Vertigo

- **Vertigo** is a subjective sensation of movement, usually rotatory but sometimes linear.

- The objective sign of vertigo is ***nystagmus***.

- Bodily balance is maintained by the input to the **brain** from the **inner ear**, the **eyes** and the **proprioceptive organs**, especially of the neck; dysfunction of any of these systems may lead to imbalance.

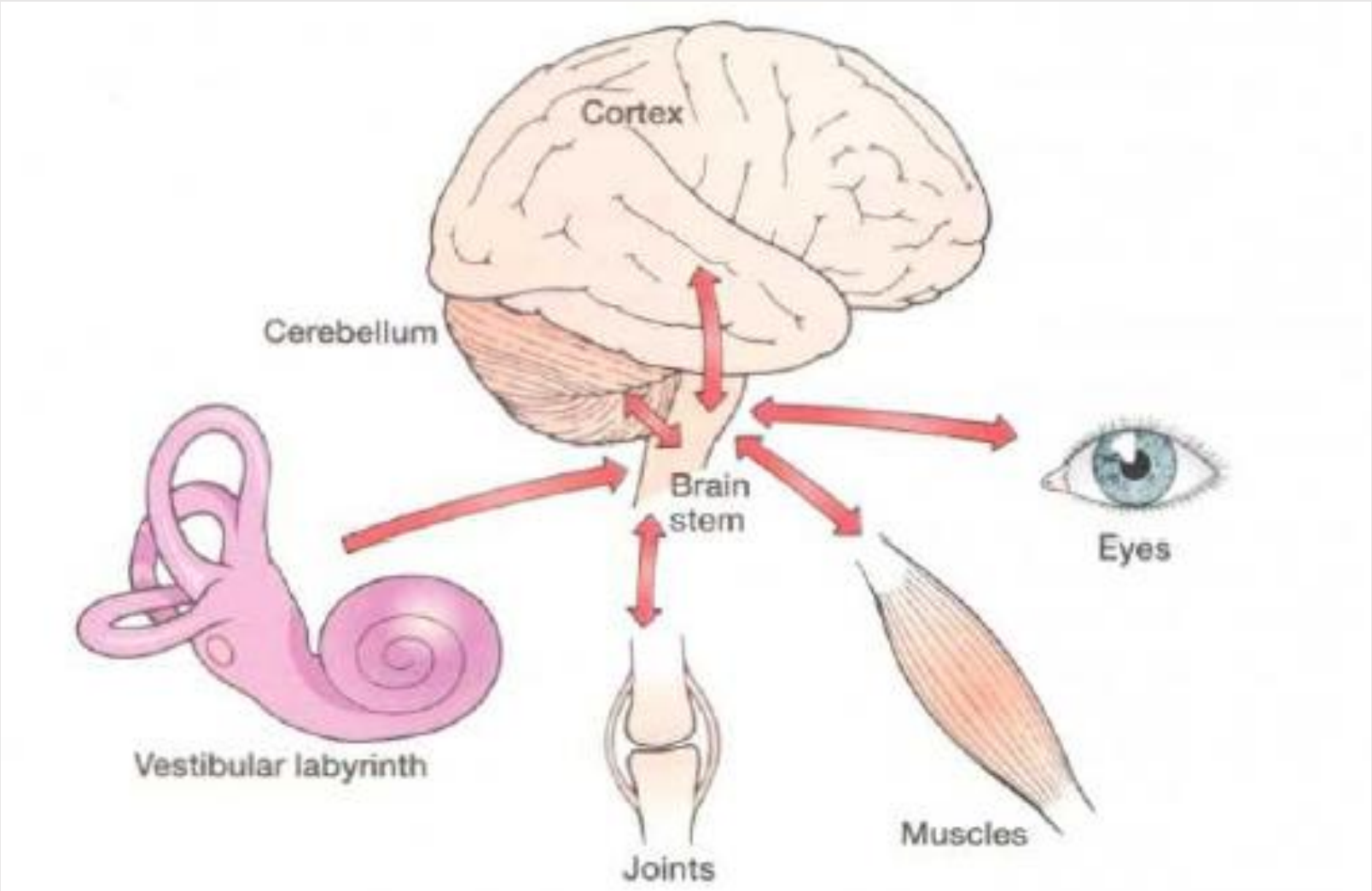


Fig. 1 **Maintenance of balance.** Balance can only be maintained if the various sensory inputs do not contradict each other. For example, a feeling of dysequilibrium can ensue if the head is suddenly stopped from spinning round. This is due to the vestibular labyrinth still indicating movement of the head while the eyes indicate the head is stationary.

