

# Vestibular Rehabilitation Therapy: Role of Physical Therapy in Management of Vertigo

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## Abstract

Vestibular Rehabilitation Therapy (VRT) is the therapy used for rehabilitation of patients with vestibular lesion who have not compensated fully. Basically Vestibular Rehabilitation Therapy is customized exercise program designed according to the need of patient by physiotherapist.

Three clear indications for vestibular rehabilitation

- 1. Specific interventions for benign paroxysmal positional vertigo (BPPV)
- 2. General interventions for vestibular loss
  - 2.1 Unilateral vestibular loss e.g. in case of vestibular neuritis or acoustic neuroma
  - 2.2 Bilateral vestibular loss e.g. in case of gentamycin toxicity and related conditions
  - 2.3 Central vestibular lesions brainstem infarct, cerebellar infarct, MS etc.
- 3. Empirical treatment for common situations where the diagnosis is unclear
  - 3.1 Post-traumatic vertigo
  - 3.2 Multifactorial disequilibrium of the elderly

Persons without a vestibular problem e.g. the patients who will not benefit from vestibular rehabilitation therapy are - as a sentence...

- · Low blood pressure
- Medication reactions (other than ototoxicity)
- Anxiety, malingerers, depression (although T'ai Chi may be helpful for anxiety)
- · Migraine associated vertigo (although it has been reported to be helpful nonetheless)
- · Transient ischemic attacks (TIA) Persons with fluctuating vestibular problems.
- Meniere's disease
- Perilymph fistula

Functional Goals of VRT-

- Decrease disequilibrium Improve functional static & dynamic balance.
- Improve postural and gait stability.
- To reduce motion related dizziness.
- Decrease oscillopsia-visual blurring during head movement increase gaze stability i.e. DVA during both static and dynamic activities

# Keywords: Physical therapy, Vertigo, Vestibular rehabilitation

# Introduction

Vestibular Rehabilitation Therapy or balance rehabilitation therapy is a customized exercise program to improve balance and reduce dizziness-related problems.

Evidence has shown that the therapy can be effective for rehabilitation of patients with vestibular lesion and can help in improving the symptoms related to many vestibular (inner ear/ balance) disorders.

People with vestibular disorders often experience problems with vertigo, dizziness, visual disturbance (especially when turning your head quickly), and imbalance. It may also contribute to emotional problems such as anxiety and depression and can frequently cause people to adopt a sedentary lifestyle which as a result decreases muscle strength and flexibility, increases joint stiffness, and reduces stamina.

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Dizziness is a significant risk factor for falls in elderly individuals and it has been estimated to be the leading cause of serious injury and death in persons older than 65 years.

# Three clear indications for vestibular rehabilitation

# Specific interventions for benign paroxysmal positional vertigo (BPPV)

BPPV is a common cause of vertigo (feeling or sensation of spinning). It might occur in children but more common in older persons.

The most common cause of BPPV is degeneration of the vestibular system of the inner ear. It is thought that tiny calcium "stones/crystals" known as otoconia, inside your inner ear gets displaced from the maculae of the inner ear into the fluid-filled semicircular canals. Moving around of these stones in semicircular canals due to changes in the position of the head, such as standing, turning head or tipping the head backward, etc., lead to sudden vertigo – a spinning sensation.

The main symptom of BPPV is a feeling that you are spinning or tilting when you are not. It may include other symptoms such as a sense of imbalance, nausea, vomiting if it is bad enough.

It can be diagnosed by a Dix-Hallpike test.

BPPV is possible to be treated by procedures called the Epley maneuver and the Semont maneuver, Brandt-Daroff exercises, Log roll exercises on advice of the physician.

#### Some Precautions:

People with this disorder need to be extra careful to avoid hurting themselves in case of sudden attack of vertigo.

If there is any possibility that vertigo could strike then avoid driving so that you not lose control.

Avoid heights.

## General interventions for vestibular loss

**Unilateral vestibular loss:** UVL is a one-sided weakness or impairment in the balance mechanism of the inner ear. There are several causes of UVL but the most common causes are vestibular neuronitis or acoustic neuroma.

Common symptoms include vertigo (a spinning sensation), imbalance, dizziness, and nausea or vomiting in severe cases.

**Vestibular neuronitis:** Vestibular neuritis refers to inflammation of your nerve of the inner ear called the vestibulocochlear nerve and results in symptoms such as sudden, severe vertigo (spinning/swaying sensation), dizziness, balance problems, trouble concentrating nausea and vomiting. This disorder, caused by an infection can be treated by medications and physical therapy (VRT).

