



Canadian Academy of Audiology
Académie Canadienne d'audiologie

Vestibular Disorders for the Non-Vestibular Audiologist

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What are the odds?

- Dizziness is one of the most common complaints: 20 to 30% of population
- About 30% of these are related to vestibular disorders
- Prevalence increases with age
- More prevalent in women
- Equally prevalent in children
- More prevalent in individuals with hearing loss

Neuhauser, H. K. , von Brevern, M. , Radtke, A. , Lezius, F. , Feldmann, M. , Ziese, T. & Lempert, T. (2005). Epidemiology of vestibular vertigo. *Neurology*, 65 (6), 898-904.



What can I do about it?

Ask and they will tell you:

"I feel dizzy, I am unsteady, I am off"

Investigate a bit more:

- How does the dizziness feel like?
 - No movement: lightheadedness, fainting sensation, pressure in the head
 - Movement: swaying, rocking, tilting, turning, spinning
 - Imbalance, have to hold for steadiness, bumps onto objects



What can I do about it?

- How long does it last?
- How often does it happen?
- What brings it on? What makes it worse? What makes it better?
- Are there any other symptoms?
 - Hearing loss, aural fullness, tinnitus
 - Headaches, auras, phono/photophobia
 - Oscillopsia ("things jump" or "my vision is not steady")
 - Nausea, vomiting



A path to Diagnostic Hypothesis

- BPPV – benign paroxysmal positional vertigo
- Vestibular Migraine
- Meniere's Disease
- PPPD – persistent postural-perceptual dizziness
 - Fear of falling
- Labyrinthitis
- Semicircular Canal Dehiscence

Leading to effective treatment and management



BPPV – benign paroxysmal positional vertigo

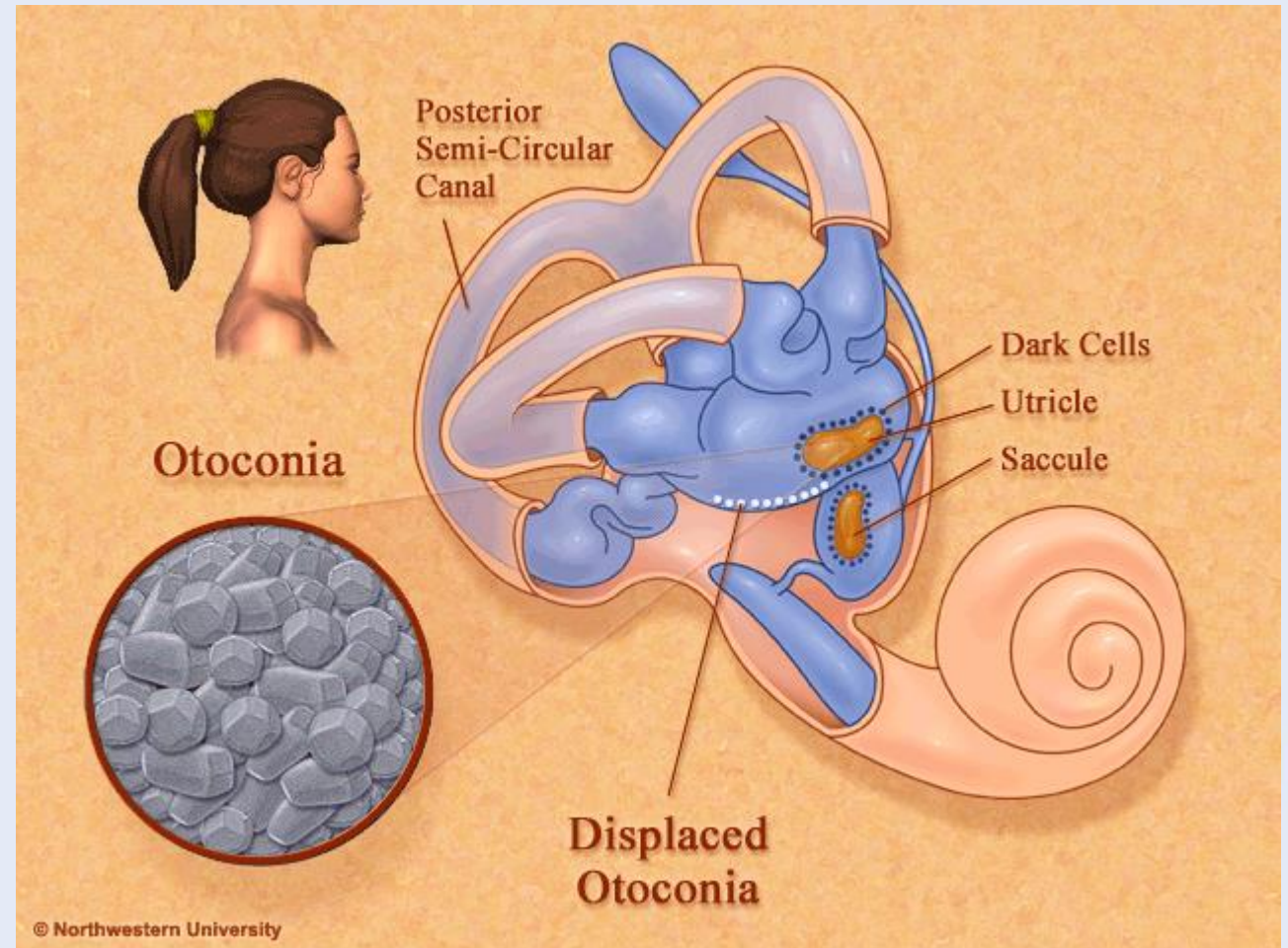
"I woke up feeling a little dizzy and when I sat up, I noticed spinning dizziness. It went away quickly and I felt fine for the rest of the day, maybe just feeling a little floaty. When I went to bed that night, as I made the movement to go down to the pillow, I felt the same spinning again. It is very short and does not happen any other time during the day, just going in and out of bed"

