# Dizziness in the Older Adult

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# Objectives

- Discuss the prevalence of dizziness
- Identify different causes of dizziness, specifically those stemming from vestibular dysfunction
- Provide an overview of the anatomy and function of the vestibular system
- Describe changes that occur to the vestibular system with aging
- Discuss common vestibular disorders that can cause dizziness
- Describe the role of vestibular rehabilitation as a treatment option for dizziness

# What is Dizziness?[1,2,3]

- According to the dictionary to be dizzy means, “having a whirling sensation in the head with a tendency to fall”
- Defined in some of the literature as “A subjective feeling of the illusion of movement, a disorientation of the body in space or postural instability”
- A broad term that can include a sensation of
  - Vertigo
  - Lightheadedness
  - Imbalance/disequilibrium/unsteadiness
  - Faintness
  - Fogginess
  - Floating
  - Swaying
  - Wooziness

https://www.express.co.uk/life-style/health/931809/feeling-dizzy-spells-sick-vertigo-tinnitus-menieres-disease

# Prevalence of Dizziness[4,5,6,7]

- Ranges from 20-30% depending on the definition of dizziness
  - 24% of people >72 years old experience dizziness in a US study
  - 30% of people >65 years old experience dizziness according to a UK study
  - 50% of people >85 years old experience dizziness in a study performed in Sweden
- Has a tendency to increase with age
- One of them most common reasons older adults go to the doctor's office
  - 2.9% of visits in people >65 years old
  - 3.8% of visits in people >75 years old
- 2.6 million emergency room visits per year are associated with dizziness or vertigo

# So why is this important?[2,4,8,9,10]

- Dizziness interferes with ADLs in 30% of people >70+ years of age
- Dizziness is a strong predictor of falls and recurring falls in older adults
    - Falls are the leading cause of hospital admission and accidental death in older adults

https://www.123rf.com/photo_90904850_stock-vector-caution-symbols-with-stick-figure-man-falling-wet-floor-tripping-on-stairs-fall-down-from-ladder-and.html

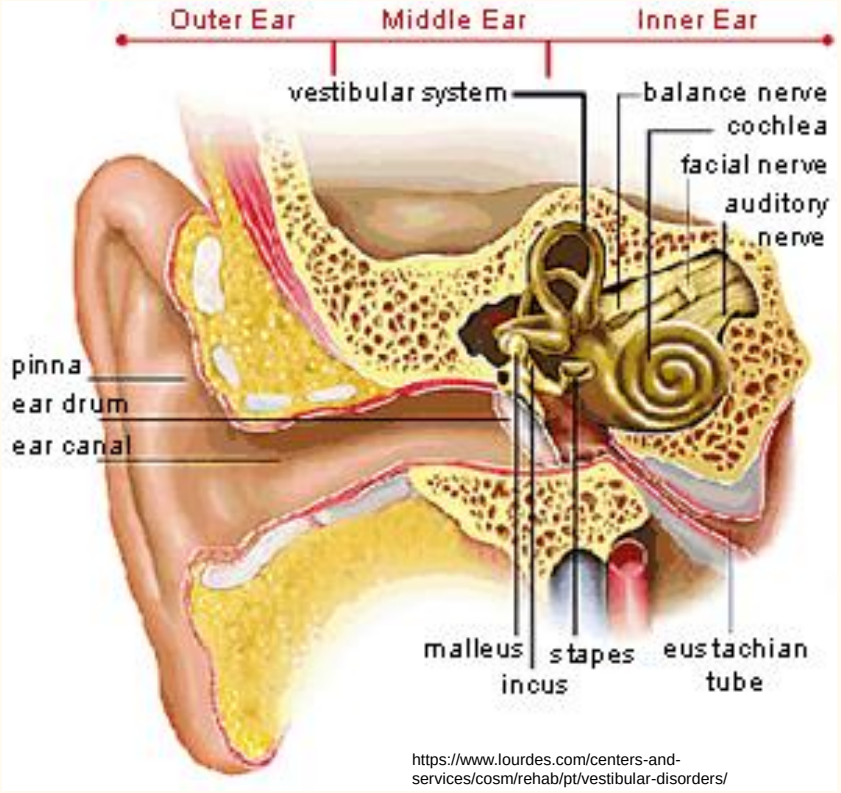
# Causes of Dizziness[3,7]

- Medication induced causes
- Psychiatric causes
- Cardiovascular/Metabolic causes
- Neurological Causes
- Changes in vision
- Vestibular dysfunction