Acoustic neuroma: An acoustic neuroma is a noncancerous slow-growing tumor that develops on the main (vestibular) nerve which runs from the inner ear to the brain and is responsible for hearing and balance (equilibrium). The symptoms of an acoustic neuroma such as Loss of hearing on one side, ringing in ears, Dizziness and balance problems occurs from the tumor pressing against the eighth cranial nerve in the ear disrupting its ability to transmit nerve signals to the brain. Treatments include regular monitoring, radiation and surgical removal.

Other causes of UVL may include:

• Wear out of the Inner ear structure due to aging

- Toxic reaction to medications
- Blood clots, tumors, or brain injury that impacts the inner ear structures

People with UVL are more sensitive to environmental stimuli (noise, crowds and visual patterns) than those without a loss. Some people also experience difficulty concentrating and thinking even after the symptoms of dizziness and imbalance abate

Symptoms of UVL such as dizziness, disequilibrium, nausea and imbalance can be reduced or eliminated with the help of Physical therapy design exercise such as:

- Gaze stabilization exercise can help improving the coordination of head and eye movements
- Special balance exercises will incorporate and strengthen your inner ear balance system
- Walking exercises will improve balance in challenging environments like walking outdoors, on uneven surfaces, in dark rooms, in crowded places, etc.

**Bilateral vestibular loss:** Bilateral vestibular loss occurs when the balance mechanism of both inner ears are damaged. Symptoms in most cases are Imbalance and visual disturbance. The imbalance is worse in the dark or in situations where footing is uncertain. Spinning vertigo is unexpected. There are several causes for BVL but the main and most common cause is Gentamicin Ototoxicity, which is due to exposure to an ototoxin such as gentamicin.

**Central vestibular lesions:** The central part of the vestibular system includes structures within the brainstem and cerebellum.

Damage to central vestibular system may lead to various vestibular dysfunctions including head tilt, nystagmus, strabismus, ataxia and gait disturbance

Central vestibular lesions may cause neurological signs like abnormal mental status including depression, numbness, insensibility or coma and cranial nerve deficits including intentional tremor and dysmetria.

# Empirical treatment for common situations where the diagnosis is unclear

**Post-traumatic vertigo:** It refers to the dizziness that follows a neck or head injury.

There are many potential causes of post-traumatic vertigo. It may include injuries resulting from motor vehicle accidents, falls, assault and contact sports.

To diagnose post-traumatic vertigo, one needs to know, when and how the head or neck was injured, and the character of the dizziness i.e. spinning, unsteadiness and confusion. Treatment for post-traumatic vertigo involves a combination of medication, changes in life style and possibly physical therapy.

**Multifactorial disequilibrium of the elderly:** Vertigo, dizziness and balance disorders are often a chronic complaint in elderly people and may worsen the functional and psychosocial outcomes such as losing balance or fear of losing balance. Disequilibrium is multifactorial in many cases and is triggered by multiple medications and iatrogenicity. Symptoms cause restrictions in the working ability and quality of life.

Patients with this disorder must be stimulated to perform customized physical exercises safely, taking their general state of health in consideration. Vestibular and balance rehabilitation program can help to avoid psycho-social complications, such as fear of falling and aims to encourage patients to develop an efficient personalized strategy of equilibrium and to increase their level of physical activity, autonomy, and safety to reduce the potential for falls.

Patients usually referred for vestibular rehabilitation therapy are those which are diagnosed with dizziness, imbalance, vertigo, Meniere's syndrome, BPPV, neck-related dizziness and migraine. Other patients are those who have had a stroke or brain injury or who frequently fall.

Persons without a vestibular problem: The patients who will not benefit from vestibular rehabilitation therapy are -

- Low blood pressure
- Medication reactions (other than ototoxicity)
- Anxiety, malingerers, depression (though T'ai Chi could be helpful for anxiety)
- Migraine associated vertigo (however it has been reported to be helpful nonetheless)
- Transient ischemic attacks (TIA)

## Persons with fluctuating vestibular problems:

- Meniere's disease
- Perilymph fistula

## Functional Goals of VRT are to

- Improve any deficits that were identified.
- Improve postural and gait stability.
- Reduce motion related dizziness and risk for falling
- Decrease oscillopsia- blurring of vision while moving head
- Increase gaze stability i.e. Dynamic Visual Acuity (DVA) during both static and dynamic activities
- Decrease disequilibrium Improve functional static & dynamic balance and ability to function in activities of everyday living and ultimately, improve your quality of life

If patients continue to perform the exercises they have learned, they will find the symptoms to decrease significantly or completely disappear.