- No hearing and aural symptoms
- No headaches, photo/phonophobia
- No nausea, no vomiting



BPPV – benign paroxysmal positional vertigo

- Otoconia from the utricle end up in one or more semicircular canals
- Posterior canal – >80%
- Lateral canal – 15%
- Anterior canal – 2%
- Nystagmus directly related to affected canal → treatment maneuver
- Differential diagnosis with central positional types



BPPV – benign paroxysmal positional vertigo

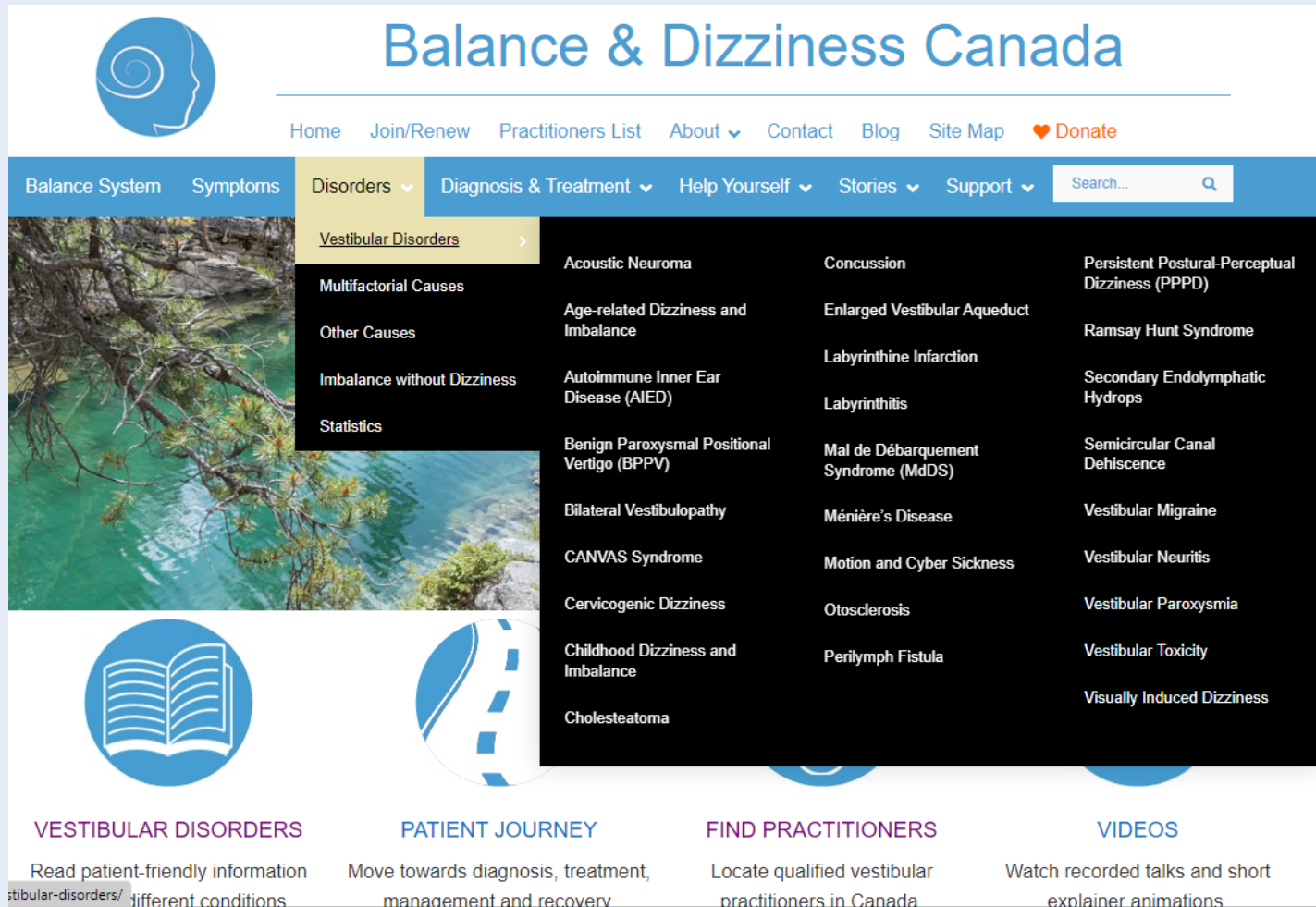


- Testing: Dix-Hallpike and Positional Body or Head Roll
- Treatment: canalith repositioning maneuvers for the affected canal
- Success rates are high when testing is accurate and treatment is targeted



Information is power!

<http://www.balanceanddizziness.org/>



The screenshot shows the homepage of the Balance & Dizziness Canada website. The header features a logo of a head with a spiral inside, followed by the site name. A navigation bar includes links for Home, Join/Renew, Practitioners List, About, Contact, Blog, Site Map, and a Donate button. Below this is a secondary navigation bar with categories like Balance System, Symptoms, Disorders, Diagnosis & Treatment, Help Yourself, Stories, and Support, along with a search bar. The main content area is a grid of links to various conditions and resources. On the right side of the page, there is a large, stylized blue logo of a human ear.

Balance & Dizziness Canada

Home Join/Renew Practitioners List About Contact Blog Site Map [Donate](#)

Balance System Symptoms Disorders Diagnosis & Treatment Help Yourself Stories Support Search...

