The Evaluation and Treatment of Dizziness in Mild TBI

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Objectives

- Review incidence and Anatomy of Dizziness in mTBI
- Differential diagnosis of Dizziness in mTBI
- Evaluation
- Treatment

No Financial Disclosures
Incidence of Dizziness and mTBI

mTBI
- 5% of the US population per yr (16 million), likely higher number as many not reported
- mTBI is loss of consciousness 30 mins-1 hour
- 25-39% of mTBI pts reported dizziness within the 1st year after injury
- “post-concussive” symptoms
- 20% of patients with mTBI do not return to work, often due to debilitating symptoms including dizziness
Vestibular system

What does the vestibular system do?
- Linear and angular accelerometer
- Senses rotational/angular movements of the head via the Semicircular Canals
- Senses linear movements of the head via Utricle (horizontal) and Saccule (vertical)
- Senses head position in space

Differential Diagnosis

CENTRAL
- Diffuse Axonal Injury (Microstructural Brain Injury)
- Post-Traumatic Vestibular Migraine
- Psychological/PTSD/Post concussive syndrome
- Low CSF Pressure
- Brain Tumor
- CVA
- Multiple Sclerosis

PERIPHERAL
- Labyrinth Disorders
  - BPPV
  - Exertional Dizziness
  - Labyrinthine Concussion
- Vestibular Disorders
  - Peri lymphatic Fistula
  - Superior Semicircular Canal Dehiscence
  - Temporal Bone Fracture
- Otolith Disorders

Evaluation

HISTORY
- Most important step
- Can use Dizziness Questionnaire
- Dizziness Handicap Inventory
Evaluation – Dizziness Questionnaire

I. When you are “dizzy” do you experience any of the following symptoms?
1. Light-headedness or swelling sensation in the head?
2. Blacking out or loss of consciousness?
3. Tendency to fall? to the left? to the right? forward? backward?
4. Objects spinning or turning around you?
5. Sensation that you are spinning or turning
6. Loss of balance while walking? veering to the left? veering to the right?
7. Headache?
8. Nausea or vomiting?
9. Pressure in the head?
10. Tingling in your fingers, toes or around your mouth?

II. 1. My dizziness is: Constant? In attacks or episodes?
2. When did the dizziness first occur?
3. If in attacks: How often do attacks occur
4. How long do they last?
5. When was the first episode?
6. What was the duration of the shortest attack?
7. Do you have any warning that it is going to occur?
8. Do they occur at any particular time of day or night?
9. Are you completely free of dizziness between attacks?
10. Does change of position make you dizzy?
11. Do you have trouble walking in the dark?
12. When you are dizzy, must you support yourself when standing?
13. Do you know any possible cause of your dizziness?
14. Do you know of anything that will stop your dizziness or make it better? Make your dizziness worse? Precipitate an attack? (e.g.: fatigue, exertion, hunger, menstrual period, stress, emotional upset, alcohol) Were you exposed to any irritating fumes, paints, etc. at the onset of dizziness?

“Million Dollar Clues”

Dizzy after rolling in bed = BPPV
Most common etiology, 9% of pts>65 seeing Doctor for other issues
Very light sensitive during dizzy spells or difficulty in visually-stimulating surroundings = Migraine associated Dizziness
One ear feels like it’s going to explode and/or roaring tinnitus = Meniere’s (Endolymph. Hydrops)
Triggered by Salt, caffeine, dehydration and emotional stress
Sounds make my vision jump or blur = Semicircular Canal Dehiscence (SSCD)

