

# Approach to the Dizzy Patient

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# Dizziness

- When patients are referred to my Otoneurology practice with dizziness, they frequently ask me:
- *“Why am I dizzy?”*
- *“Why hasn’t it gone away?”*

# Objectives

- Review the anatomy and pathophysiology of dizziness
- Describe the rehabilitation of dizziness

# Symptoms

Dizziness as a symptom can be from many different sources

- Vestibular system – ear, neck, etc.
- Presyncopal – cardiac, hypotensive, etc.
- Neuropsychiatric – anxiety, hypervigilance, fear
- Pharmacologic – side effects to myriad medication

## Symptoms

Symptoms of vestibular system dysfunction can be myriad as well

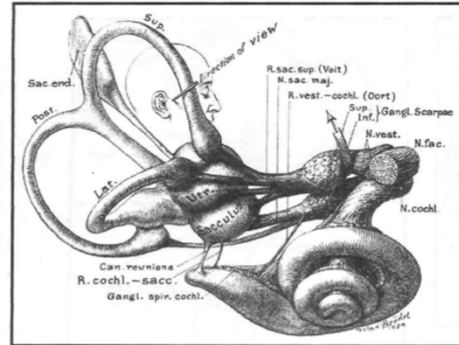
**vertigo-** sensation of self-motion when no self motion is occurring

**vertigo -** false sensation the world is moving or flowing)

**dizziness -** sensation of an impaired spatial orientation without a false or distorted sense of motion)

**imbalance –** sensation of impaired stability

## Anatomy of Dizziness



Drawing by Max Brödel of the vestibular labyrinth using temporal bone slices

## Anatomy of Dizziness

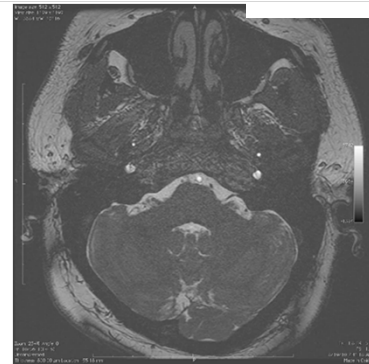
### Vestibular sense organs

- Otolith organs: Sacculus and Utriculus
- Semicircular canals: Superior, Posterior, Lateral

### Cochleovestibular Nerve (CN VIII)

- Vestibular ganglia (superior and inferior) are in the labyrinth (the site of vestibular ganglionitis)
- Cochlear nerve/spiral ganglion is quite separate but adjacent (provides localization)
- Meatal ganglion of the facial nerve (CN VII) is adjacent in 15% (the site of zoster oticus reactivation)

## Anatomy of Dizziness



## Pathophysiology of Dizziness

- Vestibular hair cells transform head movements into nerve impulses
- Semicircular canals sense head velocity in 3 different planes of motion – roll, pitch, yaw
- Each vestibular nerve produces an equal and opposite firing rate to each head movement
- Disruption in one ear (loss) produces a response identical to a head movement – and generates nystagmus
- Head movements during a unilateral vestibular loss magnify the difference

## Pathophysiology of Dizziness

- Otolith organs sense both head position and translational head movement
- Impairment to the otolith organ or nerve produces a loss of the subjective vertical, resulting in a head tilt and an imbalance to one side
- Otolith loss can also produce an illusion of head position when the head position changes its position relative to gravity, resulting dizziness (not vertigo) with position change

## Pathophysiology of Dizziness

- Nystagmus is the sign of the unilateral loss of labyrinthine function (acute peripheral loss)
- Nystagmus can also signal the activation of a posterior semicircular canal in canalolithiasis, the pathology of benign paroxysmal positional vertigo (BPPV)
- Direction-changing gaze evoked nystagmus can also be the sign of central nervous system dysfunction
- Pure vertical nystagmus seen at the bedside is always a sign of central nervous system disease