Vestibular Disorders

- Multifactorial Causes
- Other Causes
- Imbalance without Dizziness
- Statistics

Acoustic Neuroma	Concussion	Persistent Postural-Perceptual Dizziness (PPPD)
Age-related Dizziness and Imbalance	Enlarged Vestibular Aqueduct	Ramsay Hunt Syndrome
Autoimmune Inner Ear Disease (AIED)	Labyrinthine Infarction	Secondary Endolymphatic Hydrops
Benign Paroxysmal Positional Vertigo (BPPV)	Labyrinthitis	Semicircular Canal Dehiscence
Bilateral Vestibulopathy	Mal de Débarquement Syndrome (MdDS)	Vestibular Migraine
CANVAS Syndrome	Ménière's Disease	Vestibular Neuritis
Cervicogenic Dizziness	Motion and Cyber Sickness	Vestibular Paroxysmia
Childhood Dizziness and Imbalance	Otosclerosis	Vestibular Toxicity
Cholesteatoma	Perilymph Fistula	Visually Induced Dizziness

VESTIBULAR DISORDERS **PATIENT JOURNEY** **FIND PRACTITIONERS** **VIDEOS**

Read patient-friendly information about different conditions Move towards diagnosis, treatment, management and recovery Locate qualified vestibular practitioners in Canada Watch recorded talks and short explainer animations

Vestibular Migraine

"As I woke up and turned in bed I felt dizzy, the room span and I felt nausea. When I stood up to head to the bathroom, I had to hold onto the walls and could barely make it without having to crawl. I got sick and needed help to get back in bed. I continued to feel dizzy and nauseated for several hours. I had a pressure, achy feeling on the right side of my head and behind my right eyeball. I could not open my eyes, move my head even slightly and couldn't even think about talking. I slowly recovered over the course of 5 days, but I am still having brief moments of a "wave" of dizziness that washes over me from time to time, for no apparent reason"



Vestibular Migraine

Vestibular Migraine Criteria⁷

- A. At least 5 episodes with vestibular symptoms^a of moderate or severe intensity^b, lasting between 5 minutes and 72 hours
- B. Current or previous history of migraine with or without aura
- C. One or more migraine features with at least 50% of the vestibular episodes:
 - 1. Headache with at least 2 of the following characteristics: unilateral location, pulsating quality, moderate or severe intensity, aggravation by routine physical activity
 - 2. Photophobia, phonophobia
 - 3. Visual aura
- D. Not better accounted for by another vestibular or ICHD diagnosis

Probable Vestibular Migraine⁶

- A. At least 5 episodes with vestibular symptoms^a of moderate or severe intensity^b lasting 5 minutes to 72 hours
- B. Criteria B or C (migraine history OR migraine features during the episode)
- C. Not better accounted for by another vestibular or ICHD diagnosis

^aSpontaneous vertigo; internal / external perception of motion; positional vertigo; visually-induced vertigo; head motion-induced vertigo; head motion-induced dizziness and nausea

^bModerate: interfere but do not prohibit activities of daily life;
Severe: discontinue activities of daily life

- Most people have personal and family history of migraine headaches and/or ocular migraines
- Most people have a history of motion sickness in childhood
- 3 women to 1 men
- Cochlear disorders are 3 times more prevalent: tinnitus, hearing loss and aural fullness



Vestibular Migraine

- Management
 - Prevention
 - lifestyle measures SEEDS for success (sleep, eat, exercise, dehydration, stress)
 - Supplements (Magnesium, Vitamin B2, Coenzyme Q10)
 - Prescription drugs (Betahistine, prophylactic migraine meds)
 - Identifying and avoiding triggers
 - Acute
 - Abortive migraine meds are usually not effective
 - Chronic
 - be very careful with vestibular rehabilitation therapy



Meniere's Disease

"I was just sitting down, reading and all of the sudden started to feel dizzy. Very quickly it progressed to spinning and I had to crawl to the bathroom. I laid down in the bathroom, throwing up and also having bowel movements. My tinnitus was roaring very loudly in my right ear. I was able to walk to the bedroom in a couple of hours and when I woke up an hour later I only had a hungover feeling. The next day my right hearing was still muffled and the tinnitus still louder but it is better now, a week later. I recalled that I was more sensitive to sounds after a stressful situation at work the day before this happened"



Meniere's Disease

Definite MD

- A. Two or more spontaneous episodes of vertigo^(1,2), each lasting 20 minutes to 12 hours⁽³⁾.
- B. Audiometrically documented low- to medium-frequency sensorineural hearing loss^(4,5) in one ear, defining the affected ear on at least one occasion before, during or after one of the episodes of vertigo^(6,7).
- C. Fluctuating aural symptoms (hearing, tinnitus or fullness) in the affected ear⁽⁸⁾.
- D. Not better accounted for by another vestibular diagnosis⁽⁹⁾.

