

## Vertigo — Causes, Symptoms and Treatment

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**This article provides an overview of vertigo in clinical practice - how it presents, how to differentiate it from dizziness, common differentials, their pathophysiology, treatments and complications. It also introduces the reader to the Dix-Hallpike manoeuvre used in vertigo diagnosis and the Epley manoeuvre used in the treatment of benign paroxysmal positional vertigo (BPPV).**



### Definition and Epidemiology of Vertigo

Vertigo is defined as an illusion of movement, often rotatory, of the patient's surroundings.

It is important to note that vertigo is **not light-headedness**, which can be caused by a multitude of reasons including **anxiety and orthostatic hypotension**.

Vertigo affects approximately **4.9% of the population each year**. Of this 4.9%, 1 year prevalence is around 1.6% for **benign paroxysmal positional vertigo** and 0.89% for **migraine associated vertigo**. 1 year prevalence for **Meniere's disease** is 0.51%.

### Differential Diagnosis of Vertigo

For the patient presenting with dizziness:

- Benign positional paroxysmal vertigo

- Meniere's disease
- Vestibular neuritis
- Labyrinthitis
- Vestibular [migraine](#)
- Syncope
- Orthostatic hypotension
- [Diabetes mellitus](#)
- [Hypothyroidism](#)
- [Rheumatoid arthritis](#)
- Alcohol

Once true vertigo is established, consider:

- Peripheral causes:
  - Benign paroxysmal positional vertigo
  - Labyrinthitis (vestibular neuritis)
  - Herpes simplex virus
  - Meniere's disease
- Central causes:
  - Vestibular migraine
  - Post-traumatic vertigo
  - Neoplasia (some)
  - [Stroke](#)
- Mixed causes of vertigo:
  - Acoustic neuroma

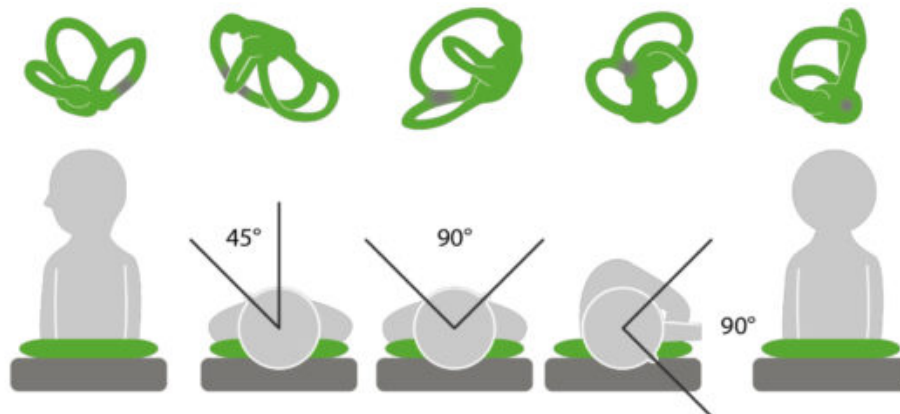
## Diagnosis of Vertigo

A **full history and examination** should be taken. Many patients initially present with generic dizziness. A patient with vertigo will report **feeling unsteady on their feet**, as if they are constantly moving (vertigo does not always present as rotatory). Vertigo is **always worse with movement**.

If the patient describes episodes of vertigo which last seconds to a few minutes, the most likely cause is **benign paroxysmal positional vertigo (BPPV)**. When the patient describes symptoms lasting minutes to hours, this is suggestive of **Meniere's disease**, while hours to days is suggestive of a **central or labyrinthine pathology**.

Diagnosis is usually made by physical examination via the **Hallpike maneuver**. For this test, the patient is supine with his/her head slightly lower than his/her body. **Nystagmus** can be noted when turning the head towards the affected ear. This is a positive Hallpike maneuver and indicates diagnosis of benign paroxysmal positional vertigo (BPPV).

## Dix-Hallpike/Epley Maneuver



**Meniere's disease** is associated with **recurrent episodes** of vertigo lasting from around half a hour to a few hours. Ask about **hearing loss** as it is commonly associated with sensorineural hearing loss. The patient may also suffer from **tinnitus**. Typically, Meniere's presents in **middle-aged adults**. The key to diagnosis can often be the variable amount of hearing loss (associated with the episodes of vertigo).

It is important to differentiate between peripheral and central vertigo. **Peripheral vertigo** will be associated with a number of other symptoms like **hearing abnormalities, tinnitus or ear pain**.

**Central causes** of vertigo like **ischemia** and **migraine** are relatively rare. Migraine associated vertigo will inherently present with a history of migraines (often vertigo comes on with the migraine).

**Vertebrobasilar ischemia (stroke)** is relatively rare and will present with other symptoms of **brainstem** involvement. In rare cases, **neoplasias** and **strokes** can cause **brainstem disease** leading to vertigo.