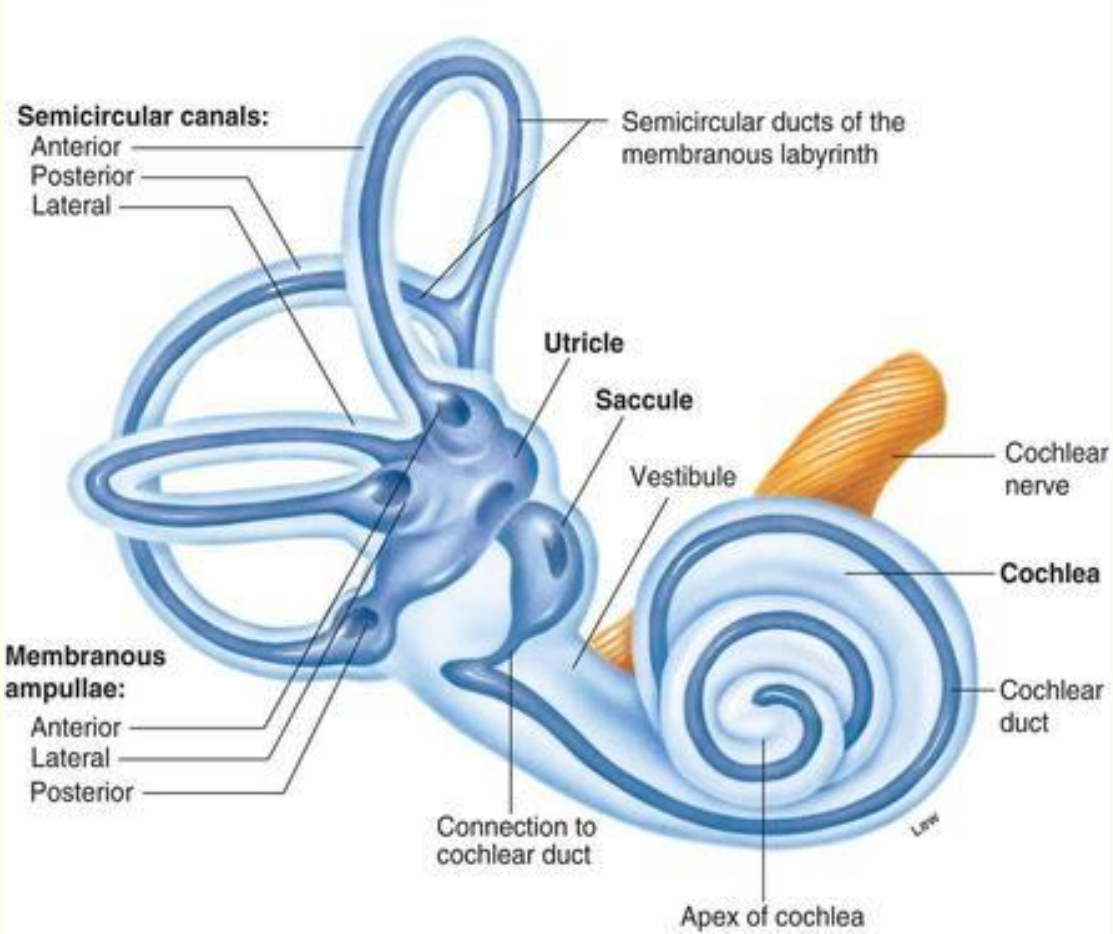
https://en.wikipedia.org/wiki/Dizziness#/media/File:Dizziness.jpg

# The Vestibular System: Anatomy and Function[5,11,12]

- Helps make up our system of equilibrium/sense of balance
- Located within our inner ear
- Peripheral vestibular apparatus
- Vestibulocochlear Nerve connects information from the apparatus to the processing centers in the brain