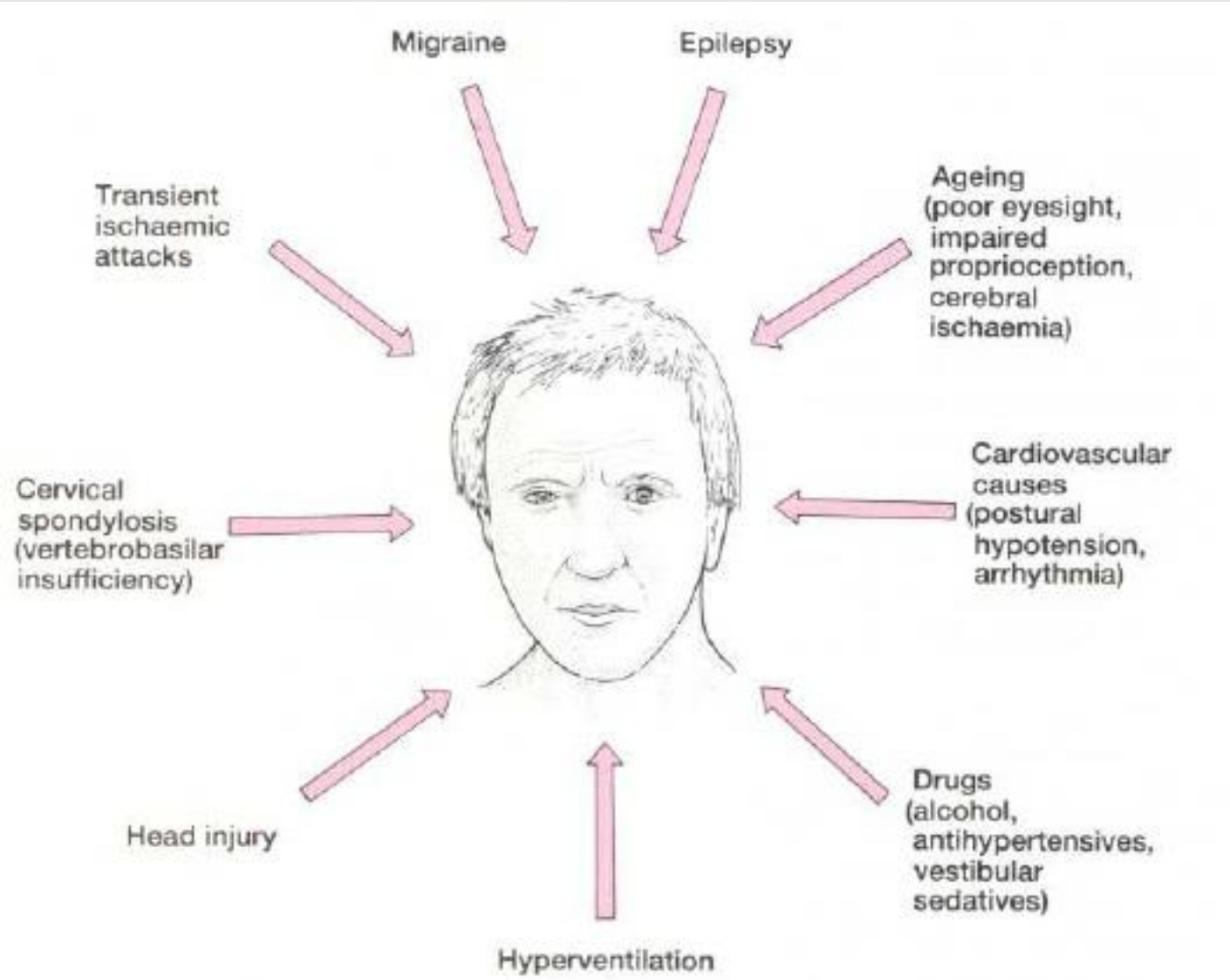


Fig. 1 **Non-otological causes of imbalance are very common.** In the elderly, minor pathological causes can act synergistically to give considerable symptoms.

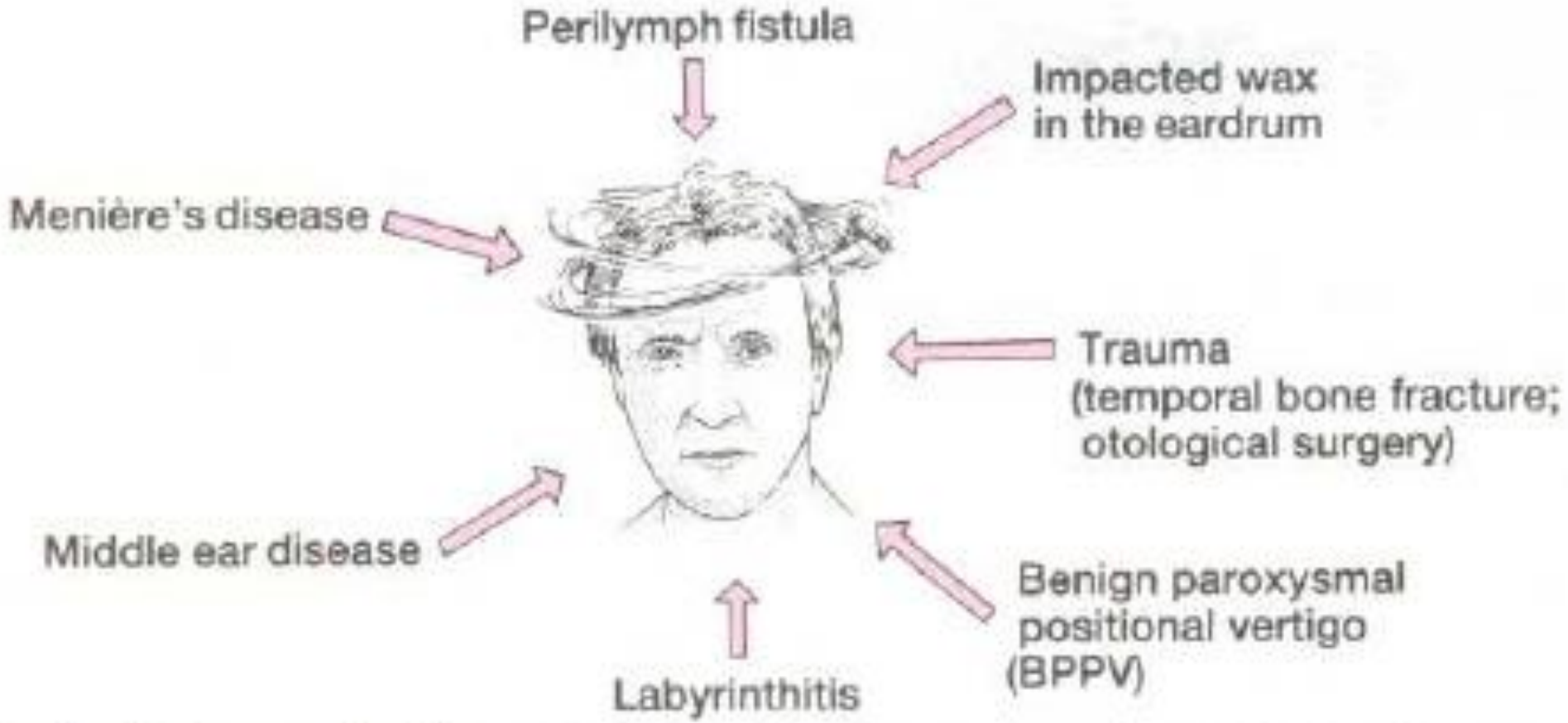


Fig. 3 **Otological causes of imbalance.** The subjective symptom is vertigo which the patient may describe as either the environment or himself spinning. It is obviously an hallucination of movement.

- The diagnosis of the cause of vertigo or imbalance depends mostly on history, much on examination and little on investigation.
- The particular questions to be asked relate to three areas:

1. **Timing**: episodic, persistent.
2. **Aural symptoms:** deafness, fluctuating or progressive; tinnitus; earache; discharge.
3. **Neurological symptoms:** loss of consciousness; weakness; numbness; dysarthria; diplopia.