In some cases, **benign tumors of the Schwann cells of cranial nerve VII** can cause vertigo. Patients may also present with **deafness**. This can be idiopathic or as a result of genetic disorders like **neurofibromatosis type 2**. Diagnosis is typically confirmed with MRI.

## Pathophysiology of Vertigo

The **vestibular system** is responsible for the sensation of motion, both in linear and angular directions. The **semicircular canals and otoliths** are responsible for this process. Vertigo is a deficit in either the sensation of motion (i.e. an issue with the semicircular canals) or a centralized issue with the processing of information from the semicircular canals.

## Pathophysiology of benign paroxysmal positional vertigo (BPPV)

BPPV is due to **loose otoliths in the semicircular canals**. These are usually found

within the posterior canal. They are disturbed by head movement and cause the brief vertigo sensations experienced in BPPV.

BPPV is a common condition with a good prognosis. It remits without treatment in around 30% of patients. And almost all patients do not suffer from the condition at 6 months post onset.

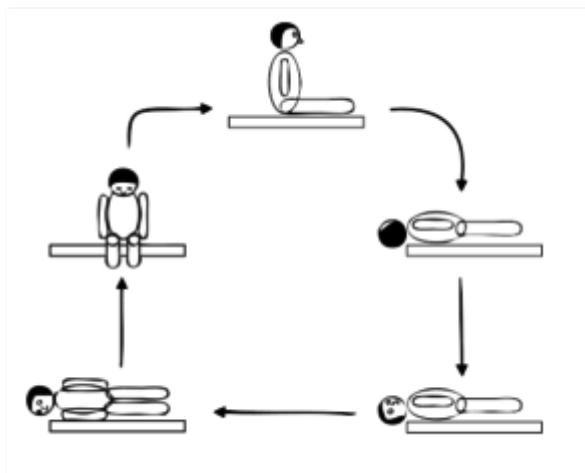
## Pathophysiology of labyrinthitis

Labyrinthitis is caused by **inflammation of the labyrinthine** and its associated vertigo has a rapid onset. Infection of the membranous labyrinth can result in **intraluminal fibrosis and ossification**. Infections can spread from the middle ear (**otitis media**) to the inner ear and internal auditory canal and cause sensations of vertigo.

## Pathophysiology of Meniere's disease

Meniere's disease is caused by **excess endolymphatic fluid in the inner ear**. This can either be caused by overproduction or under-absorption.

## Therapy of Vertigo



**Image:** "Epley's maneuver for treatment of benign paroxysmal positional vertigo of the left ear. The physician holding the head is not shown." by C mamais - Own work. License: [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)

Therapy depends on the underlying cause of vertigo.

## Treatment of benign paroxysmal positional vertigo

Treatment is typically provided by **repositioning maneuvers (Epley's)**. Epley's maneuver involves the positioning the head in different positions. Lying supine, the patient's head is tilted to the left side until nystagmus and dizziness have passed. The patient's head is then tilted in the other direction, again allowing nystagmus and dizziness to pass. Epley's is effective in around 70% of patients with BPPV.

## Treatment of labyrinthitis

Many things can inherently cause labyrinthitis including **viral diseases like HIV and HSV**. In most cases, the underlying disease should be treated, as a treatment for vertigo

will be purely **symptomatic** in nature. In viral cases, **benzodiazepines** have been found to successfully control vertigo. **Anti-emetics** can be used for nausea and vomiting.

In patients with **bacterial infections** that have to lead to labyrinthitis, **topical antibiotics** are usually prescribed except when **meningitis** is suspected, in which case treatment will be **IV antibiotics**.

In patients with **autoimmune-associated labyrinthitis**, **corticosteroids** can be effective.

## Treatment of Meniere's disease

**Management of symptoms** is the goal for therapy in Meniere's disease as there is currently no cure. Due to the pathophysiology of Meniere's disease – where **endolymphatic pressure** is varyingly high – treatment has tended to attempt to reduce this pressure.

There is some debate as to whether this is an effective treatment option. In practice, 80% of patients find that vertigo is controlled by **dietary changes** and **diuretics**. **Benzodiazepines** can be helpful in some patients for the control of vertigo.

## Treatment for acoustic neuromas

Treatment depends on the individual patient. **Radiotherapy** or **surgical resection** can be opted for if the tumour is large (<3cm) and growing. If it is stable and under 3 cm it may be wise to **manage conservatively**.

## Complications of Vertigo

With many diseases causing vertigo, the common complication is falling **after feeling unsteady** leading to **trauma**, especially in elderly patients.

## Complications associated with BPPV

During Epley's maneuver, a high proportion of patients will feel vertigo which may be distressing. Other complications include **accidents during work or driving** if patients suffer an episode of BPPV.

## Complications associated with acoustic neuroma treatment

Both radiotherapy and surgery are associated with a number of risks. **Risk of surgery** include **hearing loss**, **facial weakness** and **facial numbness**. **Facial nerve palsy**, hearing loss and **secondary malignancy** can occur following **radiotherapy**.

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