Treatment by Diagnoses

- Peripheral vestibular deficits
- Central deficits

Peripheral Vestibular Deficits

- Unilateral
- Bilateral
- Fluctuating
- Benign Paroxysmal Positional Vertigo (BPPV)
Unilateral Vestibular Deficit Treatment

- Habituation (head movement no target)
- Adaptation/Gaze stabilization (head and eye movements with target)
- Balance
- Conditioning

Habituation Exercises

- Repeated head or body movement in various planes of motion (H, V, Diagonal) without a visual target
- Encourage full range of head movement, vary speed, increase reps and sets for endurance
- Goal to fatigue out the response and encourage central compensation

Adaptation Exercises

- Use of head movement with a visual target to induce retinal slip to work VOR and encourage substitution strategies and vestibular adaptation
- Head movement with stationary visual target
- Head movement opposite dir of moving target
- Head movement at same speed and dir of target for VOR cancelation
- Vary distance of target, speed and complexity of background

Bilateral Vestibular Deficits Treatment

- Adaptation/Gaze stabilization
- Balance
- Sensory reorganization (optimize or compensate)
- Conditioning
- Patient education
- Compensatory needs

Fluctuating Vestibular Deficits Treatment

- Medical management
- Balance exercises
- Patient education
  - Self management for adaptation

BPPV - Treatment

- Canalith repositioning exercises
- Liberatory / Semont procedure
- Roll maneuver
- Brandt-Daroff exercises
Dix Hallpike Maneuver

A: Dix Hallpike Right
- Patient is seated with head turned 45 degrees to the right
- Gently lie down with head dropping slightly below level of the shoulders
- Monitor eye movements for 1 min.

B. Dix Hallpike Left
- Patient is seated with head turned 45 degrees to the left
- Gently lie down with head dropping slightly below level of the shoulders
- Monitor eye movements for 1 min.

Side Lying Maneuver

Epley - Left

Semont

Post Maneuver Instructions
- Don’t tip head down or bend at the waist for the rest of the day and night
- Sleep reclined at a 45 deg angle and do not lay on the affected side for 3-4 days
- Try movements or a halipike the next morning to check for symptoms
- If symptoms persist further treatment may be necessary

Central Deficits
- Vascular ischemia
- Diffuse damage
- Demyelinating disease
- Tumors
Central Deficits Treatment

- Medical management
- Patient education
- Adaptation/Gaze stabilization
- Balance exercises
- Conditioning
- Compensatory measures

Outcomes

General conditioning speeds recovery!

- Most effective
  - Unilateral peripheral deficit
  - BPPV
- Functional improvement
  - Bilateral peripheral deficits
- Improved postural stability
  - Central deficits

Case #1 Case History

- 82 y.o. male
- Hx of fall from a ladder 1 year ago with resultant concussion and head injury
- Shuffling gait and dragging feet
- Back pain, bilateral knee replacements, hearing loss and broken right leg in 1980’s
- Macular degeneration with vision difficulties

Interpretation

- Does he have BPPV?
  - Yes, bilateral
- Any evidence of Peripheral Involvement?
  - No
- If so, is it compensated?
  - NO: disequilibrium
- Any evidence of Central Involvement?
  - No
- Any Recommendations?
  - VBRT

Musculoskeletal/Neurological

- Cervical rotation to right limited 50% all other extremities WFL for age
- Strength 5-to5/5 x 4
- Tactile WNL except radiating sciatic pain
- Sensory Organization with Mod CTSIB was WNL on all conditions, but nudge test showed 4-5 steps to free fall posterior on all conditions
Functional Testing
- Sitting balance on dynamic surface with significant difficulty drifting to left and inability to return to midline
- DGI 19/24 with difficulty with one leg stance activities, veering with head movement and inability to increase speed
- Was treated with Epley maneuver on left 2 days prior with no spinning or nystagmus now but imbalance

Home Program
- Amb with Horiz and Vertical Head movt with surface and lighting challenges
- Working on gradually larger and faster backward stepping 5-6 x on 1 leg at a time
- Work on the gym ball with supervision to increase ability to control hips and utilize trunk balance responses

2nd Visit 4 weeks later
- Has not performed maneuvers at home
- Patient c/o “faded and hazy vision”
- Persistent left BPPV subjective symptoms without nystagmus present
- Increased back pain which he may need to “go in for another injection”
- DGI up to 21/24 from 19/24 still min difficulty with head movt and stairs
- Computerized balance testing showed difficulty on RWS, LOS was WNL

Case #2 Case History
- 62 y/o female
- Acute onset room spinning dizziness worse with head movements
- Improving over the following 4-5 days
- Residual head motion sensitivity /imbalance
- No otologic or neurologic associations
- CT was completed and was WNL
Case #2
- Bedside: positive right head thrust
- All ocular motor testing was normal
- Left beating positional nystagmus

Case #2 Caloric

Musculoskeletal/Neurological
- Cervical ROM WNL but Motion symptoms with rotation bilaterally
- U/L extremities ROM WNL
- Hammer toes bilaterally with discomfort
- Gross mm strength 5/5 X4
- Tactile and Kinesthetic sensation WNL
- Sensory organization on Mod CTSIB Indep on all conditions and efficient stepping strategy within 1-3 steps