https://www.lourdes.com/centers-and-services/cosm/rehab/pt/vestibular-disorders/




http://greymattersjournal.com/the-vestibular-system-and-the-spins-a-proposal/

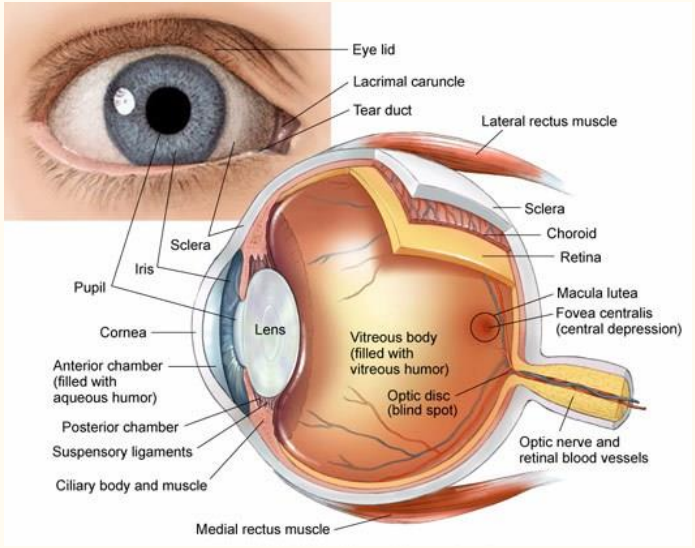
# Additional Systems That Control Balance

2 additional body systems, that **work with** the vestibular system to control balance

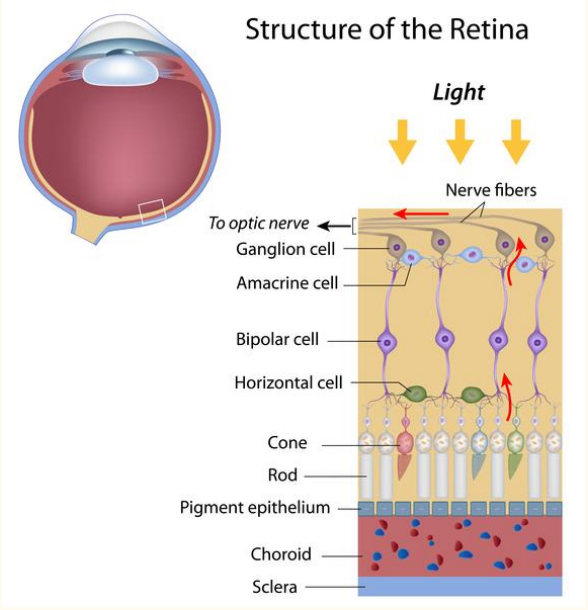
- Visual System
- Somatosensory System

http://www.compressiondesign.com/how-long-to-hold-a-yoga-pose/

# Visual System[3]




http://specialtyicare.com/what-is-retina-specialist/

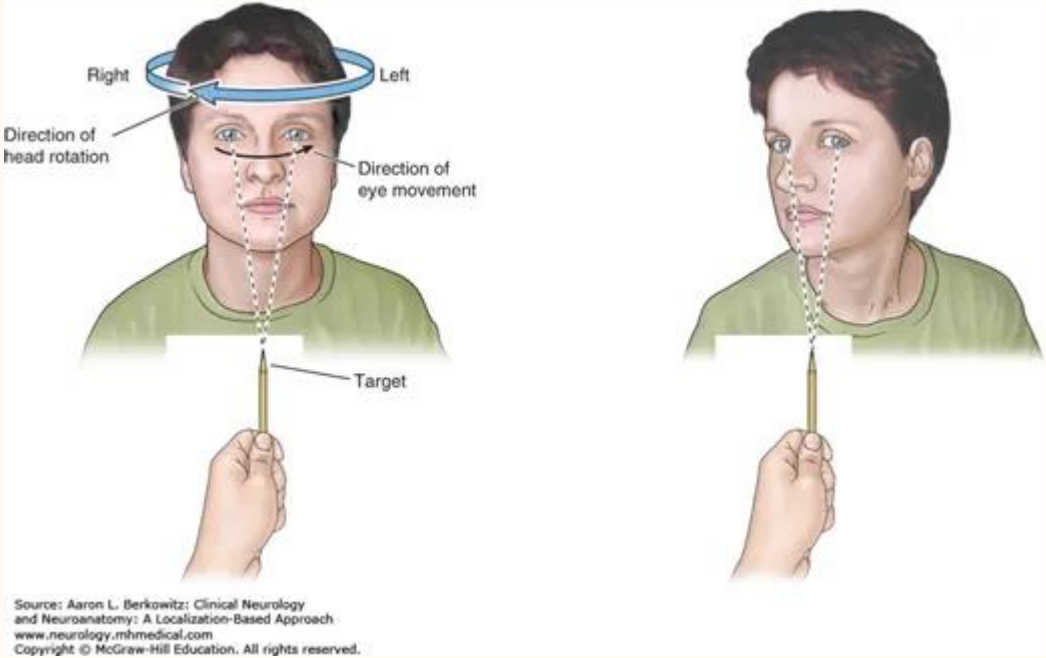



https://ghr.nlm.nih.gov/condition/cone-rod-dystrophy

-Sensory receptors include rods and cones along retina that detect light impulses

