Oh, Not Another Dizzy Patient!

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PELTZ AND ASSOCIATES
PHYSICAL THERAPY INC

Thank you!

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- Thank you
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    - Professor, Otolaryngology and Director, Dizziness and Balance Center at Washington University St. Louis
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  - Robert F. Landel, PT, DPT, OCS, CSCS, FAPTA
    - Director of Clinical Physical Therapy at USC's Biokinesiology and Physical Therapy Department

Who am I?

- Who am I?
  - Grew up in Santa Rosa
  - Cardinal Newman High School
  - Willamette University B.S. in Exercise Science/Sports Medicine
  - Clinical Doctorate in Physical Therapy from University of Southern California
  - Residency in Orthopaedics/Board Certified Orthopaedic Specialist in Physical Therapy
  - Advanced Training in Vestibular Rehabilitation from Emory University
  - Peltz and Associates Physical Therapy Inc in Wikiup/Larkfield

Why am I Here?

- Ask that question everyday of my life, but…
- Dizziness
  - One year prevalence is 8.6% in >65 year old population[1] and is the 3rd most common symptom reported in general clinics[2].
  - Difficult to examine and manage
    - Cardiovascular – MI, Orthostatic hypotension, Arrythmias…
    - Vestibular – BPPV, Labyrinthitis, Vestibular Neuritis, Meniere's…
    - Neurological – CVA, TIA, Cerebellar disorders, MS…
    - Musculoskeletal – Cervicogenic, Fistula, SSC Dehiscence…
- How do you approach such a complex problem?

What Should You Do?

- Best practice
  - Unknown – Sorry…
    - No clinical guidelines that address “dizziness”

The Evidence Base for the Evaluation and Management of Dizziness[3]

Kevin A. Kerber, MD and A Mark Fendrick, MD

Journal of Evaluation in Clinical Practice

2010 Feb;16(1):186-91.

3000 articles identified

1244 articles met the inclusion criteria

Evidence

- “The evidence base for the evaluation and management of dizziness appears to be weak. Research should address questions such as, “Which dizziness patients are likely to benefit from having a brain image, vestibular test, audiogram, or blood work?” – since these tests are expensive, inconvenient and often bothersome to patients, and are generally of very low yield. Evidence for interventions – other than re-positioning for BPPV – is either insufficient or absent entirely. Thus, more empirical studies, systematic reviews and meta-analyses on relevant dizziness topics are needed so that evidence is established in a way that will inform clinicians and also research agendas. Guideline statements can then be developed to translate evidence into actual recommendations for clinical care. With these goals as priorities, future work could make an important contribution to the efforts to optimize patient care and healthcare utilization for one of the most common symptom presentations in all of medicine.” (Kerber)

Monday Morning

- Mrs. Smith
  - 76 year old female with “dizziness”
  - Had dizziness before, but this time it is much worse
  - Woke up with the room spinning, nausea, vomiting
  - Taking 7 medications, 2 b.p. meds, and has a pacemaker
  - History of 2 falls in the past 3 months. No fx yet
  - Difficulty seeing and difficulty walking in to the clinic
  - Can’t seem to remember where she put her keys
  - Eyes are beating to the left
- You have 12 minutes max…what do you do?

What Should You Do?

- Evaluate the dizzy patient
  - Quick dizzy exam…oxymoron?
  - History (70%) – give you a questionnaire
  - 10 minute dizziness examination (10-20%) – give you a handout and videos
- Come up with a differential diagnosis
  - There are over 85 causes of dizziness – see handout
  - Know pathophysiology of common causes of dizziness
  - Be able to determine if it is Peripheral vs. Central in nature
- Treat and/or refer out
  - Is this urgent? - CVA vs. Vestibular Neuritis - 3 tests – r/o better than MRI
  - Can you treat it? – Appropriate medication and Epley
  - Do you need more information via testing? (10-20%)
  - Who can test it or treat it if you can't and what works?
    - 50% of GPs refer out to specialists[4]

