

## Dizziness — Definition and Treatment

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**Dizziness, or the feeling of light-headedness or vertigo, is characterized by being in the state of unsteadiness or by having a feeling of whirling sensation. Dizziness can be induced by benign activities including spinning, state of disequilibrium to life-threatening disorders like infections, Dandy's syndrome, Meniere's disease, or due to psychiatric origins or due to anxiety. Various signs, symptoms, and tests are involved in diagnosing dizziness. Currently, various pharmacological, non-pharmacological and surgical options are used for the treatment of dizziness.**



### Definition of Dizziness

Dizziness is a common term used for **various feelings or sensations**, which include vertigo, disequilibrium, and presyncope that occur from various kinds of vestibular and non-vestibular causes.

### Epidemiology of Dizziness

According to studies, a prevalence of **vertigo** is the highest followed by unsteadiness and dizziness. The incidence of imbalance, dizziness, and vertigo is around 5-10% and increases to 40% in older people with more than 40 years of age. Reports show an estimated number of 3.9 million ED visits due to dizziness and vertigo in the US.

Dizziness is the 9th common clinical symptom observed in all patients. However, this is reported as the third common symptom in elder patients at the age of 65–75 years. The presence of this symptom in elder patients also **increases the chances of falls** leading to accidental deaths.

## Differential diagnosis of Dizziness

Diagnosis of dizziness can be a daunting task for the physicians due to its non-specific and varied aetiologies. The differential **diagnosis associated with dizziness is broad** and accounts only for 10% representation of the common aetiologies. However, physical examination and correct patient history can support the differential diagnosis. Patient history and right understanding of the causes is important for classifying dizziness into one of the types and treatment plan.

### The four main types

1. Disequilibrium
2. Vertigo
3. Light-headedness
4. Presyncope

### Vertigo

Vertigo is the most common cause of dizziness that includes

1. Vestibular neuritis
2. Benign paroxysmal positional vertigo
3. Labyrinthitis
4. Meniere disease

The duration of the symptoms and **hearing loss** are important for differential diagnosis. Disequilibrium or sense of imbalance can be caused by various underlying conditions like stroke and neurological findings. Light-headedness is often associated with psychiatric issues like anxiety and depression.

### Various types and differential diagnosis for dizziness

<b>Otologic or vestibular causes</b>	<ul style="list-style-type: none"> <li>• Vertigo or vestibular dysfunction</li> <li>• Vestibular neuritis (viral infection of vestibular nerves)               <ul style="list-style-type: none"> <li>• Benign paroxysmal positional vertigo</li> <li>• Labyrinthitis (infection and inflammation of labyrinthine organs)</li> </ul> </li> <li>• Meniere disease (increased fluid in the inner ear)</li> </ul>
<b>Psychiatric causes</b>	<ul style="list-style-type: none"> <li>• Anxiety</li> <li>• Panic disorder</li> <li>• Depression</li> </ul>
<b>Cardiovascular causes</b>	<ul style="list-style-type: none"> <li>• Arrhythmias</li> <li>• Carotid artery stenosis</li> <li>• Myocardial infarction</li> <li>• Orthostatic hypotension</li> </ul>
<b>Other causes</b>	<ul style="list-style-type: none"> <li>• Poor vision</li> <li>• Parkinson disease</li> <li>• Musculoskeletal disorders that affect gait               <ul style="list-style-type: none"> <li>• Peripheral neuropathy</li> <li>• Alcohol consumption</li> </ul> </li> </ul>

Acute and prolonged dizziness is caused due to neurological issues like **cerebellar or brainstem stroke**. Patients with **peripheral vestibular lesion** display unidirectional horizontal spontaneous **nystagmus**. **Transient ischemic attacks** display dizziness as its only symptom. However, recurrent episodes can also be associated with neurological disorders.

**Meniere disease** is also characterized by repeated episodes of dizziness which are associated with **auditory symptoms, ear fullness, hearing loss or tinnitus**. Repeated spontaneous dizziness without an associated with neurological or auditory symptoms is often associated with **migraines**.

Repeated episodes of dizziness triggered by position are its most common cause known as **BPPV and orthostatic hypotension**. Various positional changes like rolling over the bed, lying down, looking up or reaching onto something can trigger BPPV. In contrast to this, getting up from a seated position or from a lying position can trigger orthostatic hypotension.