Functional Testing
- Balance in gait DGI 18/24 with mild veer to right and difficulty with speed and head movement
- MST MSQ= 88 in mild range with most difficulty with H and V head movement VOR x 1 5 reps 3/5 intensity
- Unable to perform DVA due to intensity of symptoms

Home Program
- H and V Habitation ex’s gradually increasing reps and speed
- VOR x 1 adaptation ex’s with increasing reps, speed and varying distance of target
- Heel and toe ex’s to improve A/P motor control
- Amb with H and V head movement for improved bal in gait with visual distraction
2<sup>nd</sup> Visit 3 weeks later
- DGI up to 23/24 from 18/24
- Mod CTSIB with nudges with 1 step strategy instead of 3
- MSQ=0.1 down from .88
- VOR x1 less than 1/5 intensity from 3/5
- Tol comp GS test on the left at 131 deg/sec and 133 deg/sec the right
- Func feeling 95% better than last visit

Case #3: Case History
- 63 year old female
- Complaints of intermittent episodes of a sensation of swaying, described as a motion feeling with some difficulty going down stairs.
- Episodic: some days will be perfectly fine - other days she can tell in the morning when she gets up.
- Position change does not impact the dizziness.
- Mild left eustachian tube dysfunction

Case #3: Case History
- In 1995, she had an episode of dizziness that resolved in weeks.
- 2 years later: Complaint of chronic dizziness.
- She reports occasionally when leaning forward she has a sensation of imbalance.
- Seen by neurology and no reported diagnosis of problems found.

Case #3: Case History
- Bilateral aural fullness
- Normal MRI, normal carotid Doppler’s and neurology evaluation.
- Chronic dizziness with initial ENG 12 years ago showing right beating positional nystagmus
- VNG 3 years ago with no significant abnormalities
- Hearing within normal range
- Had laser surgery to right eye 5 weeks ago that started symptoms - Ophthalmologist states no eye problem
- Difficulty watching motion and reading

Case #3
- VNG: Normal
- Does she have BPPV?
  - NO
- Any evidence of Peripheral Involvement?
  - No
- Any evidence of Central Involvement?
  - No
- Any Recommendations?
  - VBRT
Musculoskeletal/Neurological

- ROM and extremity strength WNL
- Standing posture - BOS WNL, no sway and good alignment
- Tactile and kinesthetic sensation normal range
- Sensory Organization on mod CTSIB 3-4 steps on level self corrected and 3-4 steps to FF on uneven
- Computerized voluntary motor balance testing RWS was WNL, LOS with fall to back target and abnormal velocity scores

Functional Testing

- Balance in gait - DGI 22/24 with veering 1½ ft in path width with horizontal head movement
- Motion sensitivity test - MSQ = 0, VOR x 1 2/5
- Unable to perform DVA due to symptoms with repetition

Home Program

- Ambulation with horizontal and vertical head movement with surface and lighting challenges
- Gradually taking larger and faster steps backward
- Heel and toe standing on level and uneven surface
- Use of gym ball with progression of challenge
- VOR x 1 adaptation exercises for motion intolerance

Second visit 2 weeks later

- DGI up to 23/24
- Mod CTSIB independent on level and uneven surface within 2-3 steps on all conditions
- No fall on computerized LOS test, but still abnormal score on forward target range
- DVA at 85 degrees/second with static Snellen fraction of 20/15 and DVA at 20/20 bilaterally
- Symptoms due to increase speed, cervical range and repetition

Third visit 2 weeks later

- DGI 23/24
- Independent on mod CTSIB within 2 steps all conditions
- Computerized Gaze stabilization test found visual acuity accurate at 105 degrees/second on left and 75 degrees/second on the right
- VOR cancelation exercises started
Fourth visit 2 weeks later
- DGI 24/24
- LOS test within normal ranges
- Mod CTSIB within normal ranges
- Computerized Gaze stabilization accurate to 120 degrees/second bilaterally
- Significant change in motion tolerance and comfort in ADL's

Who is appropriate to refer for vestibular testing?

What is assessed during vestibular testing?
- BPPV
- Migraine
- Meniere’s disease
- Disequilibrium of aging
- Labyrinthitis
- Vestibular Neuritis

What are some common vestibular etiologies?

Who is a good candidate for vestibular rehab?

What can you expect from vestibular rehab?

What are some common vestibular etiologies?

Who is appropriate to refer for vestibular testing?

- Patients whose symptoms are:
  - Disruptive to daily life
  - Continuous
  - Peripheral /Central in nature

What are some common vestibular etiologies?

What is assessed during vestibular testing?

- Does this patient have BPPV?
- Does this patient have any indications for peripheral vestibular involvement?
- Does this patient have any indications for central vestibular involvement?
- Is this patient a candidate for vestibular rehabilitation?
Who is a good candidate for vestibular rehab?

- Symptoms
  - Complaint of falls
  - Head motion provoked symptoms
  - Uncompensated
- Common Disorders
  - Bilateral peripheral vestibular
  - BPPV
  - Uncompensated stable lesion
  - Dysequilibrium of aging
  - Mild anxiety

What can you expect from vestibular rehab?

- To decrease vertigo intensity
- To improve gaze stabilization and endurance to movement
- To improve postural stability on multiple surfaces and visual situations
- To improve overall function in multiple environments

QUESTIONS????