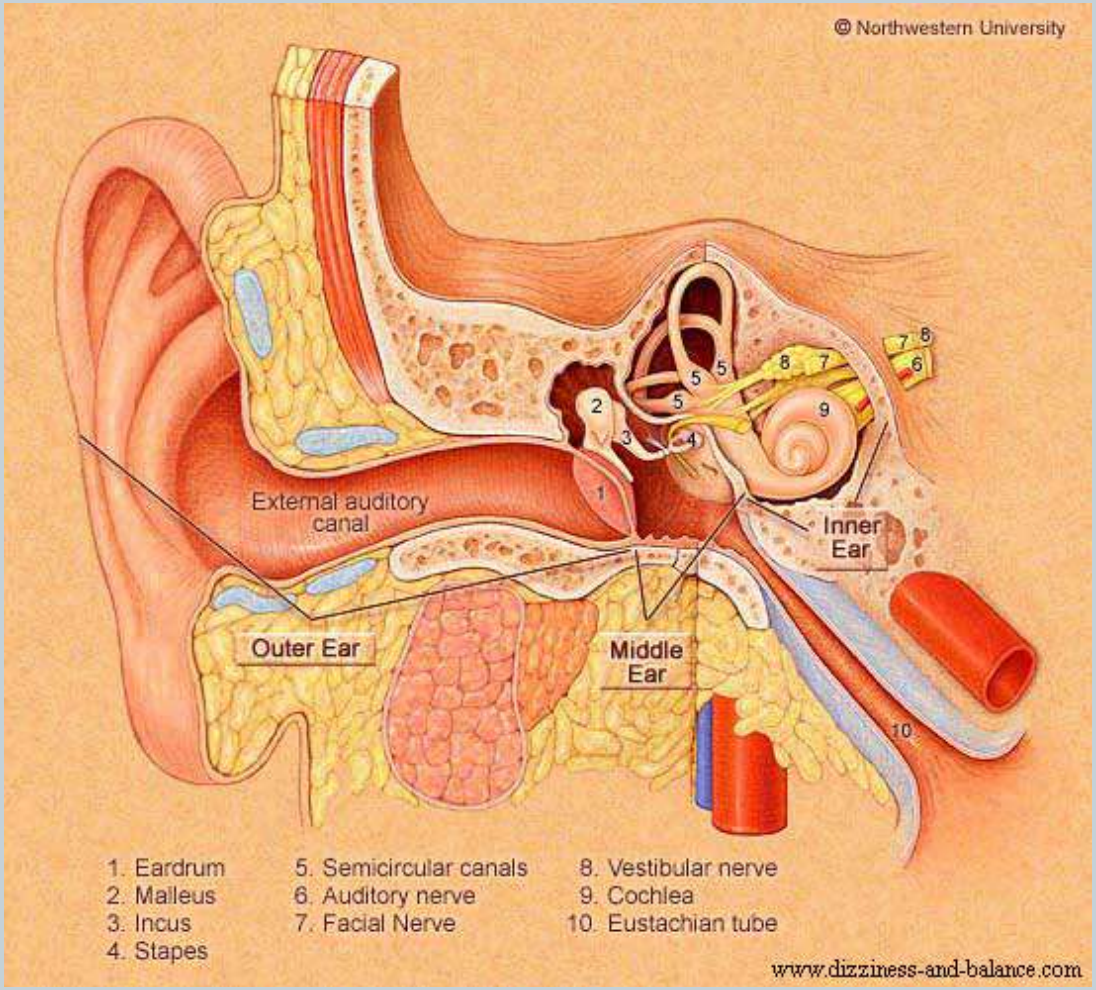
Why Do We Get Dizzy?

- Inputs
  - Vision, Somatosensation, and the Vestibular system

Inputs

- Vestibular system
  - 3 semicircular canals – detect angular acceleration (posterior, anterior, and horizontal canals)
  - 2 otoliths – detect horizontal (utricle) and vertical acceleration (saccule)
  - VIII cranial nerve – transmits signal to the brain

Vestibular System[5]



Vestibular System[6]

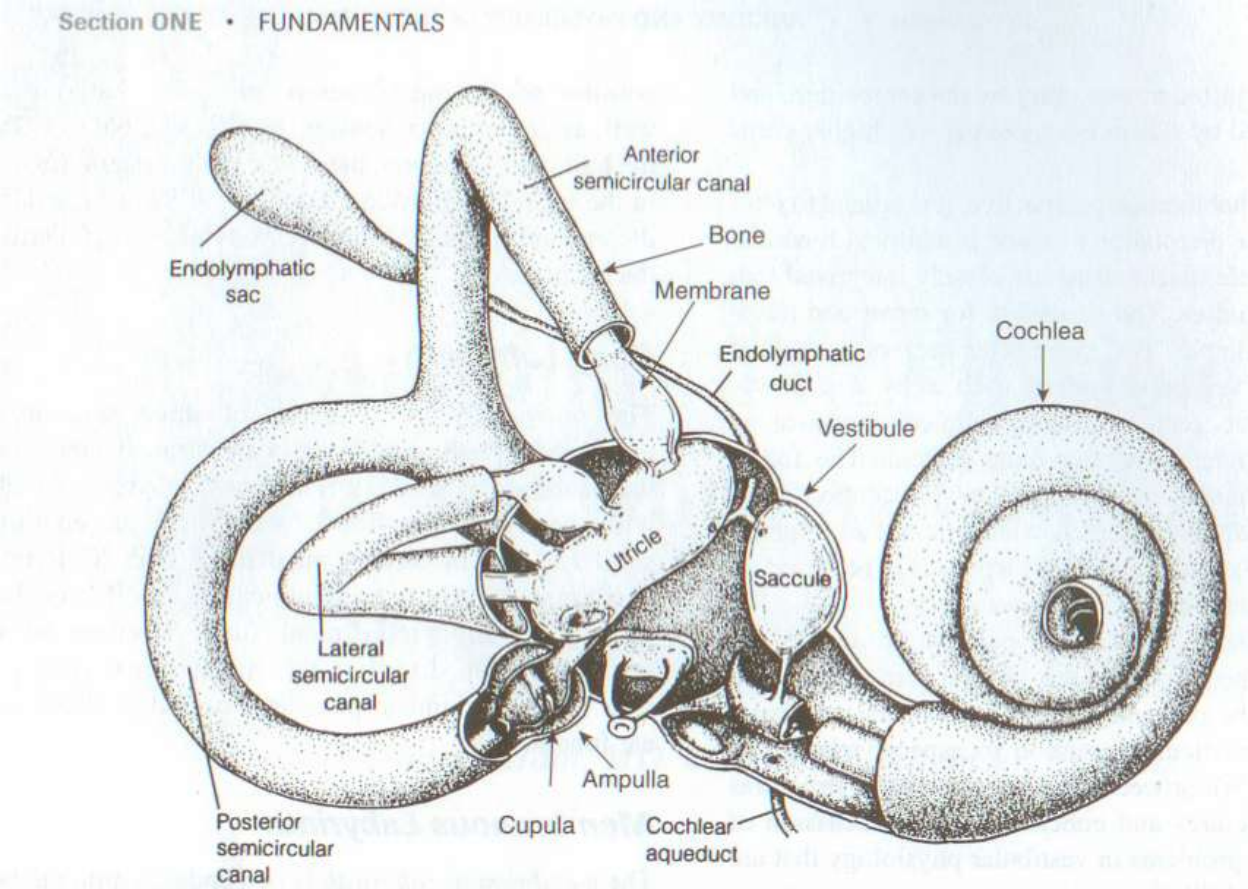


Figure 1.3 The membranous and bony labyrinths. The *inset* illustrates the perilymphatic and endolymphatic fluid compartments. (Adapted from an illustration by Mary Dersch; originally adapted from Pender, 1992.[2])

Why Do We Get Dizzy?

