Differentiating migraine, anxiety and cervical spine related dizziness

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Declaration of Conflict of Interest

• Rob Landel
  – Teaches continuing education courses in vestibular rehab and cervicogenic dizziness
• Laura Morris
  – Teaches continuing education courses in vestibular rehab and concussion
• Janene Holmberg
  – Teaches continuing education courses in vestibular rehabilitation
Introduction: Migraine, Anxiety, CGD

Determining where the dizziness comes from is complicated
• Neck impairments lead to neck pain
• Neck pain is associated with cervicogenic dizziness (CGD) and headaches (CGHA)
  • chronic conditions cause anxiety/fear avoidance/persistent pain behaviors
• Migraines can cause headaches and dizziness;
• Anxiety can cause dizziness and neck guarding leading to neck impairments
• Head trauma nearly inevitably includes neck trauma
• Neck trauma causes neck pain
• Lather, rinse, repeat
Today’s Format

- Patient Case Problem
- Presentation of symptoms, signs, etiology suggestive of each condition
- Return to Patient Case Problem: Differential diagnosis
- Management suggestions for each condition
- Wrap up: How to sequence management, and other management considerations

Patient Case

- 35 y/o female, cc dizziness, neck pain, HA
  - Also notes some mild imbalance but denies falls
- HPI: 6 wks s/p MVA, Dx = “Whiplash”
- PMH: h/o migraine HA in her 20’s
- Severity: 6/10 max for all symptoms
- Agg: head movements, busy visual environment
- Function: when symptoms 5/10, doesn’t get out of bed for fear of aggravating it: “I’m worried that this will permanently disable me.”
- Special Q’s: denies N/T, B/B, weakness

CERVICOGENIC DIZZINESS

Rob Landel
CGD: Symptoms

- Concurrent complaint of neck pain
- Not vertigo but woozy, foggy, off, spacey
- Visual disturbances
  - need to concentrate to read, visual fatigue, sensitivity to light
- Time course is variable (e.g. not helpful in the differential diagnosis)
- Complaints of postural dyscontrol
  - Unsteady, but not falling. More on this...

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CGD: Signs

- Musculoskeletal impairments in the C-spine, T-spine, TMJ
  - ROM deficits
  - Impaired muscle function: weakness/fatigability
  - Pain or symptoms with palpation
- Lack of central or peripheral vestibular involvement
  - Diagnosis of exclusion

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CGD: Signs

- Imbalance
  - Measurable increased sway, not LOB. However...
  - Remember: Balance is a multi-system impairment
  - Neck/back pain and anxiety mediate the relationship between dizziness and falls
- Sensorimotor impairments
  - Increased Joint Position Error (JPE): >4.5°
  - Decreased head movement control
  - Decreased gain on Smooth Pursuit Neck Torsion Test (SPNT)

Menant JC et al. 2013
Question

• What would happen if you turned your head 10° and:
  – Your vestibular system said you’d turned 10°
  – Your visual system said you’d turned 10°
  – But your neck somatosensory input said you’d turned 15°?

CGD: Etiology

• Sensory mismatch between cervical somatosensory, vestibular and visual inputs
Treatment: Impaired cervical kinesthetic ability
Healthy Normal <4.5° JPE

Target distance 90cm from head rotation axis

Joint Position
Degrees

Head Flexion JPE test
CGD: Etiology

- Damage to cervical musculature (probably) and/or joints (perhaps)
- Traumatic vs. atraumatic

Factors altering muscle afferents

- Functional muscle impairment
  - Increased fatigability
- Degenerative changes, such as
  - Fiber transformation
  - Fatty infiltration
  - Atrophy of the neck muscles

Images courtesy James Elliott, PT, PhD
Functional or Degenerative Muscle Changes

May alter
- muscle proprioceptive capabilities
- joint mechanics
- muscle spindle sensitivity

Consequences? Clinical Relevance?