Dizziness Handicap Inventory

Instructions: The purpose of this scale is to identify difficulties that you may be experiencing because of your dizziness. Please check “always”, “no”, or “sometimes” to each question. Answer each question only as it pertains to your dizziness problem.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Always</th>
<th>Sometimes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 Does looking up increase your problem?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>X2 Because of your problem, do you feel frustrated?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>X3 Because of your problem, do you restrict your travel for business or pleasure?</td>
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<td>X4 Does walking down the aisle of a supermarket increase your problem?</td>
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<tr>
<td>X5 Because of your problem, do you have difficulty getting into or out of bed?</td>
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<tr>
<td>X6 Does your problem significantly restrict your participation in social activities, such as going out to dinner, going to movies, dancing or to parties?</td>
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<tr>
<td>X7 Because of your problem, do you have difficulty reading?</td>
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<td>X8 Does performing more ambitious activities like sports, dancing, and household chores, such as painting or cooking, increase your problem?</td>
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<tr>
<td>X9 Because of your problem, have you been embarrassed or made to feel embarrassed?</td>
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</table>
Dizziness Handicap Inventory

Always = 4 Sometimes = 2 No = 0

Subscales
P = physical E = emotional F = functional

Notes:
1. Subjective measure of the patient's perception of handicap due to the dizziness
2. Top score is 100 (maximum perceived disability)
3. Bottom score is 0 (no perceived disability)
4. The following items can be useful in predicting BPPV
   - Does looking up increase your problem?
   - Because of your problem, do you have difficulty getting into or out of bed?
   - Do quick movements of your head increase your problem?
   - Does bending over increase your problem?

Can use subscale scores to track change as well

Office Evaluation Tests

Dix-Hallpike – In Head down position looking for Horizontal or Vertical Nystagmus
Freznel Goggles

Usually with a light source and magnifying lenses. Allows examiner to see eye movements with patient not able to fixate or focus.

Office Evaluation Tests

Dix-Hallpike – Nystagmus in BPPV, sustained Central
Spontaneous Nystagmus – Central more with fixation, peripheral jerky, more with Freznel goggles for no fixation
Gaze Nystagmus – Central Jerky, to direction of gaze, downbeat
Smooth Pursuit (60 degrees to each side) – Central not smooth, saccadic, marching
Saccades (alt gaze between fingers) – Over/undershoot, slow or late
### Vestibular/Ocular Motor Screening (VOMS)

<table>
<thead>
<tr>
<th>NT</th>
<th>Headache 0-10</th>
<th>Dizziness 0-10</th>
<th>Nausea 0-10</th>
<th>Fogginess 0-10</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Symptoms</td>
<td>N/A</td>
<td></td>
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<tr>
<td>Smooth Pursuit</td>
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<tr>
<td>Saccades Horizontal</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Saccades Vertical</td>
<td></td>
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<tr>
<td>Convergence (Near Point)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Near Point in cm 1, 2, 3</td>
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<tr>
<td>VOR Horizontal</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>VOR Vertical</td>
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<tr>
<td>Vagal Motion Sensitivity Test</td>
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### Diagnostic Testing

- MRI/HCT
- Blood Tests
- Ultrasound
- Electronystagmogram or Videonystagmogram
- Vest Evoked Potentials
- Electrococleography
- Hearing testing

### Treatment

#### Diagnosis of Etiology/Location directs treatment

**Concussion/TBI**
- Supportive care, therapies, RTW or Sports gradual with guidelines and activity increase to tolerance and limited/no symptoms and education, Headache mgmt.

**Ocular Treatment**
- Vest Therapy, vision therapy, refer to NeuroOptometry

**Vestibular Rehabilitation**
- Gaze Stability and Adaptation exercises, postural Control training (Yoga, Tai Chi)

**Epley Maneuver/Canalith Repositioning** (when appropriate)
- Visual Motion Sensitivity training
- Cervicogenic symptoms treatment
- Manual therapy, AROM, posture
- Increase Activity Tolerance
Epley Maneuver

90% effective in treating BPPV
Sxs may resolve spontaneously
Recurrence 15%

1. Lie down on your back, bent head to left for 1 minute
2. Face upward, right ear to floor for 1 minute
3. Face upward, left ear to floor for 1 minute
4. Face upward, head to left for 1 minute
5. Sit upright, head turned to left for 1 minute

If above does not work for patients with dizziness, try:

1. Lie down on your back, bent head to left for 1 minute
2. Face upward, right ear to floor for 1 minute
3. Face upward, left ear to floor for 1 minute
4. Sit upright, head turned to left for 1 minute