Chronic repeated episodes of dizziness are also associated with **anxiety disorders**.

## Clinical features and presentations of Dizziness

Various clinical features of dizziness include; **vertigo, vomiting, headache, nausea, ringing in the ears, hearing loss, sweating, fainting, and falls**. The prevalence of the clinical features increases with age.

### Vertigo

Vertigo usually involves visualization of **tilting, spinning, or dropping** in the environment. Vertigo episodes are commonly caused due to **inner-ear infections**. In cases of hearing loss, ear pressure and tinnitus.

The period of vertigo lasts for 20 minutes to 24 hours. Acute **monophasic vertigo** can generally occur suddenly and can last for weeks, months to years, while **episodic vertigo** occurs in episodes and can last for seconds to hours. **Positional vertigo** is caused when the person displays movements or certain positions.

### Headache

A headache is a common clinical feature of dizziness and is associated with migraine-related dizziness. The earlier history of **viral infections**, colds or frequent episodes of Meniere disease also results in a headache.

### Gait ataxia

Various cerebral diseases result in gait ataxia, which is more prevalent in older people.

### Vomiting and nausea

Vomiting and nausea can be due to anxiety, drop in blood pressure, use of medications, migraines, and inflammation in the inner ear.

# Clinical Investigations of Dizziness

Currently, **TiTrATE is the novel diagnostic method** used for the determination of the causes of dizziness. The method involves information and understanding of the **Time** of the symptom occurrence, **Trigger** of the symptom, and **Targeted examination** of the symptoms.

## Physical examination

Physical examination **provides basic information on the vital signs and underlying conditions** of the patient experiencing episodes of dizziness. The examination involves a cardiac and neurologic examination, orthostatic BP measurement, nystagmus assessment, and Dix-Hallpike maneuver.

The head-impulse, nystagmus, and test of skew examination (**HINTS**) help in differentiating central and peripheral aetiologies. Ear examination provides important information to the physician on **the presence of infection or inflammation in the inner ear**.

**Neck examination** involves understanding the flexibility and motion effects on the patient.

## Orthostatic blood pressure measurement

Blood pressure measurement of the patient **in a supine position** and when he stands provides information on the presence of orthostatic hypotension.

Presence of **orthostatic hypotension is considered to be sufficient** for the development of the symptoms. However, more than 40mm Hg decrease in orthostatic Systolic blood pressure (SBP), 90 mm Hg or low SBP in standing position and decrease in orthostatic mean arterial pressure of 20 % are considered symptomatic for the condition.

## Nystagmus

- Nystagmus evaluation is a vital component for the diagnosis of peripheral vestibular disorders. This test is at times **referred to as static positional testing** and is different from Dix-Hallpike maneuver as it identifies the presence of anterior and posterior canal BBPV.
- **Presence of BBPV** is diagnosed through direction-changing horizontal nystagmus or positional torsional nystagmus.
- **Vestibular neuritis** is diagnosed through unidirectional horizontal nystagmus.
- **Lesions in the lower cerebellum** do not result in unidirectional horizontal nystagmus.

### Spontaneous nystagmus

The most common oculomotor issues observed in dizziness involves the presence of spontaneous nystagmus. This indicates **an imbalance in the peripheral or central vestibular system**.

Presence of spontaneous vertical nystagmus commonly indicates a **central lesion**. After observing eye movements in the first gaze the eye movements in each direction are also observed.

Persistent nystagmus which occurs while looking at 30 degrees to the side is considered as pathological finding. **Gaze-evoked nystagmus** which is bi-directional in nature are generally caused **due to central lesions**

### Positional testing

Positional testing commonly **triggers central and peripheral nystagmus**. This is performed using the **Dix-Hallpike maneuver**

This method helps in diagnosis of **Benign paroxysmal positional vertigo (BPPV)**. The examination is performed by seating the patient on a flat table. The physician turns the patient's head from one side to another at 45 degrees and immediately lays the patient in a supine position with their head hanging at 20 degrees over the edge of the table.

The physician observes the patient's eyes for 30 seconds and the exercise is repeated on the opposite side. The method also helps in diagnosis of **vestibular debris of the ear**. Spontaneous nystagmus is generally caused due to lesions in the cranial nerve VII and labyrinth. **Electronystagmography** tests for vestibular functioning are used for detection of nystagmus.