Neck Pain

Increased Muscle Activity →
Increased Sway →
More Easily Fatigued →

Diagnostic and Management dilemma: what is the origin of the symptoms?
- Forces of concussion likely also damage vestibular and cervical spine structures

http://www.cdc.gov/concussion/index.html
Key Defining Qualities

- “Dizziness” in CGD is not true vertigo
- Presence of neck pain
- Visual Disturbances
- Postural dyscontrol
- Presence of neck impairments including sensorimotor
- Diagnosis of exclusion

Migraine Incidence and Prevalence

- Most common cause of recurrent spontaneous vertigo (Furman 2015)
  – More than Meniere’s Disease
- Most common cause of dizziness in adolescents (Langhagen 2014, Gioacchini 2014)
- Comorbidities: Meniere’s, anxiety, BPPV (Chu 2015), Mal de debarquement syndrome
Migraine

• Specific criteria for migraine
  – International Headache Society
  – Migraine Assessment Tool
    • Eight question decision tree developed in 2004 by
      Marcus, et al for nursing
  – Migraine generally under-diagnosed in those with
    chronic headache

Diagnostic Criteria- Migraine

• Headache lasts 4 to 72 hours if not treated
• Must have two of the following characteristics
  – Unilateral
  – Pulsating quality
  – Moderate to severe in intensity
  – Aggravation by “exertion”

Diagnostic Criteria- Migraine

• During headache, at least one of the following
  – Nausea and/or vomiting
  – Photophobia/phonophobia
• No evidence of related organic disease
Diagnostic Criteria- Migraine with Aura

• Add 3 of the 4 following characteristics
  – One or more completely reversible aura symptoms that indicate focal cortical dysfunction
    • Visual scotoma (area of diminished vision within a visual field)
    • Visual hallucination (zig-zag or wavy lines, colored lights or balls, shimmering patterns)
    • Hemibody weakness or numbness

Aura

• Usually precede headache
• Duration usually 10-30 minutes but can be up to one hour
• Can have a migraine aura without headache

Aura

• Transient neurological symptom/event
  • Visual (most common):
    • Positive: colored lines, jagged lines, gold/silver sparkles
    • Negative: scotomas (opaque holes in vision)
  • Sensory, motor, or cognitive
    • Paresthesias
    • Muscle weakness
    • Tinnitus- bilateral, non-specific
    • Fluctuations in hearing
    • Spontaneous and motion-provoked vertigo
    • Disorientation
Vestibular Migraine

• Diagnostic criteria
  – No documented vestibular pathology
  – Migraine diagnosis according to International Headache Society (IHS) criteria
  – Intermittent vertigo or dysequilibrium - at least 2 episodes
  – Accompanied by sensory sensitivity, visual aura, not necessarily headache
  – Interferes with function

  (Oleson 2013, Marcus 2013; Furman 2015)

Relationship of Dizziness with Headache

• Temporal relationship is variable and can change over time
• Usually during headache
• Can be before headache - aura
• Often the onset of headaches occur prior to the onset of vestibular symptoms
General Characteristics

- Postural instability with sensory organization deficits
- Visual dependence
- Intolerance of visual motion
- Motion sensitivity
- Sensory sensitivity - photo- and phonophobia
- Nausea
- Deconditioning

Pathophysiology

- Trigeminal nerve activates trigeminovascular pain system
- May be more than one initiating process
  - Triggers (C-spine)
  - Serotonin and norepinephrine released centrally
- Cortical spreading depression - hyperpolarization/depolarization through cortex
- Inflammatory response - vasodilation
- Lowered sensory/pain thresholds

(Furman 2013, Cutrer 2010)

Pathophysiology of Vestibular Migraine

- Central influence:
  - Connections between trigeminal nuclei and vestibular nuclei, other brainstem nuclei
  - Cortical depression may influence vestibular nuclei due to direct connections with parietal cortex