- Inputs
  - Vision, Vestibular system, and Somatosensation
- Processor
  - Brain
    - Cerebral cortex, Brainstem, and Cerebellum
- Discrepancy between inputs or difficulty processing causes dizziness
- Output
  - Correction of vision/Vestibular-ocular reflex (VOR)
  - Correction of body position

Differential Diagnosis - Dizziness

- Benign Paroxysmal Positional Vertigo
- Unilateral Vestibular Hypofunction
- Bilateral Peripheral Vestibulopathy
- Labyrinthitis
- Vestibular Neuritis
- Meniere's Disease
- Migrainous vertigo
- Acoustic Neuroma
- Cerebral Vascular Accident (all types)
- Orthostatic Hypotension
- High Blood Pressure
- Multiple Sclerosis
- Cardiomyopathy
- Arrhythmias
- Medications (ie: blood pressure)
- Anxiety/Depression Disorders
- Cervicogenic Dizziness
- Upper Cervical Spine Instability
- Labrynthine Concussion
- Cervical Spine Herniated Nucleus Pulposus
- Temporomandibular Joint Dysfunction
- Traumatic Brain Injury
- Vertebrobasilar Insufficiency
- Cervical Spine Fracture
- Tension Headache
- Hydrocephalus
- Brain Tumor/Schwannoma
- Anemia
- Dehydration
- Pregnancy
- Panic disorder
- Hyperventilation
- Hypoxia
- Hypoglycemia
- Hypothyroidism
- Hyperthyroidism
- Pituitary Disorder
- Dementia
- Effects of aging
- Internal bleeding
- Prolonged bed rest
- Heat stroke
- Heat Exhaustion
- Gastroenteritis
- Angina
- Diabetes Type I and II
- Parkinson's Disease
- Addison's Disease
- Fever
- Motion sickness
- Pulmonary Hypertension
- Chronic Fatigue Syndrome
- Toxic Shock Syndrome
- Transient Ischemic Attack
- Tachycardia
- Bradycardia
- Vasovagal Syncope
- Mal de debarquement
- Superior canal dehiscence
- Oscillopsia
- CNS inflammation (Sarcodosis)
- Prolonged attack of episodic
- Ataxia syndrome
- Traumatic vestibulopathy
- Otosyphilis
- Lyme disease
- Celiac disease
- Degenerative cerebellar ataxia
- Drug intoxication, illicit and alcohol
- Bacterial mastoiditis
- Brainstem encephalitis (e.g., listeria, paraneoplastic)
- Brainstem hypertensive ncephalopathy
- Herpes zoster oticus (Ramsay Hunt syndrome)
- Labyrinthine stroke‡
- Wernicke syndrome (vitamin B1 deficiency)
- Miller Fisher syndrome
- Altitude sickness or hypoxia
- Basilar meningitis (e.g., tuberculosis)
- CNS medication toxicity (e.g., lithium)
- Decompression sickness
- Electrolyte imbalance (e.g., hyponatremia)
- Endocrine disorders (e.g., acute adrenal insufficiency)
- Environmental toxins (e.g., carbon monoxide)
- Arnold-Chiari malformation
- Perilymphatic fistula

Pathophysiology – Short List

- Benign Paroxysmal Positional Vertigo – BPPV
- Vestibular Neuritis
- Labyrinthitis
- Meniere's Disease
- Vascular Event
- Periphymphatic Fistula/Superior canal dihiscense
- Anxiety/Depression/Panic Attack
- Orthostatic Hypotension
- Migraine
- Medication side effect

Benign Paroxysmal Positional Vertigo – BPPV[7,8]

- Etiology
  - Otoconia (crystals) from Utricle fall into the semicircular canals
  - Most common cause of dizziness in adults
- History
  - Spinning sensation when getting up, turning over, or bending forward
- Signs
  - Positional nystagmus seen with Frenzel glasses
- Treatment
  - Canalith repositioning techniques – there are >five
- Prognosis
  - Excellent (with Epley symptoms resolve in 67-94 % of pts.[9])

