilize H₂O at 30-44C in two heated tanks about 1m a/b T couch
- Pt recline on T couch at 30D a/b horizontal (lat semicircular canal → vertical)

- A/f checking that ext canal are clear of wax & debris & TM intact, cold H₂O (30C) run into Lt ear, via a siphon tube & 14G canula, for 40S
- Stop watch is used to record the time period from start to nystagmus stops with pt fixing on a point on ceiling
- Repeat Rt ear & then both ear with warm H₂O (44C)

- Frenzel's glasses to remove optic fixation
- Measuring of nystagmus electrically
(electronystagmography)

Interpretation

- Cold stimulation
fast phase of nystagmus → opposite side
- Warm → same side
- Most common abnl
 - canal paresis
 - directional
preponderance

Unilat canal paresis

- Response of one side is reduced or (-) compare with opposite site
 - lesion of peripheral vestibular system
(eg. Horizontal canal or vestibular N)

Directional preponderance

- Non specific enhancement of nystagmus in one particular direction

- It suggest pathology, but is usually non-localizing (may arise from any part of peripheral or central vestibular system)

Hallpike T

- Positional nystagmus is best elicited
- Pt - sitting on a bed & procedure is explained (reassurance)
- Pt - keep eyes open & looks straight ahead

- Head - held firmly b/t examiner's hands & turn **45D** to Lt or Rt
- Pt - rapidly laid backwards, head over edge of bed, **30D** b/l horizontal
- Eyes - observed for nystagmus
- If neither occur a/f **30 S** then pt - return to upright position & again asked for vertigo & exam; for nystagmus

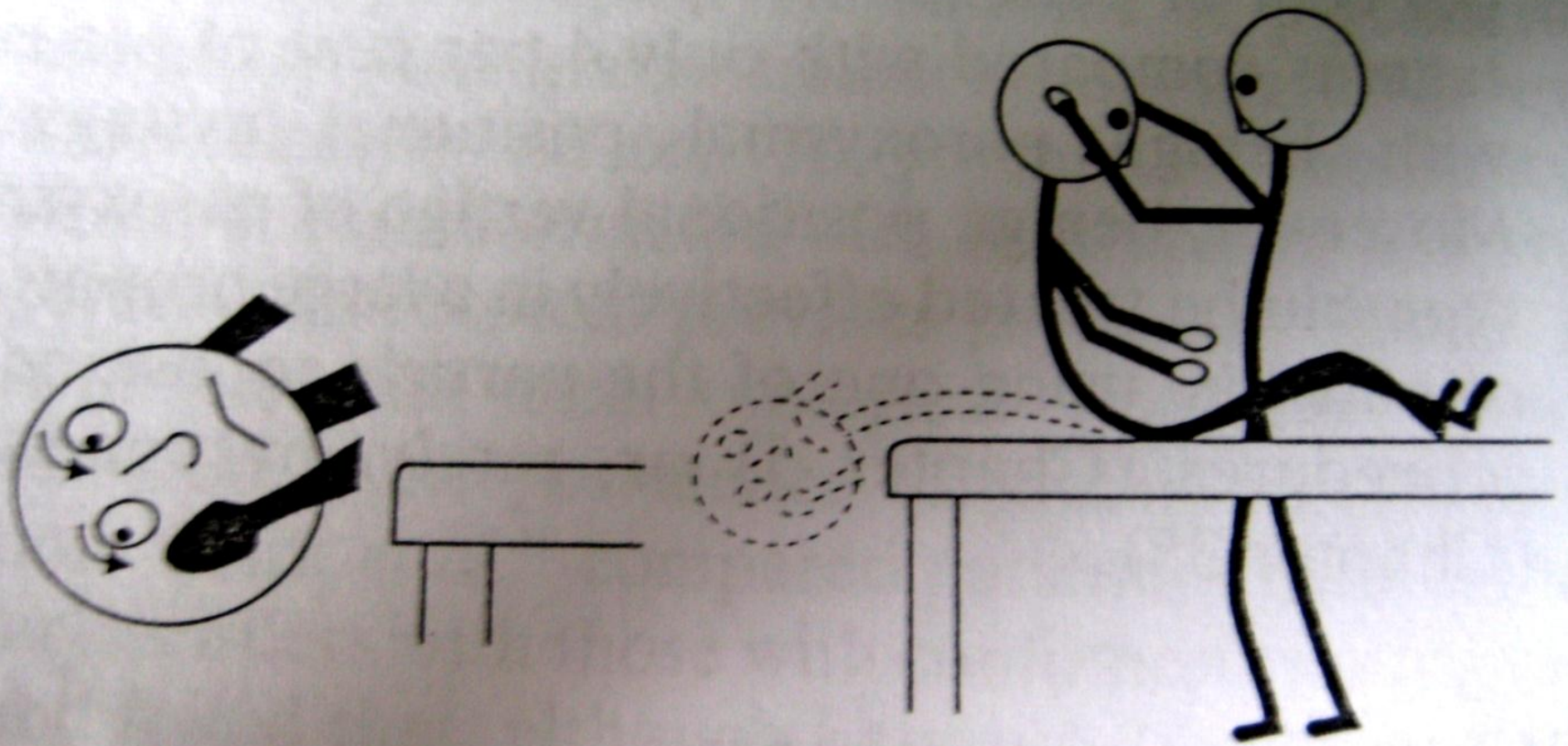


Fig 14.13 The techniques of performing the Hallpike manoeuvre to test for the presence of positional nystagmus

Difference b/t nystagmus of central & peripheral origin

	central	peripheral
Latent period	(-)	(+) 2-20 s
vertigo	(-)	(+)
fatigue	(-)	(+)
Direction	Variable	Undermost ear

Rotation T

- Nystagmus - induced by acceleration & deceleration in a rotating chair
- Disadv - stimulating both labyrinth simultaneously
- Limited clinical application

Vestibulo-spinal T

- Romberg T
- Unterberger T
- Gait Testing
- Posturography

Romberg T

- To assess pt ability to stand
- Feet together, arms by the side, with eyes open & then closed
- Pt fall towards the side of peripheral vestibular lesion

Unterberger T

- Pt - marching up & down on the spot for 30 sec
- With eyes closed & arms outstretched in front, with hands clasped together
- Body rotation of $>30^\circ$, or forward or backward displacement of > 1 m - abnormal
- NL pt - less tendency to deviate to Rt or Lt than pt with peripheral or central vestibular d/o.

Gait Testing

- Assess by watching pt walk normally with eyes open & then closed
- Hemiplegic gait, cerebellar ataxic gait, parkinsonian shuffle, or high stepping gait with loss of proprioception
- With eyes closure pt with uncompensated vestibular lesion will veer towards the affected side

Posturography

- Recording of postural sways
- Most commonly used are force platforms
- Effects of various sensory modalities upon balance to be identified
- Some claimed - various pathological conditions to be differentiated
- Their use is prohibited in both research & clinical practice d/t high cost

Other investigation

Laboratory evaluation

- electrolytes
- glucose
- blood counts
- thyroid function

identify the aetiology of vertigo in fewer than 1% of pt with dizziness

Radiologic studies

- MRI for CNS lesion
- Conventional radiographs or CT for cervical vertigo

THANK YOU.