(Furman and Balaban 2003)
Pathophysiology of Vestibular Migraine

• Peripheral influence:
  – Vasodilation locally caused by release of neurotransmitters from 8th nerve just as with trigeminal nerve
  – Repeated vasospasm-induced ischemia of labyrinth causes short term symptoms and long term damage, resulting in caloric reduction
  • Furman and Balaban, 2003

Migraine: Signs

• Oculomotor changes
  – Spontaneous nystagmus
  – Static persistent positional nystagmus
  – Direction-changing gaze-evoked nystagmus
  – Head shaking nystagmus
    • (Polensek 2010)
• Rare- hemiplegic migraine with associated hemi-weakness, sensory changes
• Pain behavior

Migraine: Triggers

• Trauma
• Stress/anxiety
• Diet/dehydration
• Vestibular stimulation (Murdin 2009)
• Visual stimulation (strobe lights)
• Cervical dysfunction/trauma
• Hormonal changes
• Barometric pressure/weather changes (Kimoto 2011)
• Changes in sleep/wake habits
Key Defining Qualities

- Oculomotor changes
- Throbbing headache
- Sensory sensitivities
  - Photo/phonophobia, tactile sensitivity
- Episodic true vertigo

ANXIETY-RELATED DIZZINESS

Janene Holmberg

Figure 1. The interrelationship between physiological and psychological factors in dizziness.

Same "end point" whether neuro-sensory system disease or Psychological
JUST AS REAL

Sloane et al. JAGS 2004
NOT
Incidence of Dizziness
Due to psychological or PPPD

- Incidence of Dizziness due to Isolated Psychological Problems (tertiary care)
  - General Anxiety 42%
  - Panic Attacks 28% & Mood Disorders 18%
  - Somatization, Conversion, Malingering 12%

- Persistent Postural Perceptual Dizziness USA
  - 25% of all dizzy patients referred to tertiary care, university balance centers
  - 10-25% medically unexplained dizziness
  - 2nd most common dx in tertiary care
    - Between BPPV 1st and VM 3rd (Staab 2012)

Anxiety Symptoms
- Constant vague sense of motion & vague unsteadiness
- Marked with FEAR/worry in all complaints
- Exacerbated
  - Generalized head motion, relatively constant
  - Environmentally
  - Some mild wax/waning but NO severe definable events other than onset
  - All symptoms worse in standing/walking
  - When postural control required

Differentiating a Panic Attack
- #1 symptom: Dizziness/Lightheadedness (50-85%)
- discrete spells intense fear or discomfort that escalate within 8-10 min. with at least four of following:
  - Dizziness (unsteady feelings or faintness )
  - Nausea
  - Shortness of breath (smothering sensation)
  - Palpitations or tachycardia
  - Trembling or shaking
  - Sweating
  - Choking
  - Depersonalization or de-realization
  - Numbness or paresthesias
  - Flushes (hot flashes) or chills
  - Chest pain/discomfort
  - Fear of dying
  - Fear of going crazy or doing something uncontrolled
### Anxiety Key Findings

- High disability scores (DHI, ABC) without associated impairments
- Normal but Symptomatic: visual testing (smooth, saccades, VORc, OPK), VOR (HIT, DVA), neurologic examination
  - Diagnosis of EXCLUSION
- Fearful/anxious behaviors reports on all testing (e.g. DH, romberg), environmental vigilance, high use cognition
  - Marked startle responses (decreased tolerance to postural disturbance)
  - Occasional Aphysiologic responses
  - Poor breathing awareness, mechanics, holding breath patterns
- Abnormal CTSIB/sensory testing (variable patterns)
  - Fear, unwillingness to try, startle responses early in disturbance
  - Poor confidence especially all foam trials
- Abnormal motion sensitivity:
  - Generalized non-specific dizziness without nystagmus
- Abnormal movement qualities...