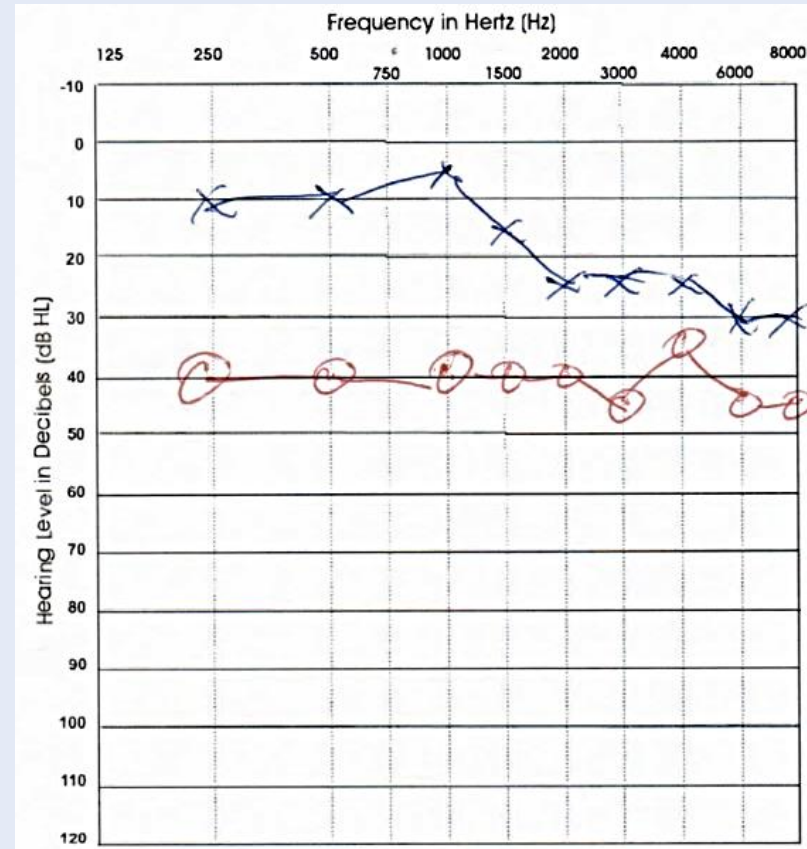
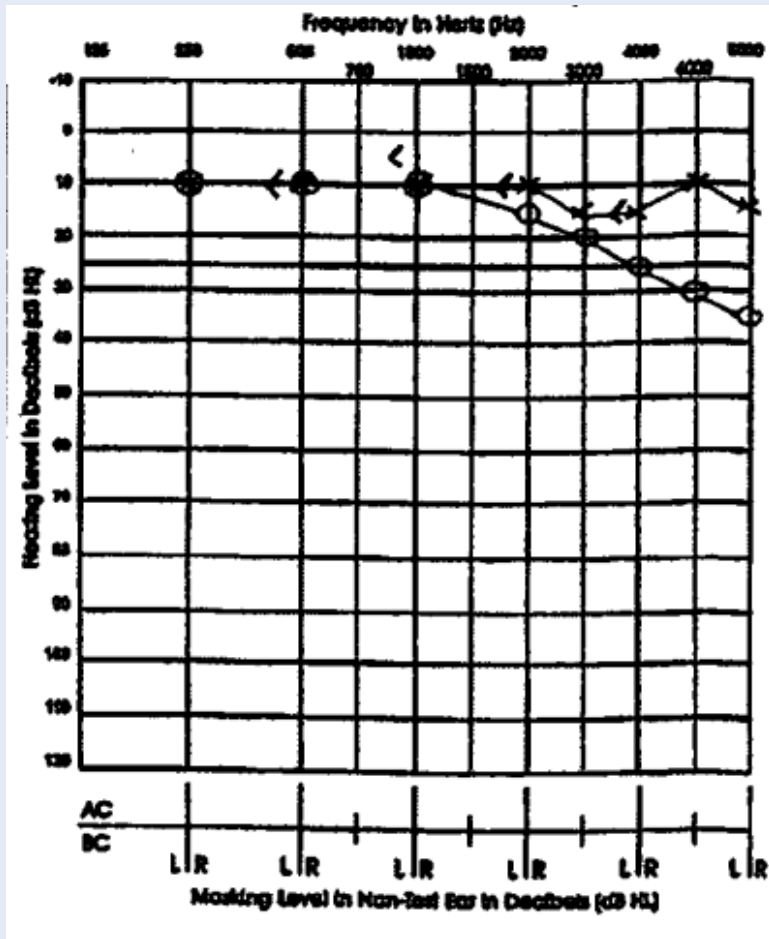
Probable MD

- A. Two or more episodes of vertigo or dizziness, each lasting 20 minutes to 24 hours.
- B. Fluctuating aural symptoms (hearing, tinnitus or fullness) in the affected ear⁽¹⁾.
- D. Not better accounted for by another vestibular diagnosis⁽²⁾.

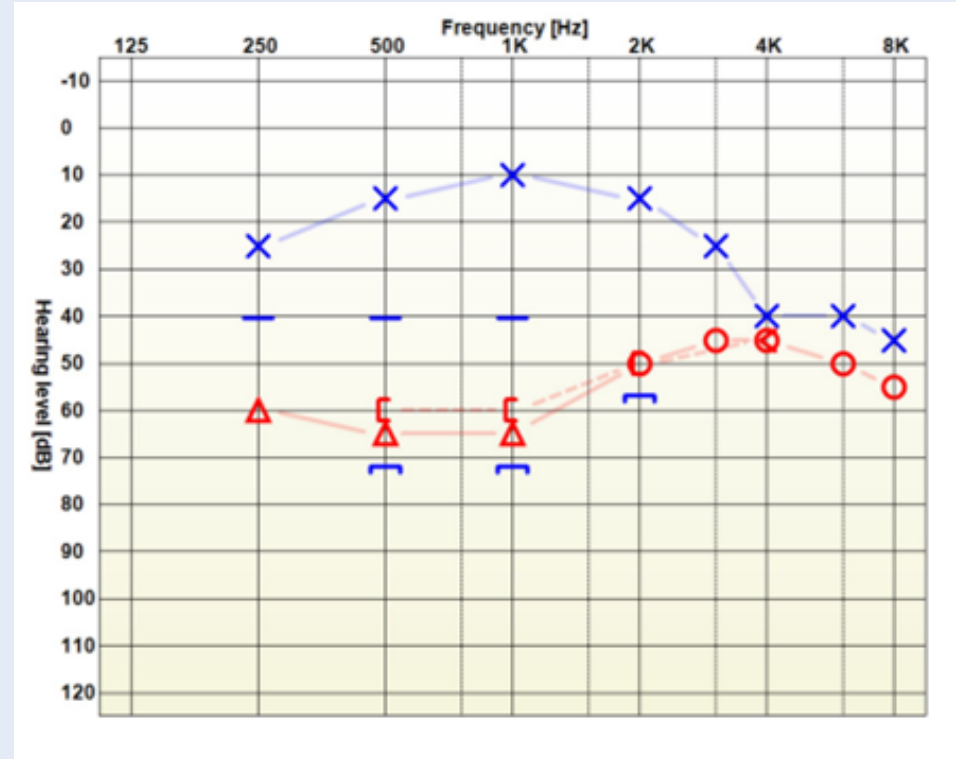
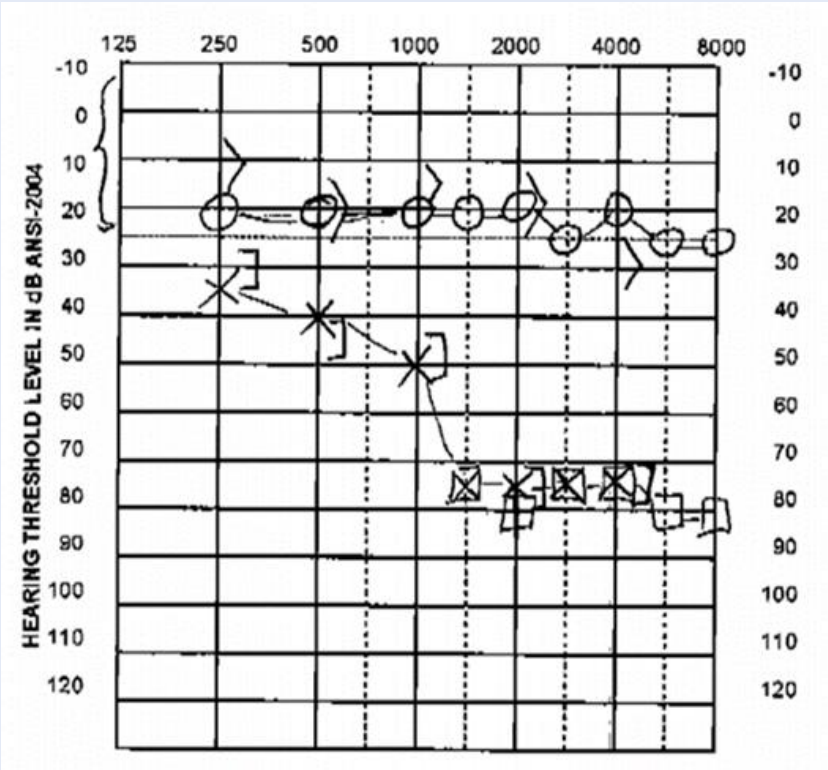
- Endolymphatic hydrops
- Cardiovascular risk factors: excessive BMI, dyslipidemia, type 2 diabetes mellitus, hypertension
- 1/3 result from auto-immune disorders
- Allergies: hearing and vestibular symptoms improve when treated
- Genetics