-Information sent to brain that identifies how a person is oriented in relation to other objects

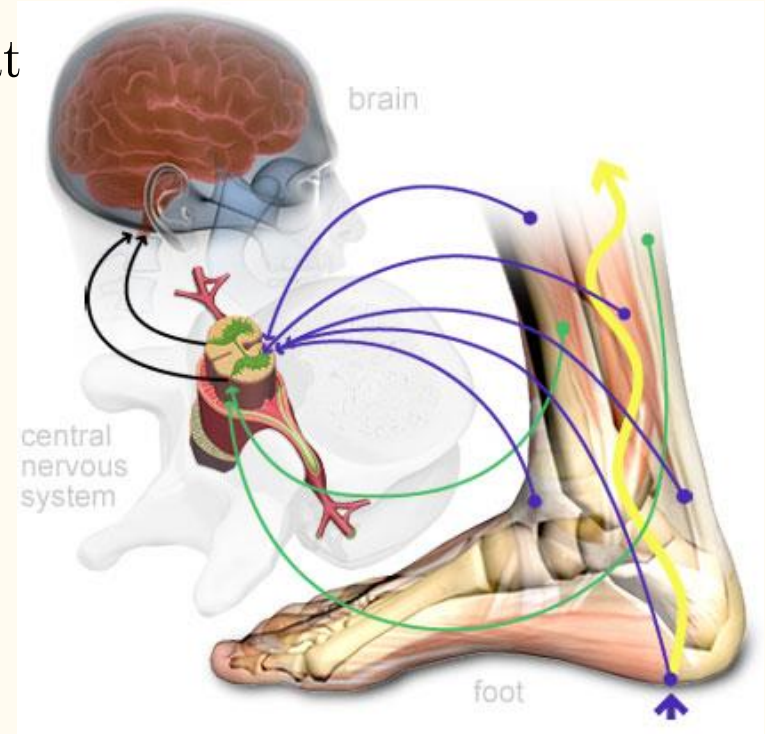
# Vestibular Ocular Reflex (VOR)[5]




https://neupsykey.com/the-auditory-and-vestibular-pathways-and-approach-to-hearing-loss-and-dizzinessvertigo-cranial-nerve-8/

# Somatosensory System[3]

- Proprioceptors and sensory receptors that respond to stretch/pressure along tissues send impulses to the brain, providing information on how that structure is oriented in relation to space
  - Present in our joints, muscles, skin
- Body regions that play a key role in our balance include:
  - Cervical Spine
  - Ankles




https://spartascience.com/resources/proprioception-the-vital-part-of-the-warm-up

When one of these systems malfunction, it can contribute to dizziness and imbalance!

# Changes that occur to these systems with aging[5]

## Vestibular

- Degenerative changes occur along the structures of the vestibular system
- VOR gain decreases - decreased visual acuity during head movement
- Decreased ability to adapt to loss of function/stresses on the vestibular system

## Visual

- Acuity, Accommodation, and contrast sensitivity decline with age
- Decreased ability to adapt to dark environments

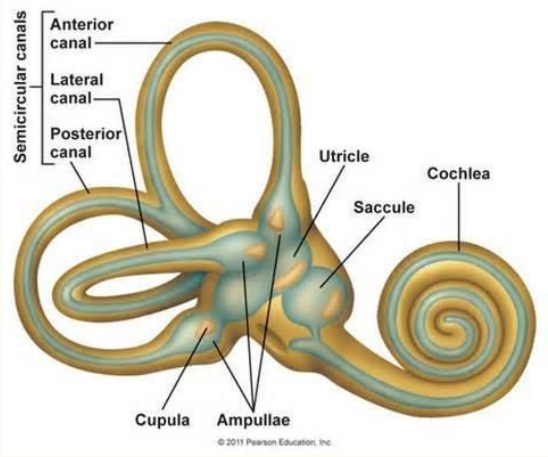
## Somatosensory

- Slower reaction times
- Decreased sense of passive motion and vibration

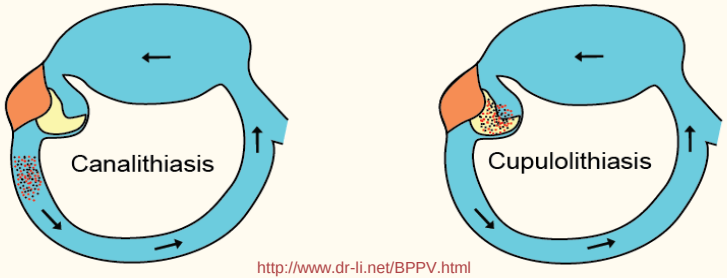
# Common Vestibular Disorders[3,5,11]