### ID Anxiety or Fear-based postural & movement qualities

- Stiffness to movement (without rigidity/spasticity)
  - Greater co-contraction with less flexibility
  - Uneconomical stabilization
  - Decreased dissociative motions (Marked cervical tension)
  - Increased upper body overt compensatory motions versus covert lower body responses
  - High risk strategies being used in routine situations
- Safety behaviors without definable impairments
- More easily destabilized to visual stimuli
- Threat system
  - CAN ALTER BALANCE PERFORMANCE

### Persistent Postural-Perceptual Dizziness (PPPD or 3PD)

- Strong associations with anxiety BUT this is not a psychiatric DISORDER....
- WHO ICD-11 Proposed Classification: Diseases of the ear and mastoid process
  - Diseases of the inner ear
    - AA51 Disorders of Vestibular Function
      - AA51.3 Chronic Vestibular Syndrome
      - AA51.5 PPPD DIZZINESS
- Synonyms
  - Chronic Subjective Dizziness (CSD)
  - Phobic Postural Vertigo (PPV)
- Narrower Terms
  - Visual Vertigo
  - Space and Motion Discomfort
PPPD Primary Symptoms

- Still have symptoms of Fullness, lightheadedness, or “crazy head”
  - Sensations of veering but no ataxia and rarely fall
  - Primary disabling c/o NOT VERTIGO, OSCILLOPSIA, DIPLOPIA!!!!!
- DRIVING persistent Hypersensitivity to vision
  - Intolerance to complex environments (busy stores, drive in rain)
  - Precision hand/eye tasks
- Predominance of generalize unsteadiness (spatial discomfort)
  - Worsens in visual challenging or ground (uneven/compliant) altered environments
  - Busy environments
  - HIGH scores across board on Visual Vertigo Analog Scale (VVAS)

Visual Vertigo Analogue Scale

<table>
<thead>
<tr>
<th>Item</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tr>
<td>1. Walking down stairs</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>2. Being a passenger in car</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>3. Group ride on spinning log</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>4. Walking or sit on stationary rollercoaster</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
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Total: 69/90 (77%) or Average: 7.7

PPPD only if a lot of people stressing me

Total: 25/90 (27%) or Average: 2.8

ANXIETY

"Happened only 1x when too many people talking"
Diagnostic Criteria PPPD
Staab, 2012; Bittar, 2014

1. Vague dizziness present >70-80% time for >3 months
   - Wax/wane spontaneously or to provoking factors
2. Sudden onset
   - Triggering event (25% vestibular, 20% panic/anxiety, 20% Migraine, 15%
     Concussion, 10-20% other medical)
3. Symptoms are most severe when walking/standing
   - Less sitting, absent/minor recumbent
4. Persistent sway/instability NOT detectable on physical exam
   - Normal exam findings or comorbid medical condition that can’t explain
     disability/sx
5. Provoking factors
   - Active/passive motion of self (reflect cumulative burden of exposure
     throughout the day)
   - Context-dependent (motion rich or high visual complexity environments,
     performance of complex visual tasks requiring precision or sustained focus
     (computer, reading))
6. Behavioral Assessment
   - Normal, low levels anxiety/depression, clinically significant distress, psychiatric
     disorders, changes in ADL’s.

ETIOLOGY??

- Genetic predisposition
- Inherent vulnerability
- Behavioral-trained heightened threat-response
- “My brain has learned to attend to something its not suppose to.”

Differentiating PPPD versus Anxiety

**PPPD**
- Predominant and disabling Visual Vertigo
- Strong environmental triggers
- Initial trigger more often associated with definable medical event
- PRIMARY RX: Visual motion desensitization with graded balance challenge and
  habituation

**Anxiety**
- More phobic-fear based avoidance
- Predominant fear-based postural/movement strategies
- Initial trigger more often associated with psychiatric triggers
- PRIMARY Rx: building balance confidence with progressive movement exposures and
  graded habituation
Key Defining Qualities
Anxiety or PPPD