Meniere's Disease



Meniere's Disease



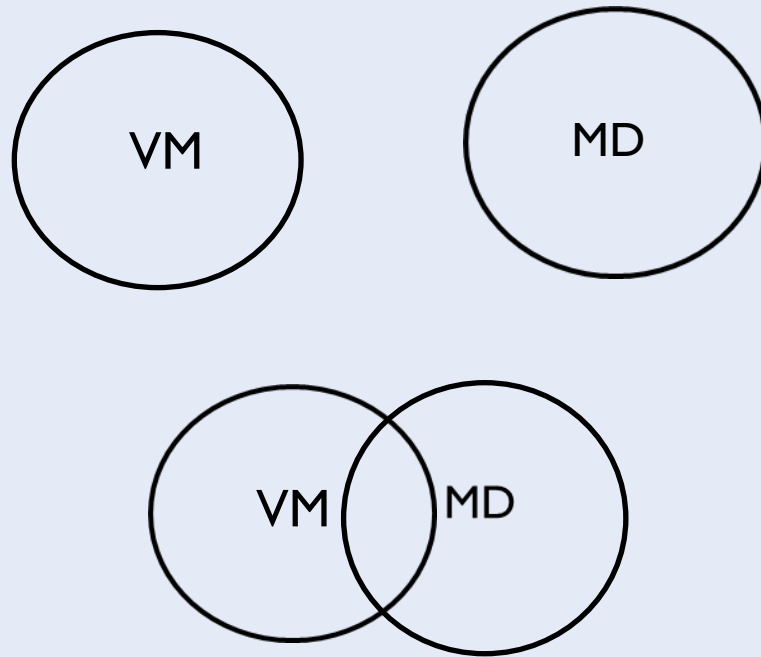
Meniere's Disease

Management

- Hearing monitoring for diagnosis and staging
- Prevention
 - lifestyle measures SEEDS for success, low sodium diet
 - Prescription drugs (Betahistine, diuretics)
 - Intra-tympanic steroids
 - Drug ablation
- Identifying and avoiding triggers
- Acute
 - Anti-nausea and sedatives
- Vestibular rehabilitation exercises do not prevent attacks
- But are recommended when symptomatic in between episodes



Is it Vestibular Migraine or Meniere's Disease?