GUIDE TO DIAGNOSIS OF VERTIGO

Episodic with aural symptoms
Menière's disease
Migraine

Episodic without aural symptoms
Benign paroxysmal positional vertigo
Migraine
Transient ischaemic attacks
Epilepsy
Cardiac arrhythmia
Postural hypotension
Cervical spondylosis

Constant with aural symptoms
Chronic otitis media with labyrinthine fistula
Ototoxicity
Acoustic neuroma

Constant without aural symptoms
Multiple sclerosis
Posterior fossa tumour
Cardiovascular disease
Degenerative disorder of the vestibular labyrinth
Hyperventilation
Alcoholism

Solitary acute attack with aural symptoms
Head injury
Labyrinthine fistula
Viral infection, e.g. mumps, herpes zoster
Vascular occlusion
Round-window membrane rupture

Solitary acute attack without aural symptoms
Vasovagal faint
Vestibular neuronitis
Trauma

Table 2 **Duration of symptoms of imbalance in relation to aetiology**

Duration	Aetiology
Seconds	Cervical spondylosis Postural hypotension Benign paroxysmal positional vertigo
Minutes to hours	Menière's disease Labyrinthitis
Hours to days	Labyrinthine failure (without compensation) Ototoxicity Central vestibular disease

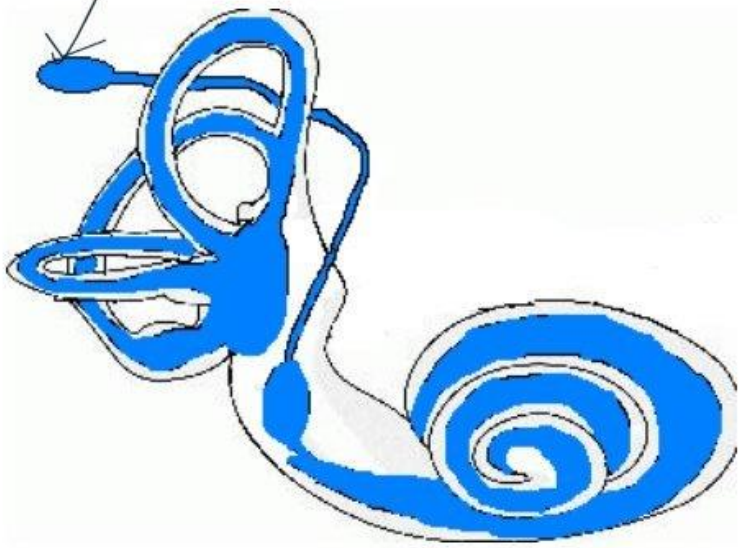
Menière's disease

- Menière's disease is a condition of unknown aetiology in which there is **distension of the membranous labyrinth** by accumulation of endolymph.

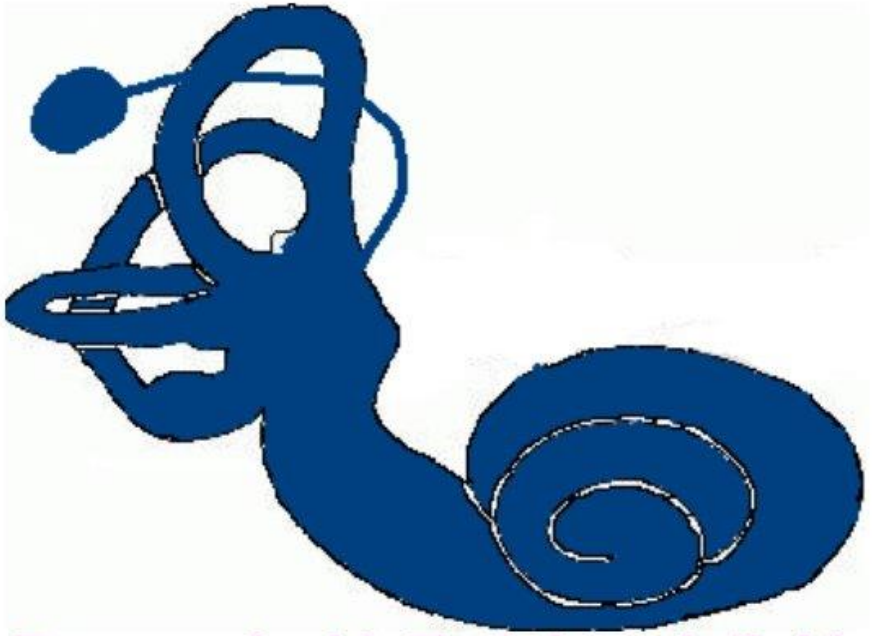
- It can occur at any age, but its onset is most common between 40 and 60 years.

- It usually starts in one ear only, but in about **25%** of cases the second ear becomes affected.