- Onset: sudden
- Triggering factors:
  - stress of medical condition that disturbs posture
- Tempo:
  - Mild waxing/waning NOT disabling spontaneous episodes
- Primary symptom:
  - vague dizziness, phobic avoidance, fear-based complaints, visual motion intolerance, environmental triggers, declined balance confidence
- Findings: Normal to mild impairments for level of disability
  - Normal oculomotor BUT poor tolerance
  - Normal VOR capacity BUT poor tolerance (No nystagmus)
  - Normal to nonspecific cervical findings (mild ROM, stiffness, decreased stabilization)
  - Normal cervicogenic-specific testing
  - High threat movement behaviors

Patient Case

- 35 y/o female, cc dizziness, neck pain, HA
  - Also notes some mild imbalance but denies falls
- HPI: 6 wks s/p MVA, Dx = “Whiplash”
- PMH: h/o migraine HA in her 20’s
- Severity: 6/10 max for all symptoms
- Agg: head movements, busy visual environment
- Function: when symptoms 5/10, doesn’t get out of bed for fear of aggravating it: “I’m worried that this will permanently disable me.”
- Special Q’s: denies N/T, B/B, weakness
Patient Case

- History/subjective:
  - Distinct disabling periods 2-3x/week associated with 7/10 headache pain (associated light/sound sensitivity & nausea)
  - Symptoms can exacerbate in grocery stores, passenger in car, busy school hallways. (VAS 6.5)
  - Symptoms can also distinctly exacerbate with neck pain and cervical therapy has temporarily relieved in the past but without long term relief

Presenting Signs

- Normal oculomotor exam but smooth pursuit VOR cancellation provoked 4/10 dizziness
- Normal neurologic testing (RAM, distal LE testing)
- Optokinetic testing normal but 4/10 dizziness provoked
- VOR head impulse normal, no Head Shaking nystagmus
- Unable to tolerate DVA testing
- Mild right beating positional nystagmus noted with fixation removed only
- Mild motion sensitivity; 12% MSQ (>31% severe)

Presenting Signs

- Flexion/rotation: 20 degrees right, 40 to left
- Extension: 20 degrees
- Rotation: >45 degrees right with dizziness and pain
- Positive neck torsion testing to right torsion
- JPE positive to rotation and flexion
- mCTSIB: Loss of balance in condition 5 if head turned to right
MANAGEMENT: CERVICOGENIC DIZZINESS

Mobility Deficits

- Exercise
  - Muscle Function: Strength, Control, Endurance
  - Joint position sense
  - Balance
- Manual Therapy
  - SNAGs
  - Joint mobilization/manipulation
  - Traction

Sustained Natural Apophyseal Glides

- SNAG (Mulligan)
- Patient moves into or away from pain
- “Push” the facet in its natural direction
  - Treatment plane
- Think overpressure,
  - e.g., add a little extra to the movement
  - “help it along”
Traction

- Keep head relatively still with as little change in spatial orientation as possible
- No vestibular stimulation
- Assess symptomatic response

Towel Traction

Home Towel Traction
Summary: Patients with cervical trauma

In addition to pain and loss of ROM will manifest some or all of the following:

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<thead>
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<tr>
<td>Cervical Muscle Function</td>
<td>Decreased Strength, Control, Endurance</td>
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<tr>
<td>Hypersensitivity to temperature</td>
<td></td>
</tr>
<tr>
<td>Post-traumatic stress</td>
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(Kristjansson 2009)
Head still, eyes fixed on target as body moves underneath
Summary: Patients with cervical trauma

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Assess/Treat Muscle Function

Traditional Manual Muscle Test

- Supine flexion in hook-lying
  - 3/5 against gravity
  - Hold, and time (30 sec?)
- After full flexion, extend head
  - Then add resistance
  - Offer posterior support!
  - Cervical flexors: push against forehead.
  - Capital flexors: push up against chin.
Assess/Treat Muscle Function

Cranio-occipital Flexion
• Test: Use an inflatable bladder, with pressure gauge, under cervical lordosis
• Patient flattens lordosis, pushing into the bladder
• Train: strength, control, endurance

Assess/Treat Muscle Function

Prone on Elbows
• Capital Extensors
• Hold neutral spine, both cervical and thoracic (top photo)
• Duration of hold?
  – 30 sec min
  – Up to 2 mins?