Vestibular System

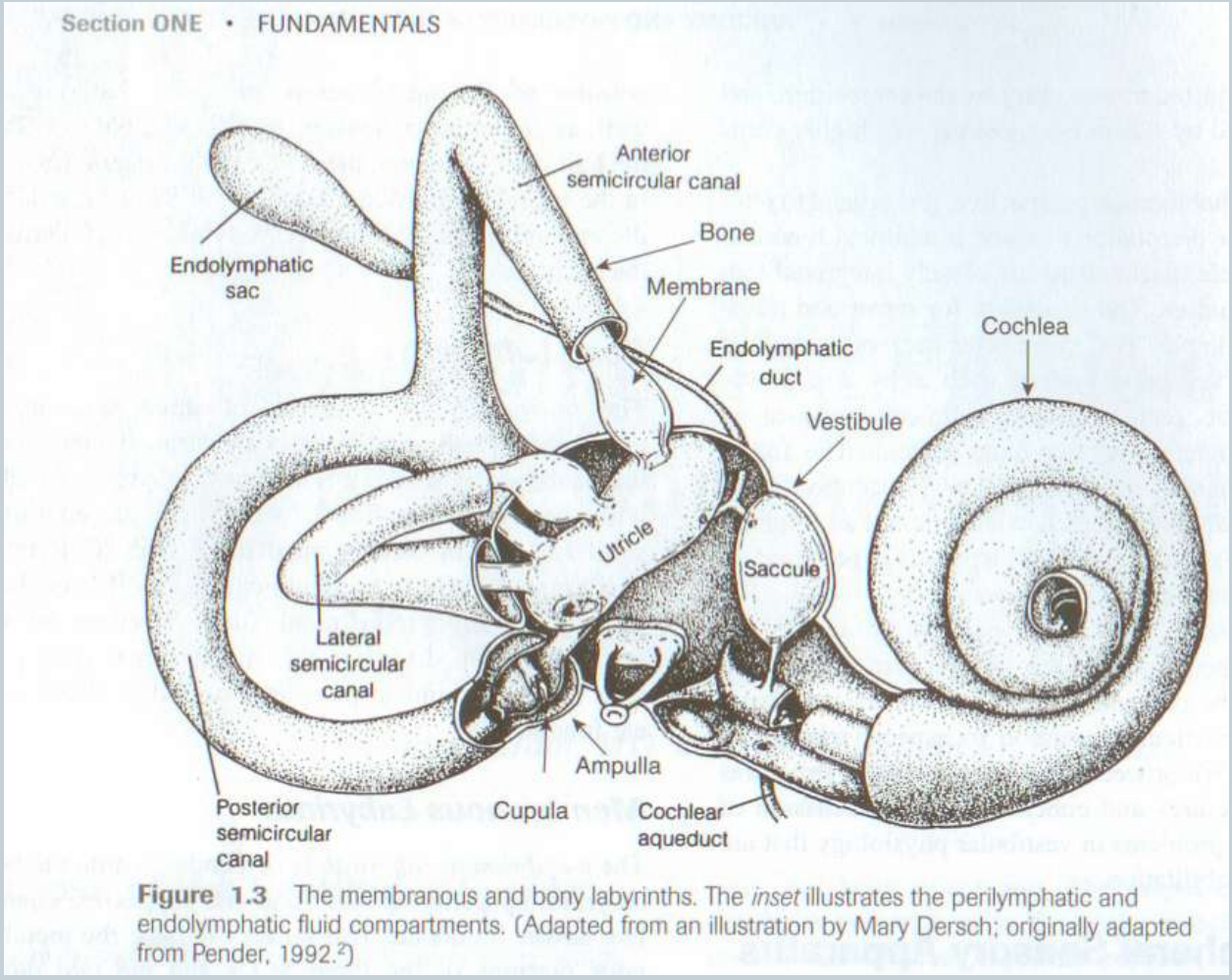


Figure 1.3 The membranous and bony labyrinths. The *inset* illustrates the perilymphatic and endolymphatic fluid compartments. (Adapted from an illustration by Mary Dersch; originally adapted from Pender, 1992.[2])

Symptoms of BPPV

Poor balance	57%
Sense of rotation	53%
Trouble walking	48%
Lightheaded	42%
Nausea	35%
Queasy	29%
Spinning inside the head	29%
Sense of tilt	24%
Sweating	22%
Sense of floating	22%
Blurred vision	15%

Treatment of BPPV - Epley

- Step 1
  - Place Frenzel glasses on patient (Best to have frenzel glasses)
- Step 2
  - Do Dix-Hallpike Maneuver
    - Observe upbeating rotational nystagmus that fatigues (anything else don't do this without additional training!)
- Step 3
  - Do Epley Maneuver to the side of rotation

Dix-Hallpike Maneuver

BPPV

Epley Maneuver

Vestibular Neuritis

- Etiology - Neural/Vascular damage
  - Viral or bacterial infection of scarpa's ganglia of VIII cranial nerve
    - Superior portion of nerve – Ant. and Lat. canals and Utricle
    - Inferior portion of nerve – Post. canal and Saccule
- History
  - Vestibular crisis over 1-4 days
  - Left with head movement sensitivity
  - No hearing loss
- Signs
  - Peripheral, no central signs (See CVA vs. vestibular neuritis later)
- Treatment
  - CNS depressant to control dizziness initially
  - Vestibular Rehabilitation (VBRT) to speed compensation (refer to PT)
- Prognosis
  - Excellent with VBRT (symptoms resolve in 70-90% of pts.[10,11])

Labyrinthitis

- Etiology
  - Labyrinthine infection
- History
  - Vestibular crisis 1-4 days
  - Left with head movement sensitivity
  - Hearing loss
- Signs
  - Peripheral, no central signs, and hearing loss (refer to audiologist)
- Treatment
  - CNS depressant to control dizziness and steroids for hearing initially
  - Vestibular Rehabilitation (VBRT) to speed compensation (refer to PT)
- Prognosis
  - Excellent with VBRT (symptoms resolve in 70-90% of pts.[10,11])
  - Hearing loss prognosis depends on amount of initial loss