## Pathophysiology of Dizziness

- The upper cervical spine (C1-C2) also supplies proprioceptive feedback to the vestibular system regarding head position
- Neck muscles that stabilize the head (sternocleidomastoid, levator scapula, suboccipital, and splenius capitus) receive input from the vestibular system
- Impairment to the upper cervical spine biomechanics, not disc disease, can generate a mismatch between neck proprioception and labyrinthine
- Upper neck pain or stiffness and cervicogenic headache can result from the strain to the neck in cases of cervically mediated dizziness

## Pathophysiology of Dizziness

- Benign paroxysmal positional vertigo (BPPV)
  - Starts with a disruption of the otoconial metabolism of the utricular otolith – utriculolithiasis
  - Manifests as a positional vertigo due to otoconia trapped in the posterior semicircular canal
  - Easily identified as a positioning nystagmus (Dix-Hallpike test)
  - Easily treated with otoconial repositioning therapy (Epley, and others) that places the otoconia back into the utricle where they are resorbed
  - Can result in persistent dizziness from either the otolith dysfunction, or the changes in the upper cervical spine

## Pathophysiology of Dizziness

- Acute vestibular syndrome (vestibular ganglionitis)
  - Defined as the acute loss of peripheral vestibular function from one ear, once stroke is excluded
  - Manifests as vertigo/dizziness/imbalance from the onset
  - Can show a nystagmus at the bedside acutely with the fast component of the nystagmus directed opposite to the side of the loss
  - Follows an adaptation/recovery over days to weeks
  - Can result in persistent dizziness from either the residual loss, or the changes in the upper cervical spine

## Pathophysiology of Dizziness

- Cervically mediated dizziness
  - Will have upper cervical spine symptoms – neck stiffness, pain, restricted movement, comfortable position/postures, possibly sensory trick
  - Exam shows asymmetry of posture (head tilt or twist), asymmetry of tone (palpable tight bands, myofascial pain), asymmetry of neck strength
  - Resistant to the repetitive head movement exercises of adaptation and requires special manual methods of physical therapy
  - May require onabotulinum toxin chemodenervation to end the asymmetry in tone

## Pathophysiology of Dizziness

- Chronic subjective dizziness-persistent perceptual postural dizziness
- Persistence of sensations of rocking or swaying unsteadiness and/or dizziness *without* vertigo lasting more than 3 months
  - Present on a majority of days (>15/30 days monthly)
  - Intensified with postural changes, sitting head unsupported, head or body motion, visual exposure to movement (supermarket syndrome)
  - Begin with the acute vestibular syndrome event but fail to fade

## Pathophysiology of Dizziness

Chronic subjective dizziness-persistent perceptual postural dizziness

- Promotes hypervigilance, agoraphobic behaviors, anxiety and depression
- Patients avoid situations that may exacerbate symptoms because they don't want to feel worse physically, they are afraid that something terrible might happen
- Physiological disorder that can have psychological consequences

## Rehabilitation of Dizziness

### Symptomatic medications

- The FDA approves no medication for the treatment of vertigo
- Motion sickness medications – dimenhydrinate (Dramamine I®) or meclizine (Bonine®, Antivert®, Dramamine II®) impair the rehabilitation of dizziness
- Anxiolytic antihistamines (hydroxyzine, diphenhydramine) impair the rehabilitation of dizziness
- Anxiolytic benzodiazepines (alprazolam, lorazepam, diazepam, clonazepam, and others) impair the rehabilitation of dizziness

## Rehabilitation of Dizziness

### Symptomatic medications

- Symptomatic medications should only be used in the short term, to enable more activities to enable the process of adaptation
- Patients with dizziness should be encouraged to taper off all sedative medications, especially when taken as needed during the process of rehabilitation

## Rehabilitation of Dizziness

### What is vestibular rehabilitation?

- A slow progressive process utilized by those who require high levels of vestibular/balance fitness to optimize their daily performance (ballet, gymnastics, hockey, figure skating).
- Reinforce the fact there is no pharmaceutical regimen effective in the treatment of the vestibular system dysfunction
- A long duration (6-18 months) *progressively challenging* course of vestibular rehabilitation physical therapy and home exercise program designed to cause dizziness/fear of falling to intensify so that the daily use of the vestibular system cause less symptoms and expands the activities of daily living.