Treating Muscle Dysfunction

Train the Spine like you would an Extremity
MANAGEMENT: MIGRAINE

Migraine Management

- PREVENTION of migraine episodes
- Coordination with medical management
- Lifestyle changes
- Postural control training
- Sensory Organization Training
- Habituation training for visual motion intolerance, motion sensitivity
- Careful! Therapy could make pt. worse
  (Wrisley 2002)

Medications for Migraine-Related Dizziness

<table>
<thead>
<tr>
<th>Category</th>
<th>Medication</th>
<th>Brand Name</th>
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<tbody>
<tr>
<td>Abortives (Serotonin receptor agonist)</td>
<td>Sumatriptan, Rizatriptan, Zolmitriptan, Eletriptan, Almotriptan, FrovatRIPTAN</td>
<td>Imitrex, Maxalt, Amerge, Zomig, Relpax, Axert, Frova</td>
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<tr>
<td>Antidepressants</td>
<td>Sertraline</td>
<td>Zoloft, Luvox</td>
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<td>Amitriptyline</td>
<td>Elavil, Tryptizol, Laroxyl</td>
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<td>Escitalopram oxalate</td>
<td>Lexapro</td>
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<td>Beta blockers</td>
<td>Propranolol</td>
<td>Inderal</td>
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<td>Calcium channel blockers</td>
<td>Verapamil</td>
<td>Isoptin, Verelan, Calan, Bosoptin, Covera-HS</td>
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<tr>
<td>Anticonvulsants</td>
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<td>Depakote</td>
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<td></td>
<td>Topiramate</td>
<td>Topamax</td>
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<tr>
<td>Benzodiazepine</td>
<td>Clonazepam</td>
<td>Klonopin</td>
</tr>
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</table>
Maintain a Structured Lifestyle

Initial interventions

- Postural control
- Sensory organization
- General stretching/exercise
- Habituation for tolerance of eye/head coordination, gross motor tasks
- Care must be taken to NOT over-do

Later Intervention:
Optokinetic Stimulation

- Intervention for visual motion intolerance
- Urban walking videos- progress
  - Small screen-> large screen
  - Ipad, laptop, big screen TV
  - Visual motion- slow to fast
  - Postural stability
  - Sitting, standing, decreased BOS
  - Stop when dizziness 4-5/10, no headache (Pavlou 2010)
Urban Walking Videos

Migraine

- Three intervention groups:
  - Topomax
  - Exercise- 20 min, 4x/week, stationary bike
  - Relaxation training

- Exercise found to be equally effective as meds or relaxation
  - (Varkey, 2011)

Intervention Considerations

- Don’t treat during active migraine
- Triggers (visual, activity, diet) may cause delayed reaction
  - No increase in symptoms during PT session, exacerbated a few hours later
MANAGEMENT: ANXIETY-RELATED DIZZINESS

IT'S NOT WHAT WE DO AS MUCH AS HOW WE TEACH, PRESCRIBE, AND ADVANCE

Basics of Treatment
Anxiety & 3PD

• Education!!!!!!!
  • Don’t feed a vestibular diagnosis
  • Empower (focus of control)
• Relaxation training (applied Relaxation)
  • Breathing awareness
  • Muscle tension awareness
• Proprioceptive “uptraining” (Grounding/surface orientation) and core stabilization efficiency/awareness
  • Progress to vestibular confidence uptraining
• Habituation BUT with emphasis on remaining grounded
  • Small doses, long rest periods, monitor for fight/flight responses
• Dissociative movements & Open integrated motions
• Successful movement experience
  • Optimal balance NOT standing still but controlling/enjoying movements