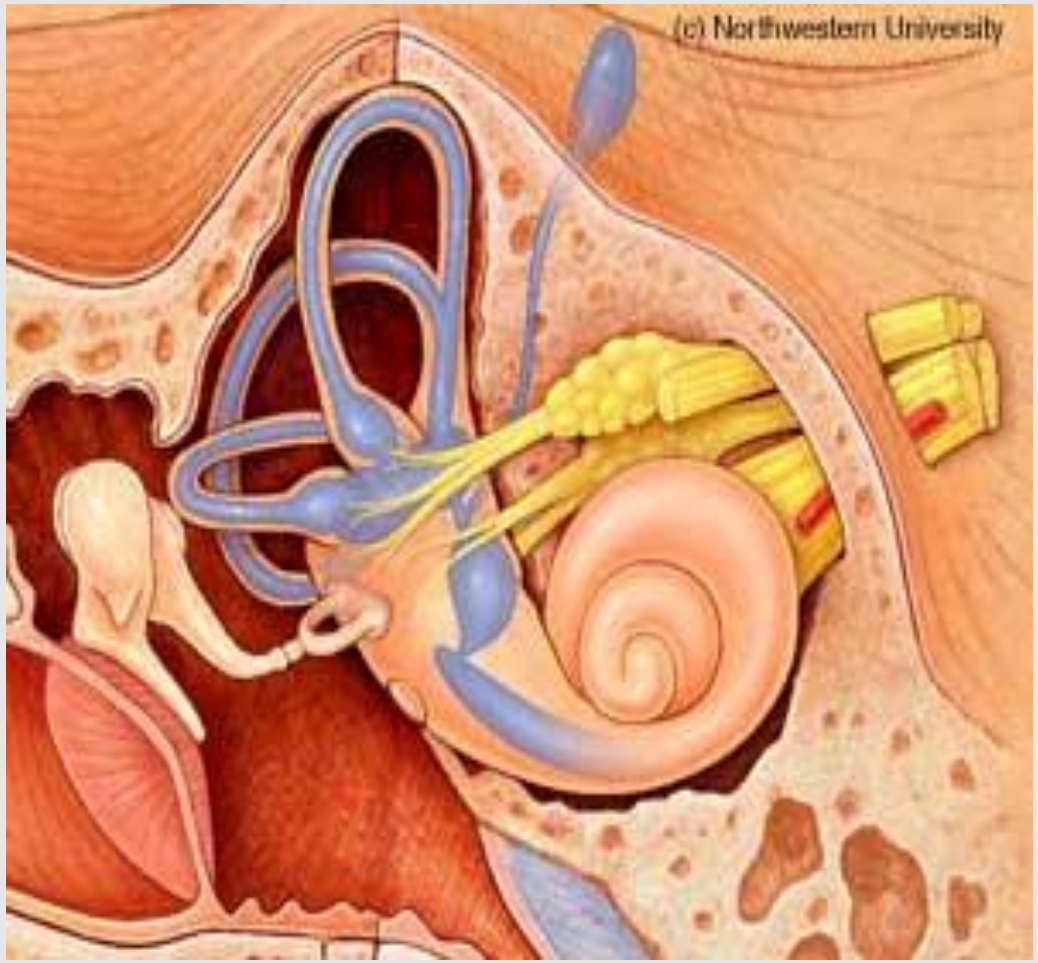
Endolymphatic Sac



Normal Inner Ear Fluids Levels



Engorged with Endolymph fluid.
The Cause of a Vertigo Attack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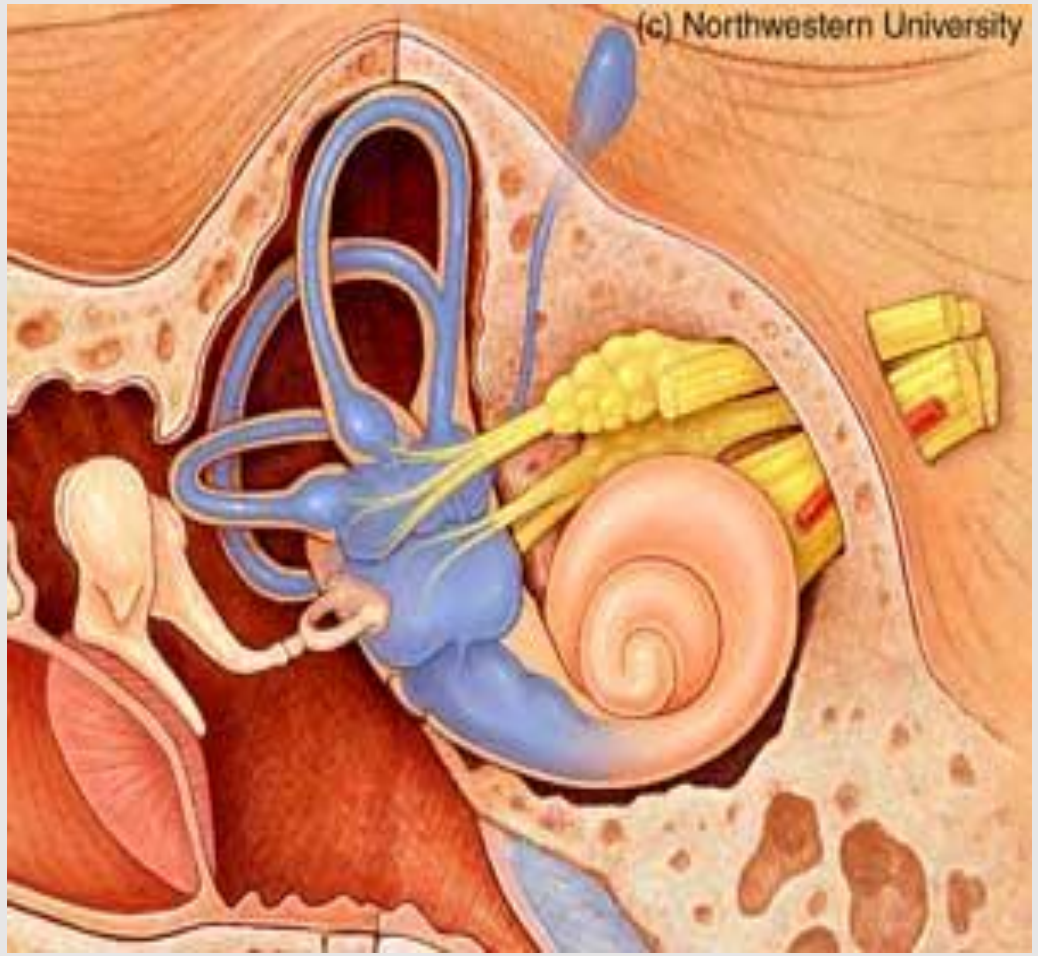
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- The clinical features are as follows:

1. **Vertigo** is intermittent but may be profound, and usually causes vomiting. The vertigo rarely lasts for more than a few hours, and is of a rotational nature.
2. **A feeling of fullness in the ear** may precede an attack by hours or even days.
3. **Deafness** is sensorineural and is more severe before and during an attack. Despite fluctuations, the deafness is usually steadily progressive and may become severe.
4. **Tinnitus** is constant but more severe before an attack. It may precede all other symptoms by many months, and its cause only becomes apparent later.

- **TREATMENT:**

❖General and medical measures:

✓In an **acute** attack, when vomiting is likely to occur, oral medication is of limited value, but cinnarizine or prochlorperazine are useful preparations.

✓Between attacks, various methods of treatment are useful:

1. Fluid and salt restriction.
2. Avoidance of smoking and excessive alcohol or coffee.
3. Regular therapy with betahistine hydrochloride.
4. If the attacks are frequent, regular medication with labyrinthine sedatives, such as cinnarizine, or prochlorperazine are of value.
5. Regular low-dose diuretic therapy may also be of benefit.

❖Surgical treatment:

1. Labyrinthectomy is effective in relieving vertigo, but should only be performed in the unilateral case and when the hearing is already severely impaired.

2. Drainage of the endolymphatic sac by the transmastoid route.

3. Division of the vestibular nerve either by the middle fossa or by the retrolabyrinthine route; this operation preserves the hearing but is a more hazardous procedure.

4. Intra-tympanic gentamycin is helpful in reducing vestibular activity but with a 10% risk of worsening the hearing loss.

Vestibular neuronitis

- Although occasionally epidemic, vestibular neuronitis is probably of **viral** origin and causes vestibular failure.

- The vertigo is usually of explosive onset, but there is neither tinnitus nor deafness.