## Benign Paroxysmal Positional Vertigo (BPPV)

- Most common cause of vertigo
- Episodes of vertigo provoked by changes in head position
- Common symptoms include spinning sensation experienced with bed mobility, bending, looking up, turning head
- May also cause imbalance, nausea, vomiting

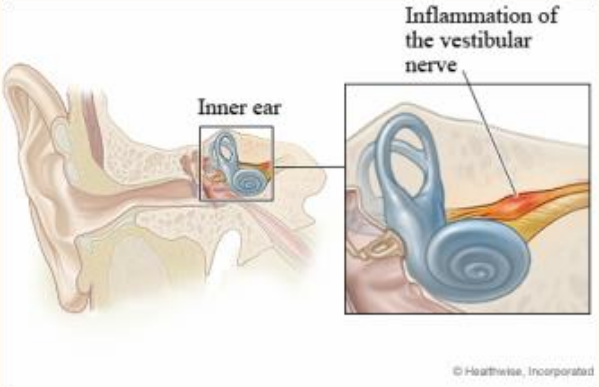


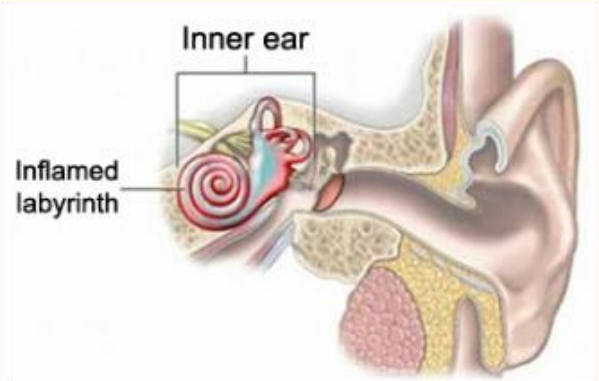

http://www.hearingandbalancetx.com/vestibular-system-anatomy.html




http://www.dr-li.net/BPPV.html

# Common Vestibular Disorders[3,4]




## Vestibular neuritis/labyrinthitis

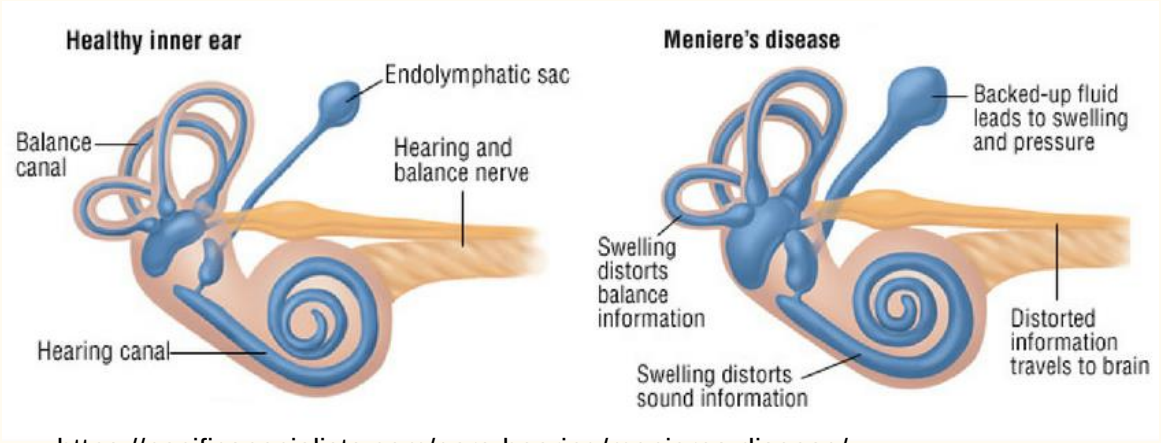
- Occurs when inflammation or an infection disrupts the structures of the inner ear which ultimately results in a faulty signal sent to the brain
- Symptoms include sudden onset of persistent dizziness or room spinning sensation that can last for hours; nausea, vomiting, imbalance, difficulty with vision, tinnitus, hearing loss (only in labyrinthitis)

https://vertigodifferentiation.weebly.com/vestibular-neuritislabyrinthitis.html

# Common Vestibular Disorders[3,4]

**Meniere's Disease**

(aka primary endolymphatic hydrops)




https://pacificspecialists.com/ears-hearing/menieres-disease/

- Unknown cause
- Sudden, severe attacks of vertigo, fullness and/or ringing in the ears, and low pitch hearing loss
- Occurs when too much fluid production occurs in the vestibular apparatus