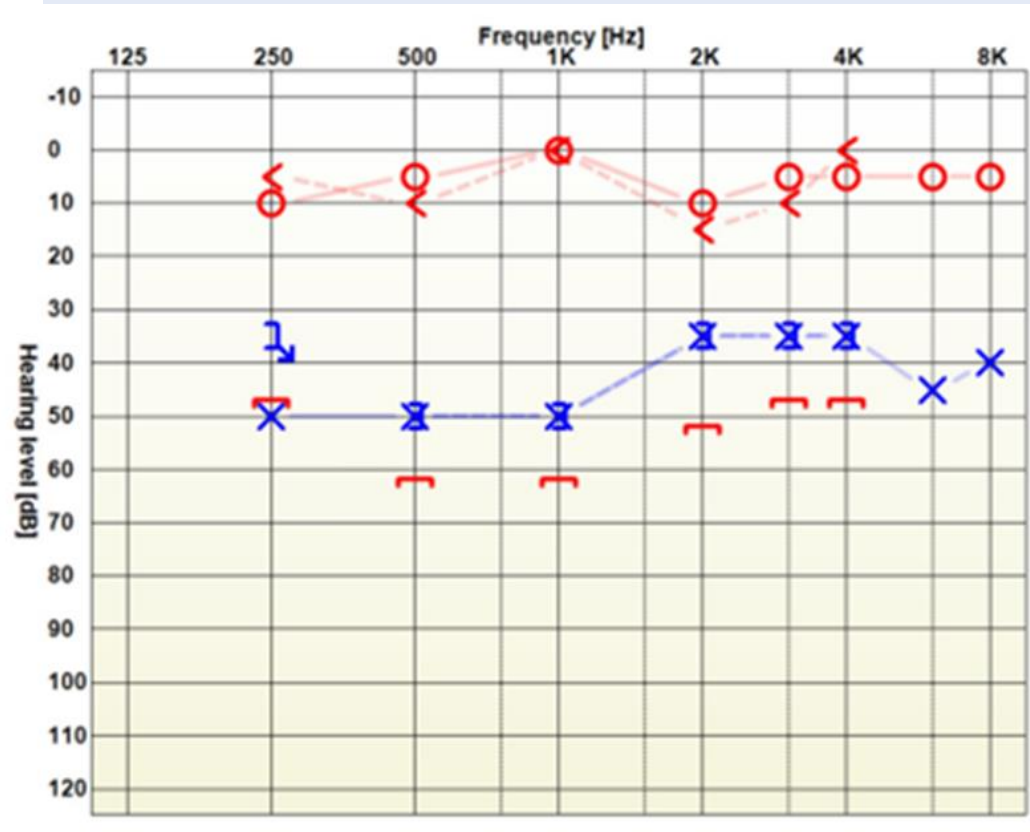
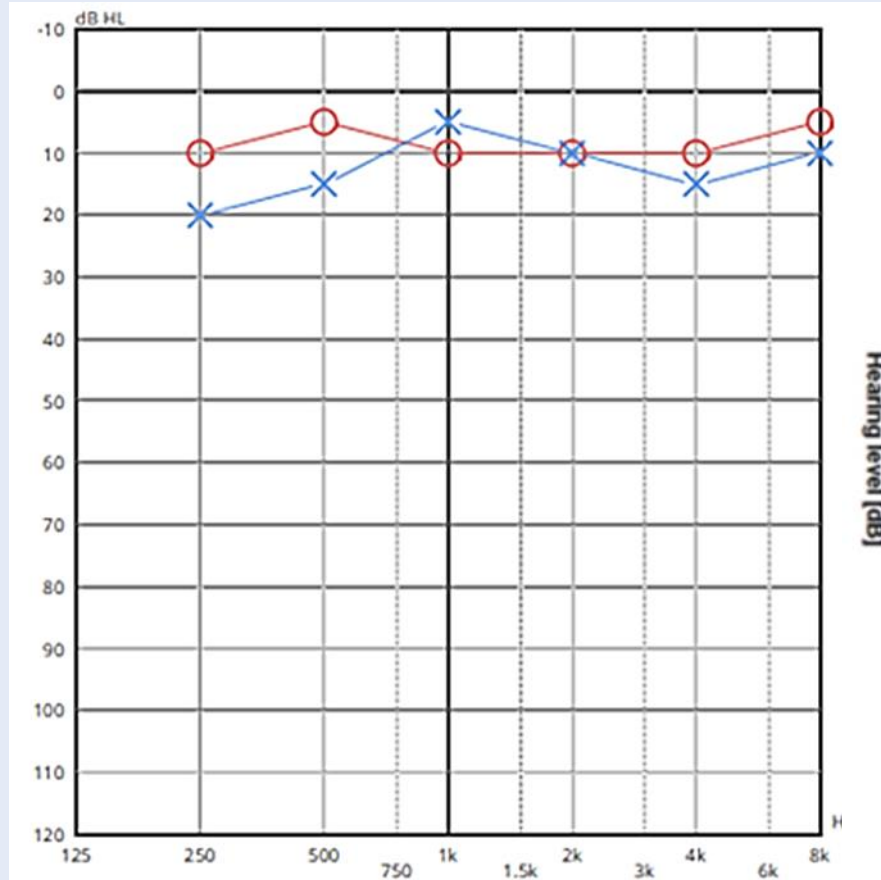
- Dr. Prosper Meniere reported headaches in 1861 paper
- 45% of MD had at least one migraine during attack
- patients with MD and VM have more and longer lasting attacks
- trigeminal vascular system dysfunction: neurogenic inflammation and dilation/constriction of blood vessels

Vestibular Migraine – Meniere's Disease Spectrum

Zhang, S., Guo, Z., Tian, E., Liu, D., Wang, J., & Kong, W. (2022). Meniere disease subtyping: The direction of diagnosis and treatment in the future. *Expert Review of Neurotherapeutics*, 22(2), 115-12



Is it Vestibular Migraine or Meniere's Disease?



Persistent Postural-Perceptual Dizziness

"I had been working on the computer for several hours that day and had a very stressful meeting. Later that night I felt as though the computer screen was moving in front of me. My head felt fuzzy and I was a little disoriented, as if I had one too many. I woke up the next day feeling lightheaded and during the day noticed the movement of the computer again. This has now become the norm: I feel like I am on a boat most of the time and I feel that I have to be careful to not lose my balance. Some days are better than others but when I don't sleep well, when I am stressed out it is definitely worse. Scrolling on the computer and going shopping are also very uncomfortable. I have been less active because lying down makes everything go away and I feel normal, as I have no symptoms at all"



Persistent Postural-Perceptual Dizziness

Criteria*	Description	Qualifiers
A	One or more symptoms of dizziness, unsteadiness, or non-spinning vertigo are present on most days for 3 months or more	<ol style="list-style-type: none">1. Symptoms last for prolonged (hours long) periods of time but may wax and wane in severity2. Symptoms need not be present continuously throughout the entire day
B	Persistent symptoms occur without specific provocation, but are exacerbated by three factors:	<ol style="list-style-type: none">1. Upright posture,2. Active or passive motion without regard to direction or position, or3. Exposure to moving visual stimuli or complex visual patterns
C	The disorder is precipitated by conditions that cause vertigo, unsteadiness, dizziness, or problems with balance including acute, episodic, or chronic vestibular syndromes, other neurological or medical illnesses, or psychological distress	<ol style="list-style-type: none">1. When the precipitant is an acute or episodic condition, symptoms settle into the pattern of criterion A as the precipitant resolves, but they may occur intermittently at first, and then consolidate into a persistent course2. When the precipitant is a chronic syndrome, symptoms may develop slowly at first and worsen gradually
D	Symptoms cause significant distress or functional impairment	
E	Symptoms are not better accounted for by another disease or disorder	