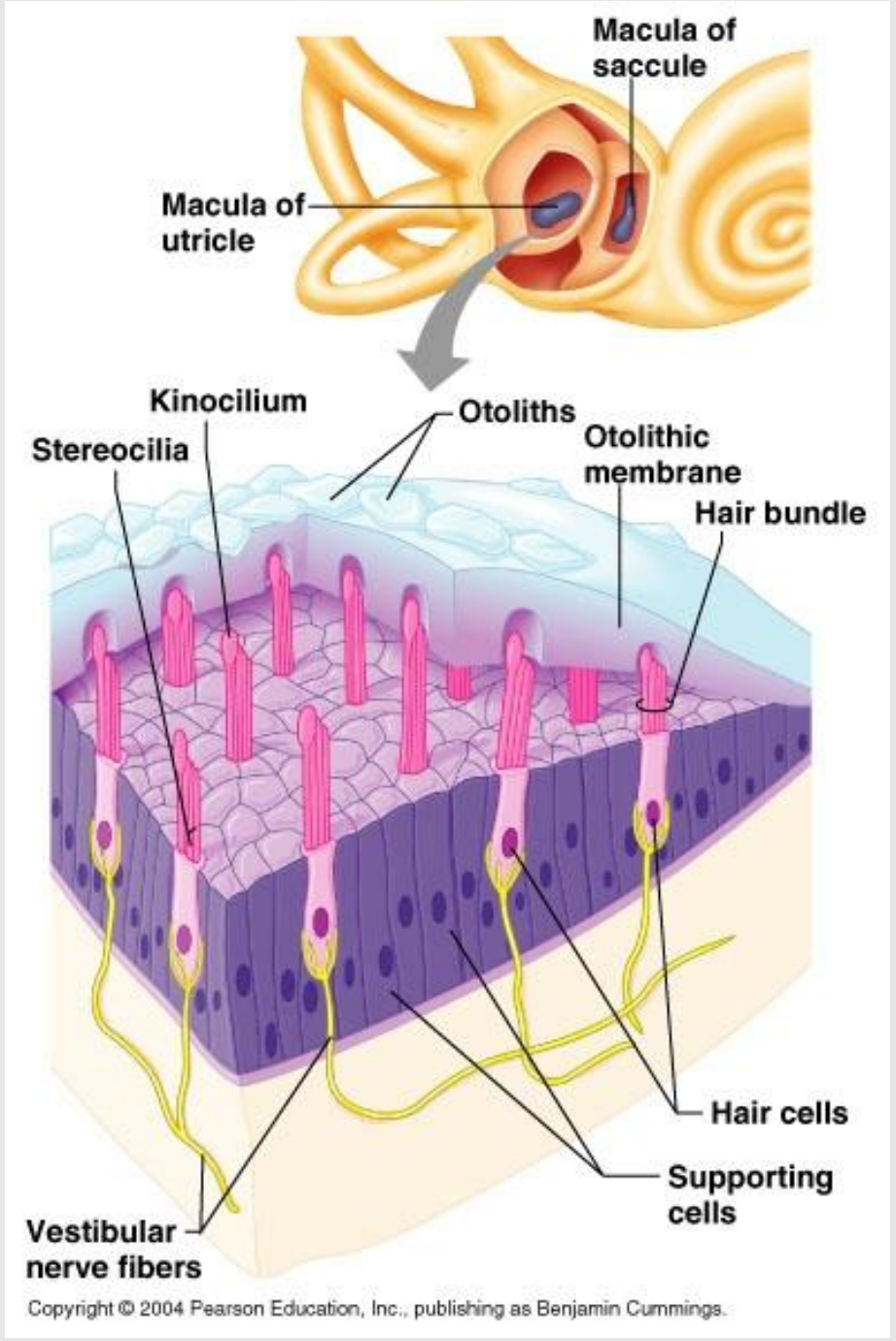
- Steady resolution takes place over a period of 6–12 weeks but the acute phase usually clears in 2 weeks.

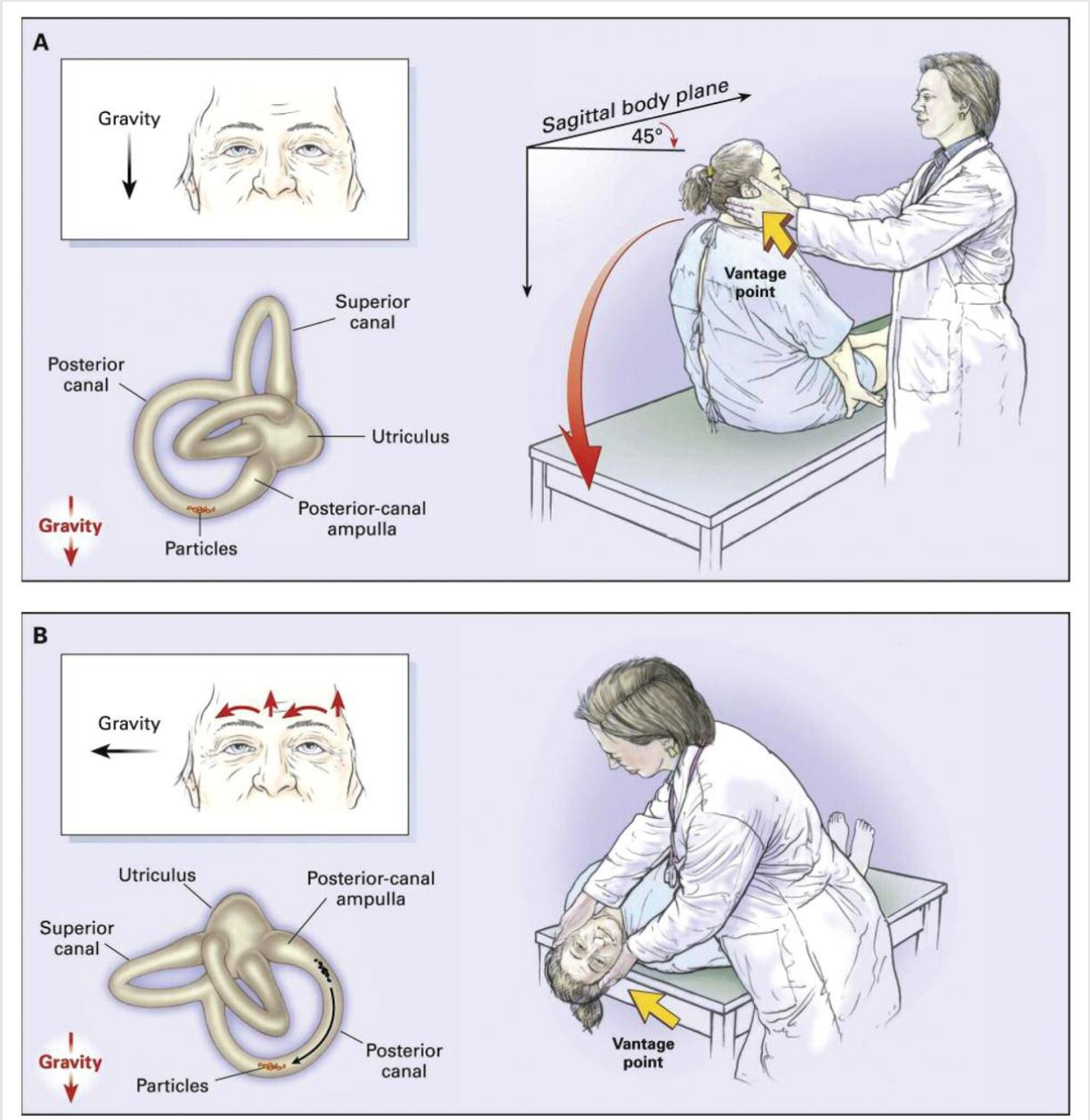
Benign paroxysmal positional vertigo

- Benign paroxysmal positional vertigo is due to a degenerative condition of the utricular neuroepithelium and may occur spontaneously or following head injury. It is also seen in CSOM.