CVA/Vascular Event

- Symptoms/Signs
  - Same as vestibular neuritis except:
  - 5 D's: Dizziness, Diploplia, Dysphagia, Dysarthria, and Drop attacks
  - Weakness and numbness
  - HINTS[11]: Negative head thrust typically, positive skew deviation, central type nystagmus - pure torsional, ocular lateral pulsion, pure vertical up or downbeat, direction changing
  - Cerebellar and cerebral hemispheric ischemic events - loss of coordination and control
  - Wallenberg Infarct (infarct of the dorsolateral medulla) – ipsilateral dysmetria of the extremities, pain and temperature loss, and lateropulsion of the eyes and head causing the body to deviate to the side of the lesion

CVA vs. Vestibular

- **Does my dizzy patient have a stroke? A systematic review of bedside diagnosis in acute vestibular syndrome (Tarnutzer, et. al)[12]**
- When dizziness develops acutely, is accompanied by nausea or vomiting, unsteady gait, nystagmus, and intolerance to head motion, and persists for a day or more, the clinical condition is known as acute vestibular syndrome.
- Most common causes are vestibular neuritis/labyrinthitis and ischemic stroke in the brainstem or cerebellum.
- Vertebrobasilar ischemic stroke may closely mimic peripheral vestibular disorders, with obvious focal neurologic signs absent in more than half of people presenting with acute vestibular syndrome due to stroke.

CVA vs. Vestibular

- C-T has poor sensitivity in acute stroke, and diffusion-weighted MRI misses up to one in five strokes in the posterior fossa in the first 24–48 hours.
- Expert opinion suggests a combination of focused history and physical examination as the initial approach to evaluating whether acute vestibular syndrome is due to stroke.
- A three-component bedside oculomotor examination — HINTS - (-) horizontal head impulse test, (+) direction changing nystagmus with eccentric gaze, and (+) test of skew — identifies stroke with high sensitivity (100%) and specificity (96%) in patients with acute vestibular syndrome and rules out stroke more effectively than early diffusion-weighted MRI.

Periphymphatic Fistula/SSC Dehiscense

- Etiology
  - RW/OW fistula
    - Sudden onset symptoms with head movement w or w/o hearing changes
    - After trauma/whiplash or spontaneous with congenital deformity
  - SSCD - loss of petrous bone over superior semicircular canal
    - Tulio complaints/hearing loss/autophony
- Signs
  - RW/OW – non-specific peripheral – possible pressure induced horizontal nystagmus
  - SSCD - VNG normal, (+) Tragal compression, (+) Valsalva, (+) C-T for bone loss
- Treatment
  - Bed rest, surgery to destroy SSC, loud sound management (ear plugs)
- Prognosis
  - If true OW/RW good. SSCD - good

Meniere's Disease

- Etiology
  - Unknown, but likely dilation (hydrops) of endolymphatic spaces – very rare condition occurring in just 0.02% of general population
- History
  - Spontaneous event >20min, <24 hrs.
  - Fluctuating hearing loss with documented loss (send to audiologist)
  - Tinnitus and aural fullness
- Signs
  - Peripheral, no central signs
- Treatment
  - Diet, suppressive medication, VRBT if symptoms between spells and >4weeks apart, surgery/gentamicin if total hearing loss
- Prognosis
  - Excellent control with Gentamicin and surgery otherwise time typically helps

Psychological

- Etiology
  - Change in blood pH may play a role
  - 40% of all dizzy patients have psychological disorders [13]
  - Dizziness most common symptom of pts. with panic attack (50-85%) [14, 15]
- History
  - If anxiety/depression – chronic lightheadedness, floating, or rocking, induced by eye movements with the head still
  - If panic attacks – dizziness, nausea, diaphoresis, fear, palpitations, and paresthesias, last minutes and may be spontaneous or situational. Asian Americans tend to experience more dizziness than Caucasian and Latino groups during a panic attack[16]
- Signs
  - Fluctuation in level of impairment, excessive slowness or hesitation with gait, exaggerated sway on rhomberg improving with distraction, uneconomical postures, and sudden buckling of knees without a fall
- Treatment
  - Medication to control mood
  - Cognitive Behavioral therapy (CBT) for panic attacks
- Prognosis
  - Anxiety/depression respond well to treatment, Somatoform and factitious disorders don't

Migraine

- Etiology
  - Unknown, but labyrinth and vestibular nuclei with other areas of the brainstem and midbrain may be involved
  - Second most common cause of dizziness in adults and most common in children
- History
  - Pt. is determined as a migraineur by IHS criteria
  - Variety of symptoms from true vertigo to chronic motion sensitivity
- Signs
  - No specific pattern – diagnosis of exclusion
- Treatment
  - Primary treatment is for migraine
  - Vestibular Rehabilitation (VBRT) does help as long as migraine also treated
- Prognosis
  - Good for reduction or elimination of dizziness with control of migraine events

Orthostatic Hypotension

- Etiology
  - Maladaptive response of cardiovascular system
- History
  - Transient dizziness when getting out of bed, standing up quickly, or bending over. Lightheadedness, weakness, impaired cognition, visual blurring, tremulousness, and vertigo prolonged by prolonged standing or exercise.
- Signs
  - Decrease in systolic b.p. of >20 mm/Hg or diastolic 10 > mm/Hg from supine (for 10 minutes) to standing (within 3 minutes)[17]. (+) Tilt table.
- Treatment
  - Elimination of diuretics, nitrates, calcium channel blockers, and Beta blockers if possible. If unsuccessful, have pt. drink at least 20oz water and salt food excessively, during each meal. If unsuccessful, fludrocortisone up to 0.6 mg/day. If unsuccessful midodrine 10mg up to 3x/day can be tried[16].