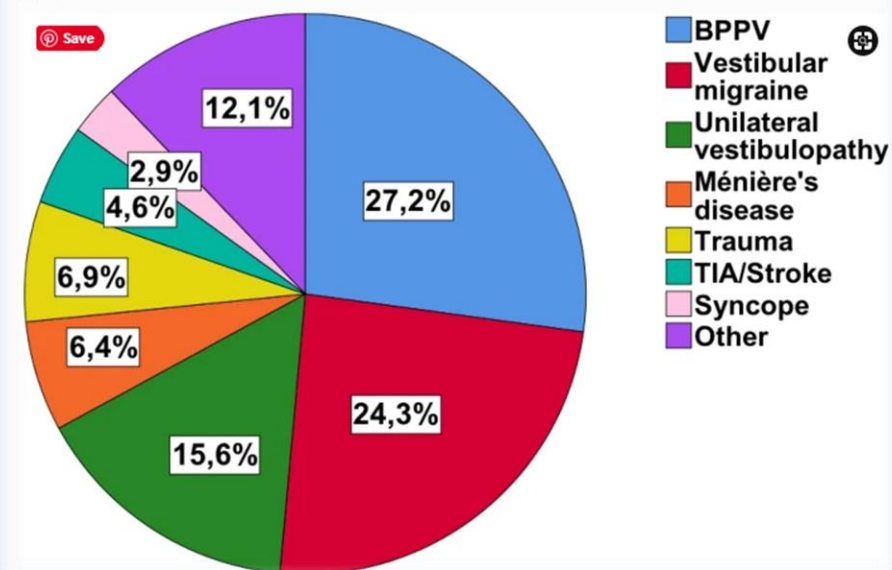
**All five criteria A–E must be fulfilled to make the diagnosis of PPPD.*



Persistent Postural-Perceptual Dizziness

- n=356 PPPD patients
- 195 patients (55%) p-PPPD
- p-PPPD significantly more anxiety (20% vs. 10%) and depressive disorders (25% vs. 9%)
- p-PPPD more handicapped

Fig. 1



162 (45%) s-PPPD

Habs, M., Strobl, R., Grill, E. et al. Primary or secondary chronic functional dizziness: does it make a difference? A DizzyReg study in 356 patients. J Neurol 267, 212–222 (2020).



Persistent Postural-Perceptual Dizziness

- Processes that are usually seamless, effortless and unconscious become apparent (personality – anxiety traits)
- Minor adjustments are interpreted as “errors” leading to significant changes in movement with fear and avoidance
- Maladaptations: unwanted tension, neck issues, brain fog, tiredness
- Visual dependency for balance – changes in brain processing
- Treatment: VRT – vestibular education, SSRI, CBT/somatic based therapy



Fear of Falling

"I feel lightheaded very often, sometimes it is there when I wake up even before I get up from bed. It is an uneasy feeling inside my head that warns me to be more careful. Then I instinctively walk with a wide stance and lean against the counter while standing. Sometimes my legs may feel weak. This first stage may last very long, but I can still move around safely in my apartment. I can feel when I need to sit or lie down. This lightheadedness may last for hours, sometimes most of the day but rarely into the evening."



Fear of Falling

- History of falls or near misses
- Causing a need to be careful - fear
- Fear → reduced activity level → deconditioning
- Fear → stiffening → changes in postural control gait pattern
- Fear → loss of confidence - psychological effect - relationship with depression
- Fear → actual changes in vestibular evoked potentials



Fear of Falling

- Vestibular testing may be warranted: out of 185 patients referred for assessment of falls risk, 73% had abnormal vestibular function tests
- Vestibular and Balance Rehabilitation Therapy
- Falls prevention program
- May need a walking aid