- Attacks of vertigo are precipitated by turning the head so that the affected ear is undermost; the vertigo occurs following a latent period of several seconds and is of brief duration.

- Nystagmus will be observed but repeated testing results in abolition of the vertigo. **These patients have NO Hearing loss, Tinnitus, or Otalgia.**



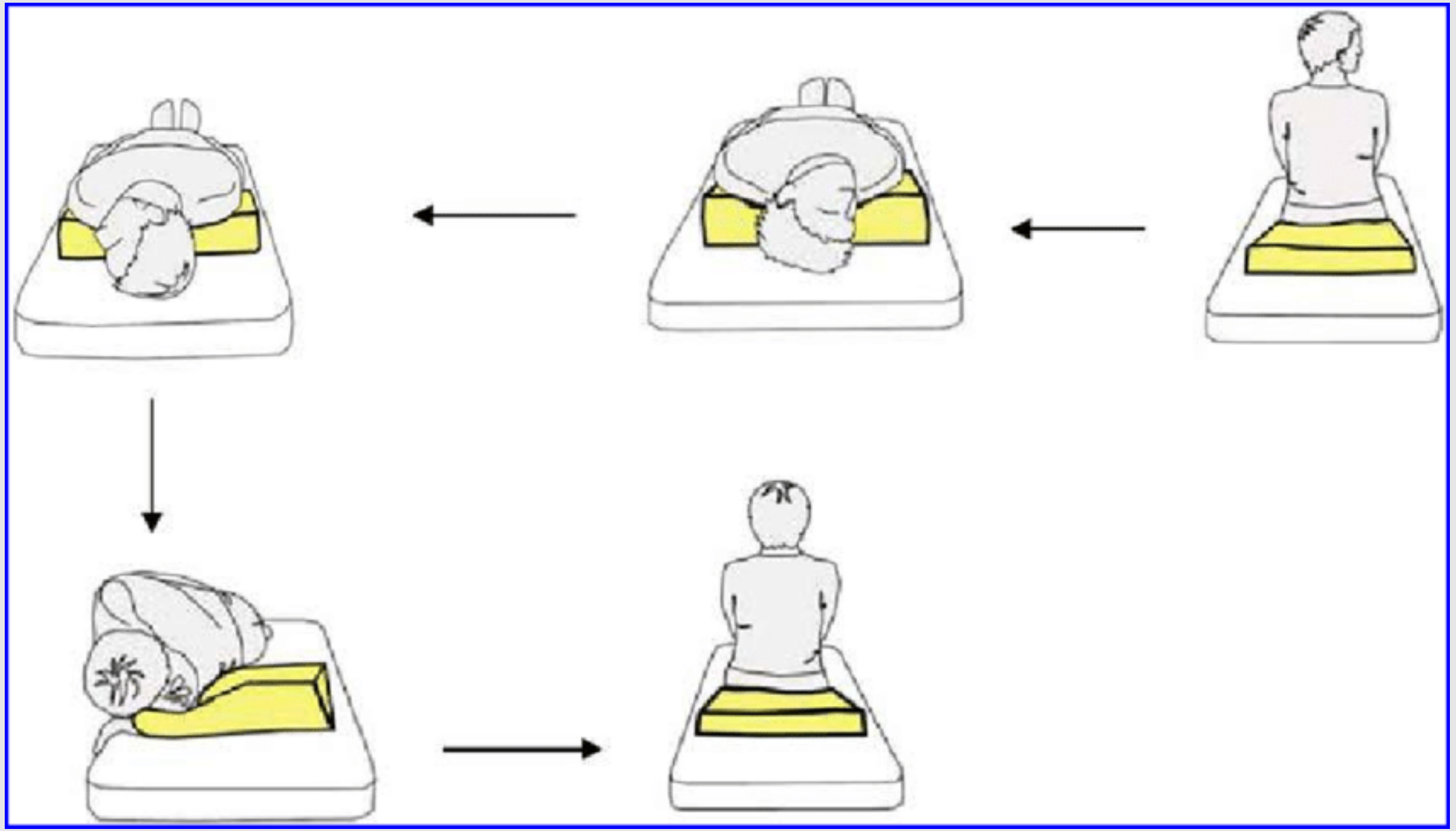


DIX-HALLPIKE TEST

- Steady resolution is to be expected over a period of weeks or months.

- It may be recurrent.

- It can often be relieved completely by the **Epley manoeuvre** of particle repositioning by sequential movement of the head to move the otolith particles away from the macula.



https://www.youtube.com/watch?v=9SLm76jQg3g

Vertebrobasilar insufficiency

- Vertebrobasilar insufficiency may cause momentary attacks of vertigo precipitated by **neck extension**, e.g. hanging washing on a line.

- The diagnosis is more certain if other evidence of brain stem ischaemia, such as dysarthria or diplopia, is also present.

- Severe ischemia may cause drop attacks without loss of consciousness.

Ototoxic drugs

- Ototoxic drugs, such as **gentamycin** and other aminoglycoside antibiotics, can cause disabling ataxia by destruction of labyrinthine function.

- Such ataxia may be permanent and the risk is reduced by careful monitoring of serum levels of the drug, especially in patients *with renal impairment*.

- There is not usually any rotational vertigo.

- **Trauma to the labyrinth:**

  ✓Trauma to the labyrinth causing vertigo may complicate head injury, with or without temporal bone fracture.

- **Post-operative vertigo:**

  ✓Post-operative vertigo may occur after ear surgery, especially stapedectomy, and will usually settle in a few days.

- **Suppurative labyrinthitis:**

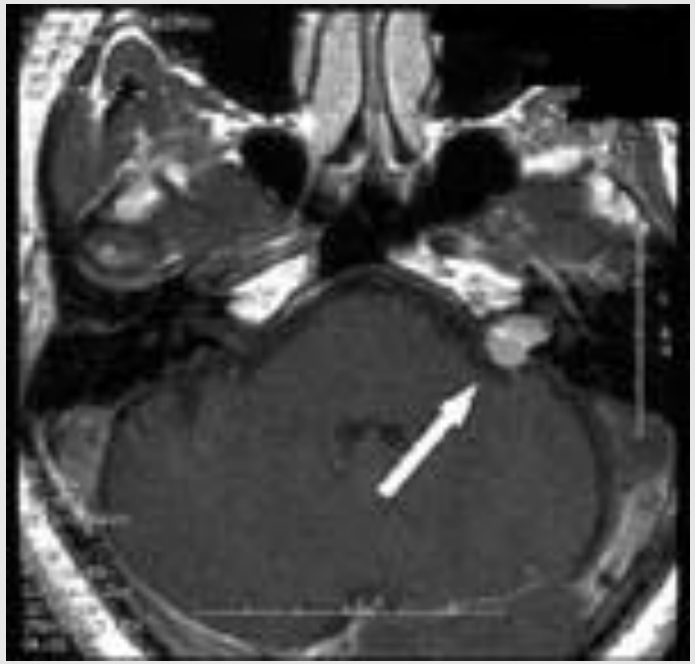
  ✓Suppurative labyrinthitis causes ***severe vertigo*** (complication of middle-ear disease). It also results in a total loss of hearing.