## Balance and Gait testing

In this test, the patient is observed during walking, tandem walking, and in Romberg position (with open and closed eyes). Gait impairment **generally suggests the presence of a neurological condition**.

Patients with a labyrinth and eight nerve lesions display off-balance and those with bilateral vestibulopathy or peripheral neuropathy are unable to stand in Romberg position with their eyes closed. Swaying on one side in Romberg test indicates the presence of vestibular dysfunction. Ataxia usually indicates cerebellar dysfunction and is characterized by slow, irregular and wide-based gait of the patient.

## Radiography and Laboratory testing

Radiography or laboratory testing for dizziness **does not show any additional benefits** for the diagnostic workup of the patients. Studies have shown a very low number of patients who displayed abnormal laboratory tests for an explanation of dizziness.

Various causes of dizziness and diagnostic methods

Cause	Type of dizziness	Diagnosis and tests	Duration of dizziness / triggers
<b>Meniere disease</b>	Vertigo	Repeated episodes of dizziness along with hearing loss	Hours/Intake of sodium
<b>Migraine associated vertigo</b>	Vertigo	Repeated episodes of vertigo with headache, phonophobia, photophobia or aura between two occurrences of vertigo	Minutes to days/lack of sleep, stress and poor diet

<b>Benign Paroxysmal positional vertigo</b>	Vertigo	Dix-Hallpike maneuver test positive with repeated episodes of vertigo without hearing loss	Seconds/Changing of positions like turning sides on the bed or reaching out to high objects
<b>Parkinson's disease</b>	Disequilibrium	Balance and gait observation test shows shuffling gait	
<b>Peripheral neuropathy</b>	Disequilibrium	Poor balance and sensation in the feet	
<b>Orthostatic hypotension</b>	Presyncope	Decrease of 20mm Hg systolic blood pressure, 10mm Hg decrease in diastolic blood pressure or increase of pulse to 30 beats per minute	Seconds/Standing from lying or seated position
<b>Hyperventilation syndrome</b>	Lightheadedness	Symptoms observed when exposed to voluntary hyperventilation	Seconds/placing the individual in hyperventilated areas
<b>Mal de débarquement</b>	Vertigo	Better feeling when in motion	Weeks to months/Plane trips or water trips

## Treatment and Management of Dizziness

Once the patient history and physical examination are performed, the physician should further place the diagnosis into one of the dizziness categories and decide upon the treatment plan for the patient. Patients with Meniere disease can lead to concurrent episodes of vertigo.

### Selected treatments

<b>BPPV</b>	<b>Meniere's disease</b>	<b>Vestibular neuritis</b>
<ul style="list-style-type: none"> <li>Epley maneuver</li> <li>Meclizine - watch for sedation and disequilibrium</li> </ul>	<ul style="list-style-type: none"> <li>Salt restriction</li> <li>Diuretics such as triamterene/hydrochlorothiazide</li> </ul>	<ul style="list-style-type: none"> <li>Methylprednisolone taper over 3 weeks</li> </ul>

### Pharmacological management

For patients with a migraine-associated vertigo are subjected to **a migraine preventing medications** for minimizing the consequences of a headache and thereby minimizing the occurrence of vertigo.

Patients with BBPV are subjected to **25-50 mg Meclizine**, which is commonly used for reducing the symptoms of vertigo. High-dose oral **corticosteroids** like methylprednisolone (100 mg daily) are administered to a patient with vestibular neuritis.

For patients with orthostatic hypotension, the **earlier prescribed drug regimen is reviewed. Midodrine** which is an **Alpha-1 agonist** metabolite is titrated up to 10 mg for preventing supine hypertension. Fludrocortisone is further administered to increase sodium and water retention.

## Non-pharmacological management

Various non-pharmacological management methods like **restriction on salt consumption, use of diuretics and** other methods are used. **Epley maneuver** and **vestibular rehabilitation** are other treatment methods which include head and neck exercises and benign paroxysmal positional vertigo treatment are used.

Other management interventions include **effective sleep, good diet,** and **exercise. Continuous monitoring of blood pressure, symptoms and potassium levels** is important for the management of orthostatic hypotension and thereby minimizing the episodes of dizziness associated with it.

## References

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