Medications That Cause Dizziness

- Aminoglycosides
- Anticonvulsants
- Antihypertensives – especially ACE inhibitors
- Hypoglycemics
- Antipsychotics
- Sedatives/hypnotics

Medications that cause dizziness - hypotension

- Cardiac medications
- Alpha blockers (e.g., doxazosin [Cardura], terazosin)
- Alpha/beta blockers (e.g., carvedilol [Coreg], labetalol)
- Angiotensin-converting enzyme inhibitors
- Beta blockers
- Clonidine (Catapres)
- Dipyridamole (Persantine)
- Diuretics (e.g., furosemide [Lasix])
- Hydralazine
- Methyldopa
- Nitrates (e.g., nitroglycerin paste, sublingual nitroglycerin)
- Reserpine
- Central nervous system medications
- Antipsychotics (e.g., chlorpromazine, clozapine [Clozaril], thioridazine)
- Opioids
- Parkinsonian drugs (e.g., bromocriptine [Parlodel], levodopa/carbidopa [Sinemet])
- Skeletal muscle relaxants (e.g., baclofen [Lioresal], cyclobenzaprine [Flexeril], methocarbamol [Robaxin], tizanidine [Zanaflex])
- Tricyclic antidepressants (e.g., amitriptyline, doxepin, trazodone)
- Urologic medications
- Phosphodiesterase type 5 inhibitors (e.g., sildenafil [Viagra])
- Urinary anticholinergics (e.g., oxybutynin [Ditropan])[18]

So…What Should You Do Again?

- Questionnaire
  - Give to the patient before the visit
  - Scan the questionnaire to help determine peripheral or central
- Examination
  - 10 minute dizziness examination[18]

Evaluation

- Questionnaire[18] – see handout
  - Section I
    - Description of the spell
  - Section II
    - Accompanying symptoms indicative of peripheral etiology
  - Section III
    - Accompanying symptoms indicative of central etiology
  - Section IV
    - Accompanying auditory complaints
  - Section V
    - General physical and emotional health

Section I - Description of the Spell

- For most patients with peripheral labyrinthine disorders, the description is brief and very focused on vertigo. Patients with acute central nervous system (CNS) dysfunction may or may not have sensations of vertigo, whereas chronic CNS, cerebrovascular, cardiovascular, and metabolic causes of dizziness seldom produce true sensations of relative motion.[18]
- See “Key Items in the History of the Dizzy Patient” handout[20]

Section II and III

- Peripheral vs. Central problems (symptoms)[7]
  - Peripheral – Vestibular system and VIII cranial nerve
    - Sudden memorable onset
    - Typically true vertigo
    - Paroxysmal events <24 hours
    - Head movements provoke for <2 minutes
    - Vestibular crisis
    - Auditory complaints more likely
  - Central – brain
    - Sudden onset with one of the other 5 D's
    - Slow onset imbalance standing and walking
    - Vague symptoms of any character – can't articulate well
    - Slow vertigo lasting 24/7

Section II - Symptoms of Peripheral Disorders

- Patients with peripheral vertigo have distinctive features of onset, duration, and accompanying symptoms in relation to their dizziness (See handout)….Hearing loss, tinnitus, and aural fullness are frequent symptoms of peripheral disease. Position changes exacerbate the dizziness, and lying still lessens the symptoms.[18]

Section III - Symptoms of Central Disorders

- Unlike peripheral vertigo, central causes of dizziness produce a more variable picture. The sensation may be described in a variety of ways: spinning, tilting, pushed to one side, lightheadedness, clumsiness, or even blacking out. If documented loss of consciousness is present, a peripheral etiology of the dizziness is rarely if ever at fault. Also helpful for localization is the presence of accompanying signs of neural dysfunction, that is, dysarthria, dysphagia, diplopia, hemiparesis, severe localized cephalgia, seizures, and memory loss. The time course of symptoms is more variable from minutes to hours, and the effect of movement or position change is less predictable. These symptoms lead the clinician to suspect brain stem or cortical rather than labyrinthine sources.[18]

Section IV - Auditory Complaints

- The single most useful localizing symptom in a dizzy patient is a unilateral otologic complaint: aural fullness, tinnitus, hearing loss, or distortion. By carefully evaluating these complaints, the clinician frequently can localize both the side and the site of the lesion before any examination or testing is done. Frequent causes of unilateral auditory disease with dizziness include endolymphatic hydrops, perilymphatic fistula, labyrinthitis, vestibular neuritis (slight high-pitched loss with tinnitus), and autoimmune inner ear disease.[18]

Section V - Physical and Emotional Health

- Many medical conditions and emotional factors can create a sense of dizziness and imbalance. Hypertension, hypotension, atherosclerotic disease, endocrine imbalances, and anxiety states are common causes of lightheadedness, near syncope, and/or instability but rarely produce a sense of true vertigo. In addition, medication side effects and excessive caffeine, nicotine, and alcohol intake should be investigated as a source of dizziness.[18]

Million Dollar Questions from Goebel

- Do you get dizzy rolling over in bed?
  - BPPV
- Are you light sensitive during your spell?
  - Migrainous Vertigo
- Does one ear feel full immediately before or during your dizzy attack?
  - Meniere's Disease
- Does a loud sound make you dizzy or make your world jiggle?
  - Perilymphatic fistula, superior canal dihiscence, Arnold-Chiari malformation

Million Dollar Questions from Goebel

- Was your first attack severe vertigo lasting hours causing nausea and vomiting?
  - Labyrinthitis, Vestibular Neuritis, and CVA
- Are you lightheaded for a few seconds when you get up from a chair?
  - Orthostatic hypotension
- Do you pass out completely with your dizziness?
  - Cardiovascular

Examination

- 10 minute dizziness exam[18] – see handout
- Series of 14 quick exam techniques that help to determine cause of dizziness
- See www.peltzpt.com\dizziness for powerpoint and videos for reference. App available to link videos and powerpoint to your phone and wireless device.