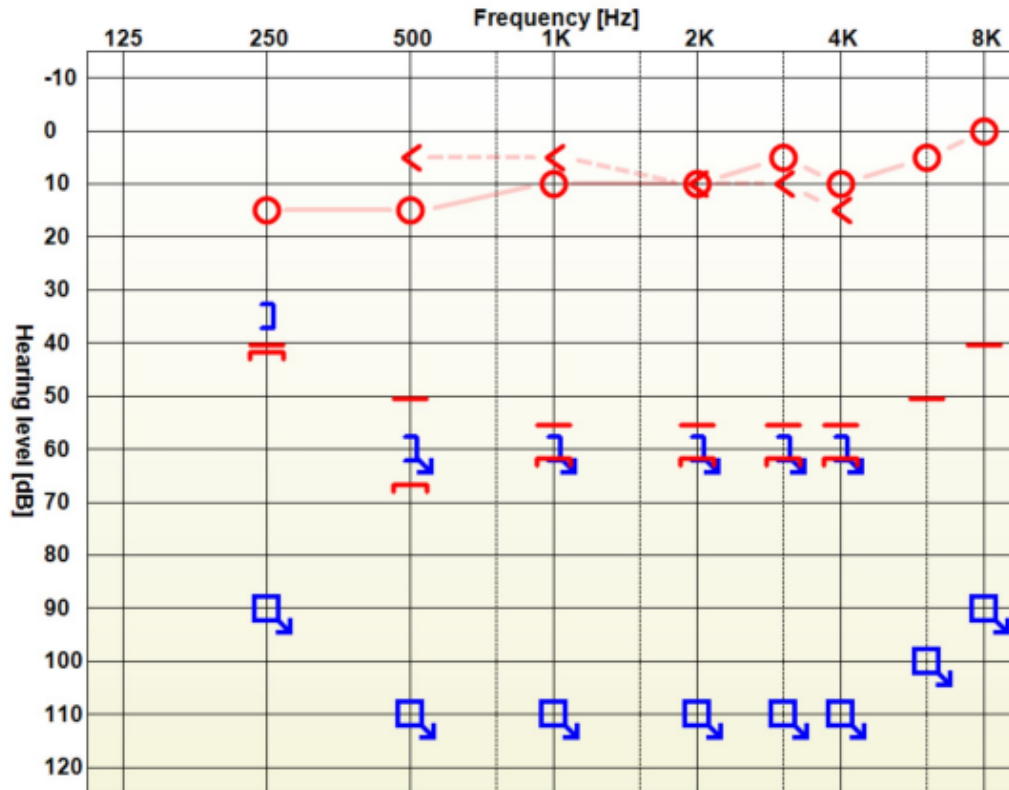


Labyrinthitis

"I was playing tennis when I suddenly felt woozy. I stopped, got some water but continued to get worse. I had to sit down as I could not stand by myself anymore. The world started spinning and I got ill. I was taken by ambulance to the ER, where they put me on Gravol; I could not stop vomiting. I noticed my ear was ringing and plugged up. They did all tests and said I was not having a stroke. I fell asleep when the Gravol and when I woke up I could not hear out of my left ear anymore. I was discharged 2 days later and am improving but it is now 2 weeks and I am still not ok."



Labyrinthitis



- ENT emergency – optimal window for treatment
- Investigation to rule out CNS cause
- Importance of restoring natural patterns of movement and engaging in Vestibular Rehabilitation as soon as possible for better outcomes



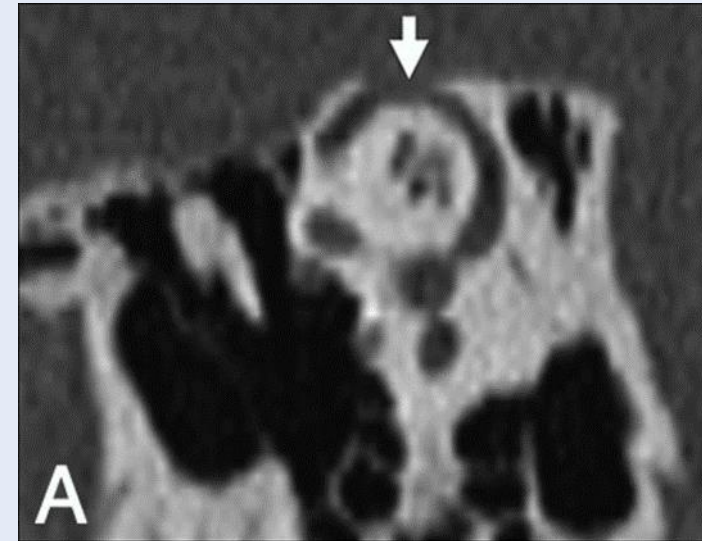
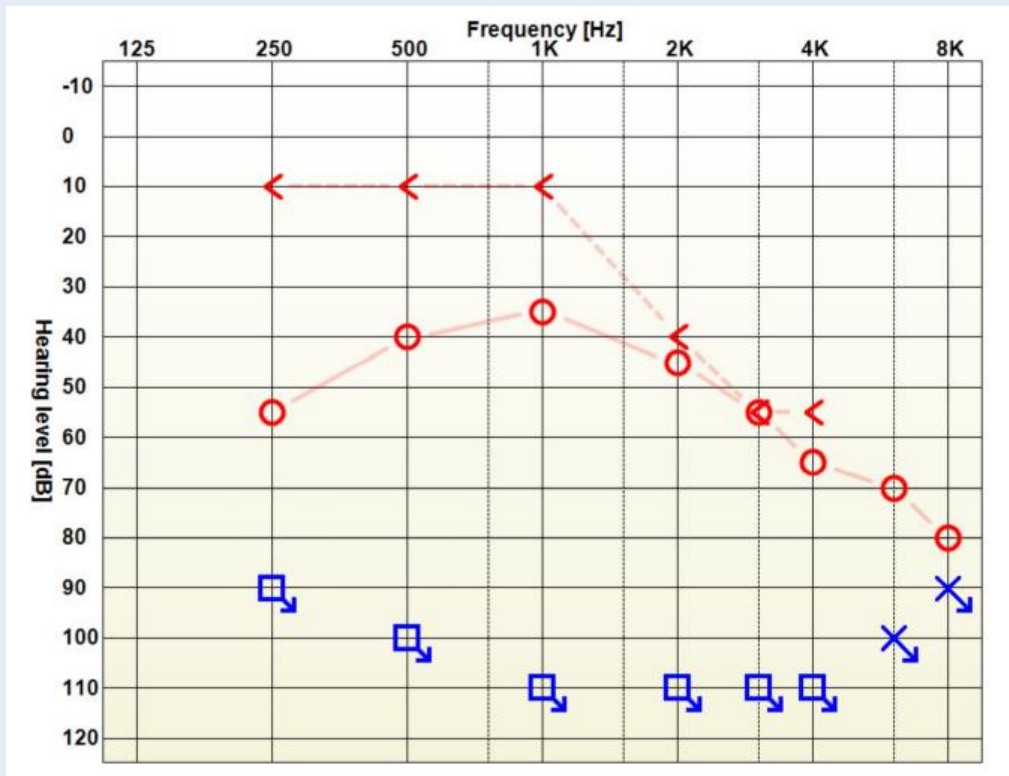
Semicircular Canal Dehiscence

"I hear my heartbeat in my right ear. I have a little bit of a sensation that my voice sounds as though I am in tunnel on this side of my head. I don't feel dizzy but I sometimes feel just a momentary sense of unsteadiness, like I am going to lose my balance."



Semicircular Canal Dehiscence

- Pseudo-conductive HL – normal tymps and present acoustic reflexes



- Third window in the inner ear – hearing and vestibular organs respond differently to sound and pressure – Tulio and Hennebert phenomena



Semicircular Canal Dehiscence

- Validation – knowing
- Amplification, counselling and tinnitus management strategies
- Surgical option – canal plugging



Thank you!

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Questions?