## Rehabilitation of Dizziness

### What is vestibular rehabilitation?

- Use of symptomatic medication to treat inattention (e.g. methylphenidate), anxiety and depression (e.g. venlafaxine), nausea (e.g. ondansetron) especially should these symptoms limit progress in rehabilitation.
- Consider cognitive and behavioral therapy with a local Psychologist trained to reduce somatic hypervigilance and encourage rehab progress

## Rehabilitation of Dizziness

### Identifying patients that need rehabilitation

- The Dizziness Handicap Inventory (DHI) is a helpful self-report 25 question tool to identify those who may need rehab (>20/100).
- Obtain a blank DHI copy and have the patient fill it out, score it before deciding to refer to rehab (Google: DHI PDF).
- Ohio State Wexner Medical Center has a comprehensive rehab team, but local resources are being established in most major cities.

## Rehabilitation of Dizziness

### Identifying patients that need rehabilitation

- Beware of the need to act as a rehab team member – tapering off the vestibular rehab impairing medications, assisting in treating the comorbid treatment of anxiety disorders without using benzodiazepines, adding medication used for nausea if the therapist reports back that nausea is impairing progress
- Provide referrals for cognitive and behavioral therapy locally

## Rehabilitation of Dizziness

### Multidisciplinary team approach

- No single therapy is sufficient in the rehabilitation of dizziness
- The medical team often needs to explain the cause to reassure it's time to begin the restorative/rehabilitative process
- Persistent concerns about the symptom as a sign of something life threatening need to be thoroughly addressed prior to rehab
- Communication between rehabilitative team members is critical in moving progress forward.

## Rehabilitation of Dizziness

### Multidisciplinary team approach

- Rehab team meetings provide a means to work out roadblocks to progress, expand members of the team (oculomotor therapists, rehab psychologists) if necessary

## Rehabilitation of Dizziness

### Vestibular Rehab Physical Therapy

- The purpose of such a referral is not just to identify benign paroxysmal positional vertigo with Dix-Hallpike testing
- Otoconial repositioning therapies (Epley, and others) are not the sole modality of modern day vestibular physical therapy
- Single visits with a one size fits all home exercise program of the past cannot replace a more comprehensive approach of the present

## Rehabilitation of Dizziness

### Vestibular Rehab Physical Therapy

- Setting goals are essential - many metrics are available to encourage restoration of function despite lingering somatic symptoms
- Rehab Team meetings provide a means to work out roadblocks to progress, expand members of the team (oculomotor therapists, rehab psychologists) if necessary

## Rehabilitation of Dizziness

### Oculomotor Therapy

- Can be performed by specially trained Optometrists or Occupational Therapists
- Use exercises to assure binocularity of vision as part of the visual rehabilitation of patients with dizziness
- Setting goals are essential - many metrics are available to encourage restoration of function
- Prisms might help with reading function when impaired

## **Rehabilitation of Dizziness**

### **Rehabilitation Psychology**

- Specially trained Psychologists
- Help organize the rehabilitation process
- Help the dizzy patient cope with somatic symptoms
- Promote healthy behaviors parallel to the goals of rehab physical therapy
- Provide a cognitive and behavioral therapy approach to symptom management and anxiety control

## **Rehabilitation of Dizziness**

**In some cases of resistant chronic subjective dizziness/persistent postural-perceptual dizziness, while the purely mental symptoms can respond to the use of psychiatric medications combined with cognitive and behavioral therapy, the somatic manifestations may never subside (much like patients with tinnitus).**

## **Summary**

- The dizzy patient can be a challenge, but rehabilitation offers the best treatment course
- Resources are available locally, but in selected cases more comprehensive rehab teams are required