Peripheral vs. Central Etiology (signs)[7]

- Peripheral
  - Direction fixed nystagmus– horizontal
  - Abnormal VOR - Positive Head Thrust
  - Nystagmus more likely with fixation removed
  - Nystagmus more likely follows Alexander's Law
  - Nystagmus more likely provoked post headshake
  - Smooth pursuit and saccade normal/age appropriate
  - If sudden onset, can stand and walk with assistance
- Central
  - Direction changing nystagmus– in direction of gaze typically
  - Nystagmus more likely enhanced with fixation
  - Nystagmus more likely vertical or pure rotational
  - Nystagmus provoked post headshake is usually vertical
  - Smooth pursuit and saccade likely abnormal
  - If sudden onset, cannot usually stand and walk even with assistance

Spontaneous Nystagmus – Part of HINTS

- Ask the patient to fixate on a stationary target in neutral gaze position with best corrected vision (glasses or contact lenses in place). Observe for nystagmus or rhythmic refixation eye movements. Repeat under Fresnel lenses to observe effect of target fixation.

Gaze Nystagmus – Part of HINTs

- Ask the patient to gaze at a target placed 20 to 30 degrees to the left and right of center for 20 seconds. Observe for gaze-evoked nystagmus or change in direction, form, or intensity in spontaneous nystagmus.

Smooth Pursuit

- Ask the patient to follow your finger as you slowly move it left and right, up and down. Make sure the patient can see the target clearly and you do not exceed 60 degrees in total arc or 40 degrees per second.

Saccades

- Ask the patient to look back and forth between two outstretched fingers held about 12 inches apart in the horizontal and vertical plane. Observe for latency of onset, speed, accuracy, and conjugate movement.

Fixation Suppression

- Ask the patient to fixate on his or her own index finger held out in front at arm's length. Unlock the examination chair and rotate the patient up to 2 Hz while the patient stares at the finger moving with them. The examiner observes for a decrease in the visualvestibular nystagmus that is evoked during rotation without ocular fixation.

Head Thrust/Impulse Test – Part of HINTs

- Ask the patient to fixate on a target on the wall in front of the patient while the examiner moves the patient's head rapidly (>2000 deg/sec2) to each side. The examiner looks for any movement of the pupil during the head thrust and a refixation saccade back to the target.

Post-Headshake Nystagmus

- Tilt the head of the patient forward 30 degrees and shake the head in the horizontal plane at 2 Hz for 20 seconds. Observe for postheadshake nystagmus and note direction and any reversal. Fresnel lenses are preferred to avoid fixation. The maneuver may be repeated in the vertical direction.

Dynamic Visual Acuity

- Ask the patient to read the lowest (smallest) line possible on a Snellen eye chart with best corrected vision (glasses, contact lenses). Repeat the maneuver while passively shaking the patient's head at 2 Hz, and record the number of lines of acuity "lost" during the headshake.
- Use a ETDRS eye chart – you can download at www.i-see.org/eyecharts.html, not www.isee.org (international society of explosive engineers)

Dix-Hallpike Maneuver

- With the examination chair unfolded like a bed, turn the patient's head 45 degrees to one side while seated and rapidly but carefully have the patient recline. Observe the eyes for nystagmus and, if present, note the following five characteristics: latency, direction, fatigue (decrease on repeated maneuvers), habituation (duration), and reversal upon sitting up.

Static Positional

- Ask the patient to lie still in three positions—supine, left lateral, and right lateral—for 30 seconds and observe for nystagmus. Use of Fresnel lenses is recommended.

Limb Coordination

- Ask the patient to perform a series of coordination tasks such as finger-nose-finger, heel-shin, rapid alternating motion, and fine finger motion (counting on all digits). Observe for dysmetria or dysrhythmia.

Rhomberg Stance

- Have the patient stand with feet close together and arms at the side with eyes open and then eyes closed. Observe for the relative amount of sway with vision present versus absent.

Gait Observation/Deviations

- Ask the patient to walk 50 feet in the hall, turn rapidly, and walk back without touching the walls. Observe for initiation of movement, stride length, arm swing, missteps and veering, and signs of muscle weakness or skeletal abnormality (kyphoscoliosis, limb asymmetry, limp).
- Fukuda Step Test – march in place for 1 minute with arms extended and eyes closed

Skew Deviation – Part of HINTs

- Alternating Cross-cover test: Cover one eye, then the other. Observe for one eye to rise after uncovering and the other eye to drop after uncovering.
- Skew deviation results from a right–left imbalance in otolith and graviceptive inputs from the vestibular system to the oculomotor system and, with rare exceptions, is generally central in origin.

Other Specialized Tests

- Pressure tests
  - Tragal Compression
    - Press the tragus into the external auditory canal
  - Valsalva with closed glottis
    - Forcefully exhale against pinched nostrils or strain against closed glottis and lips
  - (+) Test – nystagmus – indicates abnormalities at the C-T junction, periplymphatic fistula, superior canal dehiscence, or other middle ear problems
- Hyperventilation
  - Pt. hyperventilates for 60 seconds (1 breath/sec)
  - (+) Test - Nystagmus (new or reversal of spontaneous) suggests demyelinating disease process such as acoustic neuroma.

What Special Tests are Helpful?