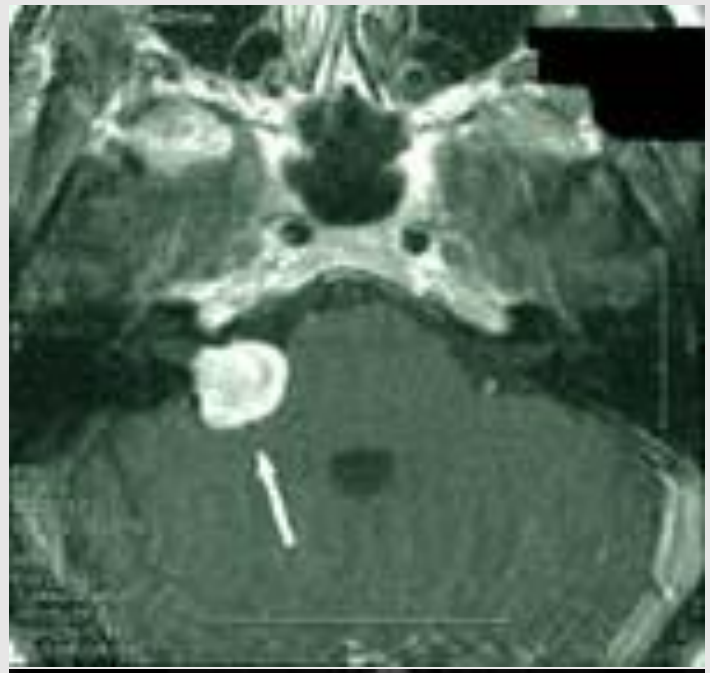
- **Syphilitic labyrinthitis:**

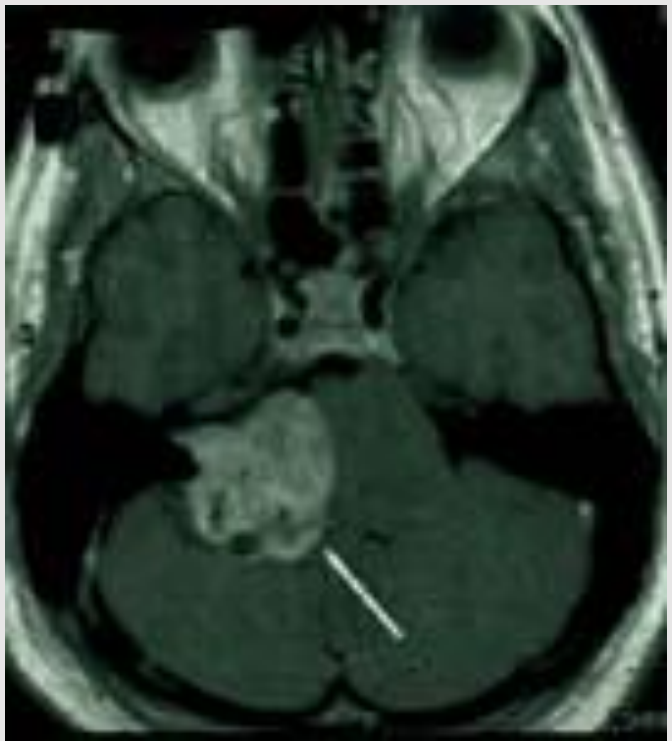
  ✓Syphilitic labyrinthitis from acquired or congenital syphilis is very rare but may cause vertigo and/or progressive deafness.

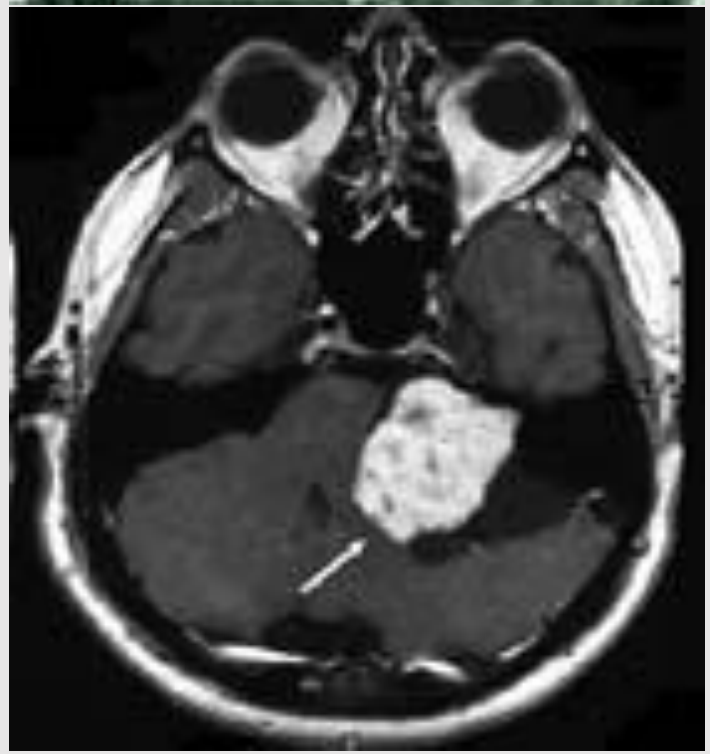
- **Acoustic neuroma:**

  Acoustic neuroma (vestibular schwannoma) is a slow-growing benign tumour of the vestibular nerve that causes hearing loss and slow loss of vestibular function. Imbalance rather than vertigo results.