# Other Vestibular Causes of Dizziness[3]

- Acoustic neuroma
- Mal de debarquement
- Migraine associated vertigo
- Perilymph fistula
- Structural deformities of the bones in the inner ear (superior semicircular canal dehiscence)
- Exposure to drugs causing ototoxicity
- Head injury
- Lack of blood flow to the inner ear

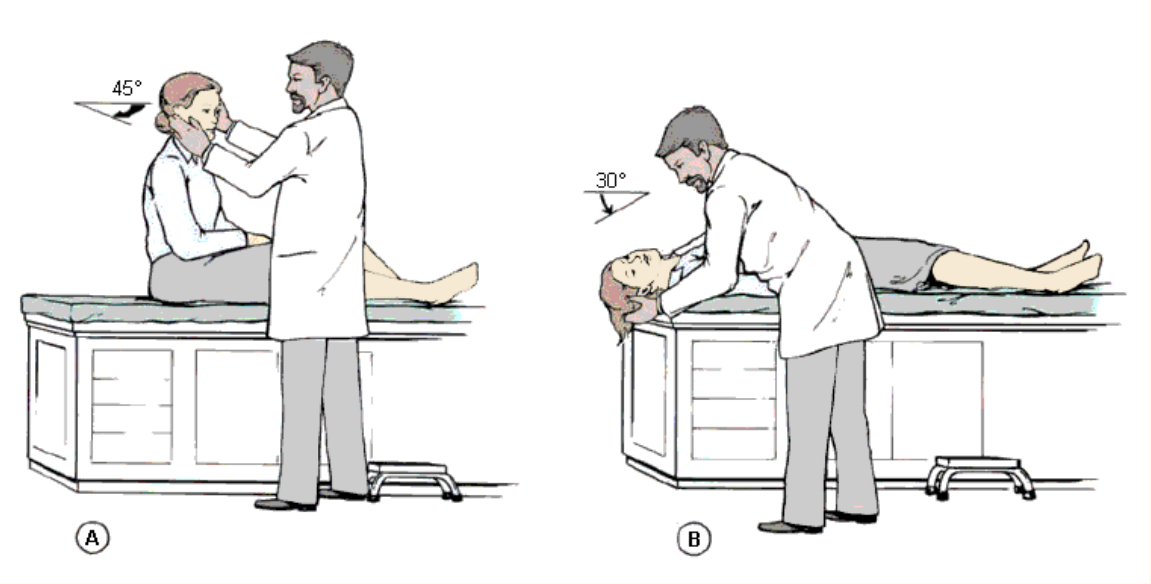
# Treatment for Dizziness[3,5]

<u>Vestibular Rehabilitation</u>**:** a specific type of physical therapy that focuses on exercise based treatments to reduce symptoms of dizziness and to improve balance through compensation.

- Gaze stabilization exercises: help to improve control of eye movements so vision can be clear while the head is in motion
- Habituation exercises: repeated exposure to specific movements or stimuli that triggers a person's symptoms
- Balance exercises: help improve steadiness and reduce risk for falls

# Vestibular Rehabilitation

Positional testing can also be performed followed by repositioning maneuvers also performed to treat BPPV




https://bestpractice.bmj.com/topics/en-gb/880

https://youtu.be/9SLm76jQg3g

# Vestibular Rehabilitation

https://www.hep2go.com/exercise_editor.php?exId=14&userRef=gciaake

https://www.hep2go.com/exercise_editor.php?exId=543&userRef=gciaake

In addition, it may include strengthening exercises to improve the function of the leg musculature to help with balance.

In conclusion, dizziness and imbalance caused by vestibular dysfunction can be treated with physical therapy to help improve symptoms and reduce risk for falls.

# Questions?

https://www.amle.org/BrowsebyTopic/WhatsNew/WNDet/TabId/270/ArtMID/888/ArticleID/452/Ideas-to-Help-Students-Develop-Higher-Order-Questions.aspx

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