- ENG
  - Calorics, saccades, smooth pursuit, and positional testing (done at Audiology Associates)
  - Quantifies loss of vestibular function and helps to define central vs. peripheral
- EKG
  - Helps to rule in/out cardiovascular component
- Rotary chair
  - Indicated for BVH, children, and pt. with absent calorics
- MRI/ C-T Scan
  - Helpful in ruling in/out neurological causes
- Posturography
  - Further assesses postural control, but not useful in defining lesion site

Where Do You Refer?

- Emergency Room
  - When dizziness is also accompanied by signs/symptoms of stroke or heart attack, i.e., dysphagia, dysarthria, drop attack, nausea, hemiparesis, hemi-sensory loss, chest pains or referral pains, shortness of breath, or general central signs.
- Cardiologist
  - When dizziness is accompanied by presycope/syncope or obvious cardiovascular changes
- Neurologist
  - When dizziness is accompanied by any cranial nerve symptoms, headache, visually induced or isolated imbalance, or progressive dizziness[21]
- ENT/Audiologist
  - When dizziness is accompanied by hearing changes or further vestibular assessment is needed
- Physical Therapist/OT/MD Trained in Vestibular Rehabilitation
  - When the cause of dizziness is of peripheral or central origin after medical management has begun

Consequences of Poor Management

- If CVA or MI the consequences are severe, but what if it is just plain dizziness?
- Older adults >65
  - Patient falls
    - Fractures most common cause of Memorial ER visits in the elderly
      - Hip fracture mortality 27% at 1 year, 79% at 9 years[22]
        - Pulmonary embolism (Wells Rule), infections, and heart failure
- Younger adults <65
  - Loss of function and productivity
    - 21 year old 6-8/10 dizziness for 1 yr…sitting on a couch

Vestibular Rehabilitation

Vestibular rehabilitation for unilateral peripheral vestibular dysfunction.[23]

Cochrane Database Systematic Reviews. 2011 Feb 16;(2)
Hillier SL, McDonnell M.

- "There is a growing and consistent body of evidence to support the use of vestibular rehabilitation for people with dizziness and functional loss as a result of UPVD. The studies were generally of moderate to high quality and were varied in their methods."
-
- Examples of these disorders include benign paroxysmal positional vertigo (BPPV), vestibular neuritis, labyrinthitis, one-sided Meniere's disease or vestibular problems following surgical procedures such as labyrinthectomy or removal of an acoustic neuroma.

Vestibular Rehabilitation[23]

- Appropriate for most peripheral and central problems
- Recovery occurs from:
  - Static - Regeneration and re-balancing of resting activity of the vestibular nucleus
  - Functional - Reprogramming of eye movements and postural responses to movement
    - Requires movements and exposure to stimuli
  - Mechanisms of Recovery and Change
    - Habituation – decreased response to noxious stimulus
    - VOR/VSR adaptation – plastic changes to the neuronal response
    - Substitution strategies – alternative strategies for lost function
    - Limited head and body movement – we don't want this!

Results of Vestibular Rehabilitation

- Substantial reduction or elimination of symptoms
  - Unilateral vestibular loss: 70-90%[10,11]
  - Bilateral vestibular loss: 33-75%[26,27,28]
  - BPPV: 67-94%[9]
  - Central: variable response depending on the cause of central deficit, i.e., CVA vs head trauma, but these patients do respond to treatment through neural plasticity and habituation

Results of Vestibular Rehab at Peltz PT

- All causes of dizziness (2006-2012)
- Percent of patients that respond to treatment: 92%
- Average perceived improvement in symptoms among patients that respond: 82%
- Of responders, average percentage of patients whose symptoms decrease to <2/10 with treatment: 81%
- Percent of patients that return to previous activities after treatment: 88%
- Average satisfaction with treatment: 97%

Monday Morning

- Mrs. Smith
  - 76 year old female with “dizziness”
  - Had dizziness before, but this time it is much worse
  - Woke up with the room spinning, nausea, vomiting
  - Taking 7 medications, 2 b.p. meds, and has a pacemaker
  - History of 2 falls in the past 3 months. No fx yet
  - Difficulty seeing and difficulty walking in to the clinic
  - Can’t seem to remember where she put her keys
  - Eyes are beating to the left
- You have 12 minutes max, what do you do?

Take Away Points

- There are many reasons for dizziness which can be categorized into peripheral or central problems
- Using a pre-visit screening questionnaire and 10 minute dizziness examination can help determine the cause of dizziness and rule-out major pathology. Remember HINTS
- There are medical and rehabilitation options for treatment for all patients with dizziness and you can treat simple BPPV
- If you are unsure of your diagnosis…practice…and refer out when appropriate

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Resources

- Frenzel goggles
  - Standard Frenzels
    - Bausch and Lome http://www.bauschinstruments.com/pd/9423/Other-ENT--Facial-Plastic-Instruments/Frenzel-Nystagmus-Spectacles/N0785.aspx
    - Optometrics - http://beta.otometrics.com/balance-assesment/frenzel-lenses
  - Video Frenzels
    - Micromedical -http://www.micromedical.com
    - Interacoustics - http://www.interacoustics.com/balance-assessment/vng/video-frenzel

Resources

- Clinicians specializing in dizziness
  - Audiologists
    - Audiology Associates
  - ENTs
    - Santa Rosa Head and Neck Surgical Group
    - Bob Pettit, MD
  - Neurologists
    - Allan Bernstein, MD
    - Others?
  - Physical Therapists
    - Peltz and Associates Physical Therapy
      - Aaron Peltz, PT, DPT, OCS
      - Keith Pullin, PT, DPT
      - Alyssa Keeney-Roe, PT, DPT, FAAOMPT
    - Others?