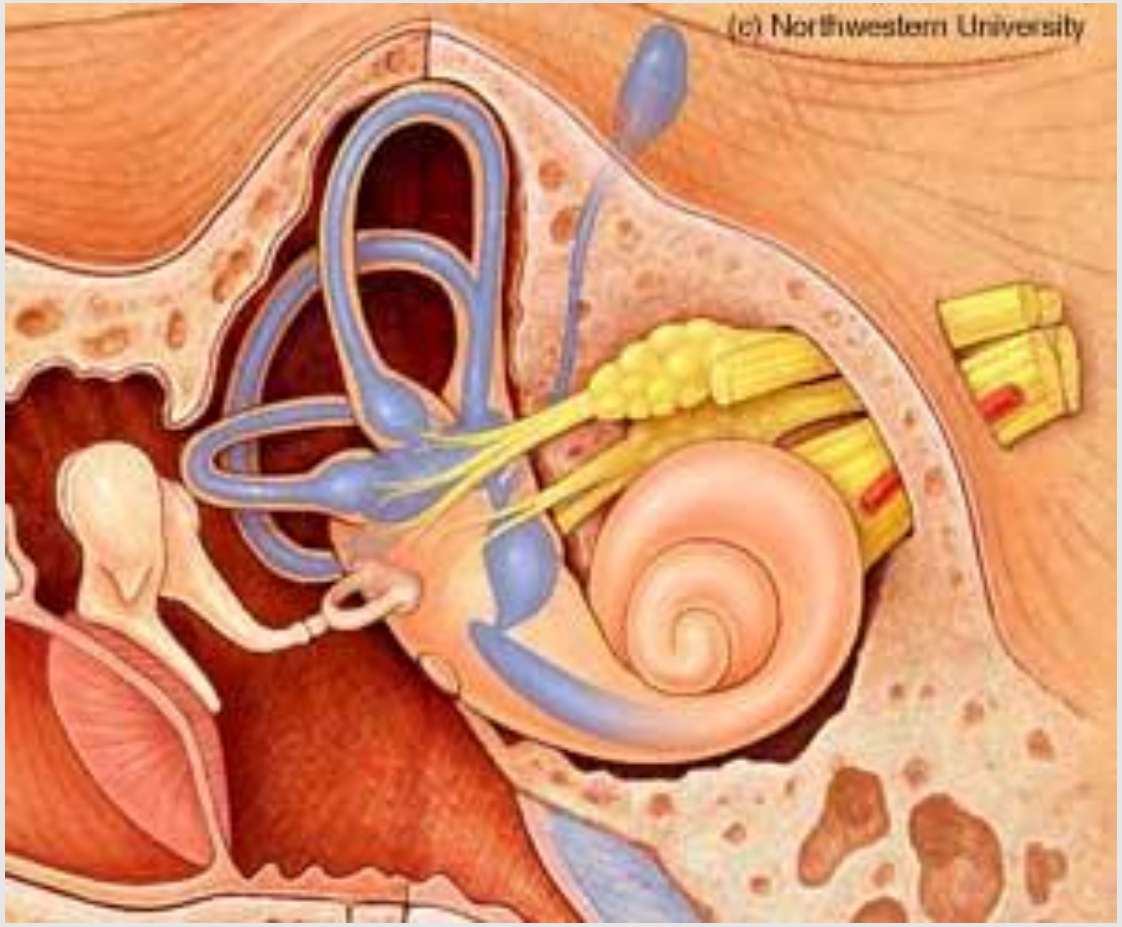
- **Perilymph fistula:**

  - ✓As a result of spontaneous rupture of the round-window membrane or trauma to the stapes footplate, perilymph fistula causes marked vertigo with tinnitus and deafness.

  - ✓There is usually a history of straining, lifting or diving in the spontaneous cases.

  - ✓Fistula test.

  - ✓Treatment is by bed-rest initially, followed by ***surgical repair*** if symptoms persist.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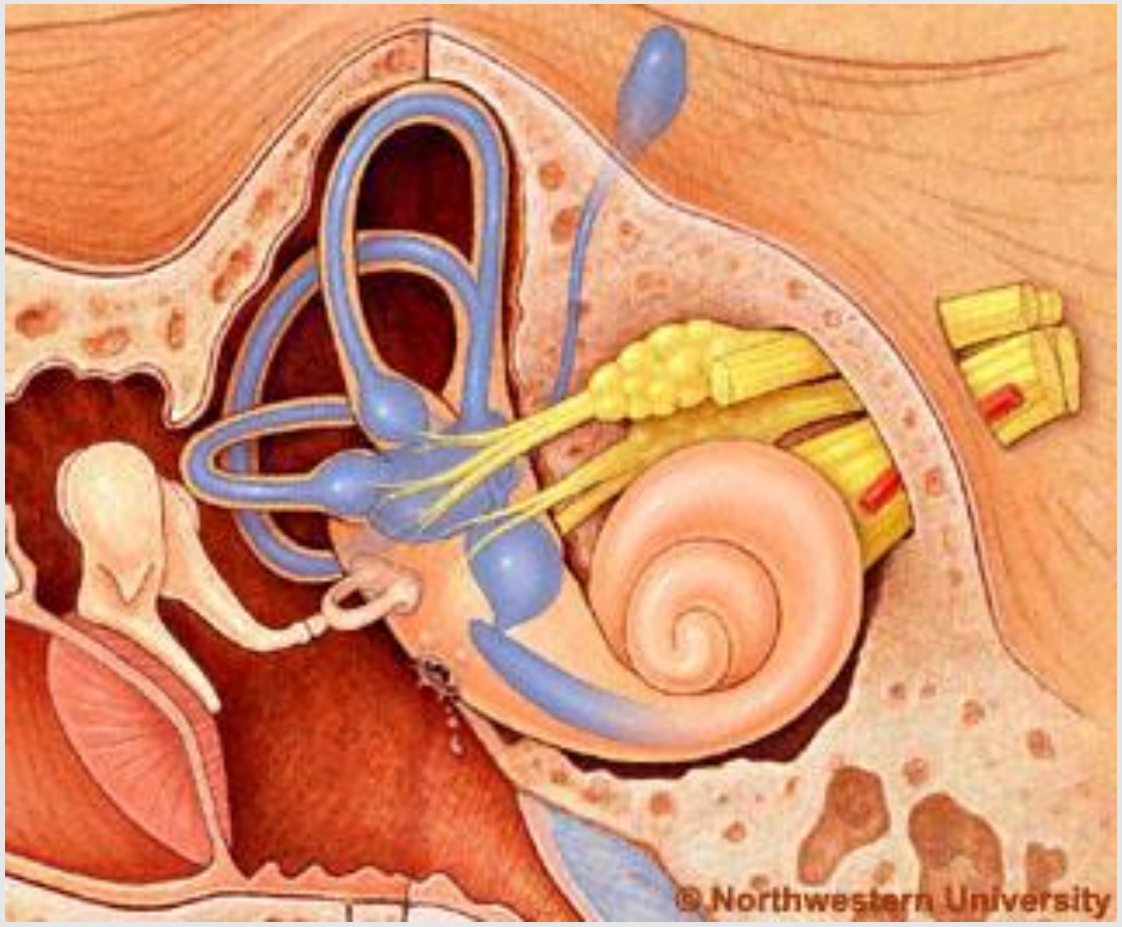
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