3PD Rehab Characteristics
Successful Vestibular Rehabilitation for CSD/PPPD (J. Staab, 2012)

• Pacing
  • Habituation begins more gently & increases more slowly
  • Daily exercise plan overcomes instinctive avoidance
  • Scheduled breaks (improve adherence and limit exacerbation)
• Persistence
  • Habituation process will take longer
  • Full benefits may not be realized for 3-6 months
• Visual Flow/visual Complexity
  • Exercises need to include visual flow and coupled visual stimuli
• Real World application
  • Use of indoor and outdoor settings that patients typically encounter promotes reintegration into daily activities
Medical Anxiety/PPPD Treatment

- Medical Management of anxiety/depression
  - 60% anxiety, 45% depression, 25% neither

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>Dosing Strategies for Serotonergic/Antidepressants for Chronic Subjective Distress</th>
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<tbody>
<tr>
<td>Medication</td>
<td>Initial Therapy$^a$</td>
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<tr>
<td>Paroxetine</td>
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<td>Lexapro</td>
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<tr>
<td>Zoloft</td>
<td>25</td>
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<tr>
<td>Cymbalta</td>
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</table>

Intervention Progression

- “Surface orientation” = weight bearing, subtle shifting drills, muscle tension awareness (GROUNDING!!!!!!!)
- Supine experience (cervical ball “unwinding”, somatic gateways, breath)
- Sitting progressing to standing (proprioceptive replacement for vision)
- Sway biofeedback Weight-bearing drills
- Prescribed eyes closed (10-20 second intervals) only if fully controlled (eventually narrowing feet BUT watch for fight/flight driven responses
- LESSEN Safety BEHAVIORS (gradual if necessary)
  - GET HEAD UP WHEN WALKING & STOP TOUCHING THE FURNITURE
  - Occasional use trekking pole gait (ONLY IF NECESSARY) and WITH EXPECTATION that will be needed for short period
  - Start habituation therapy to reduce sensitivity to head and visual motion
    - 5 repetitive head motions, rest, repeat 3 sets, TID
    - Visual tracking and or slow VORs in sitting up to 1-2 minutes, TID

Treatment progression

- Relaxation/Breathing training (2 sessions)
  - Podcast mindfulness practice 20 minutes daily
- Progressed to Umbrella spinning 1-2 mins TID in supine if necessary, progress to sitting with flexible stability, and then eventually standing with balance challenge but only when motions normalized and NO fight/flight
- Grocery store/library Prescription
  - 4 intervals of casual walking until symptoms raise 2 points (1-10) Note time and repeat and build
  - EASY store, EASY time of day
  - Must get patients to the point that they are NO AVOIDING!
Other Visual motion Treatments

- OPK stripe (OKN Strips APP) in wide, stances to semi-heel toe position and/or cushions
- 90, 180, to 360 degree turns independently then within gait
- Tennis ball on wall drills 5–10 minutes daily, simple to busier balls
- Further Systematic desensitization in grocery store
  - Goal 20–30 minutes, increase finding items from 5–10 to 20–30 items with advancing demands postural demands and NO safety behaviors
- Ipad Visual games when sitting, to standing, to eventually with walking
  - Picture scanning
  - Card games that were provocative
  - YouTube Specific environment exposures
  - Needs to be specific to patient

Immersed OPK......

Stripes to virtual grocery stores, stable ground to moving...
Layering of intervention

- No literature to base this upon
- Listen, listen, listen
  - Differentiate “types of dizziness”
- Cervical
  - Careful re: triggering for migraine which would trigger anxiety
  - Sensitized central nervous system
- Medical intervention for migraine
- Address anxiety last but could introduce the concept earlier
  - watch for avoidance
  - “I can’t do that”
  - Poor postural stabilization interfering

Take home differential....

<table>
<thead>
<tr>
<th>Cervicogenic</th>
<th>Migraine</th>
<th>Anxiety/PPPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart</td>
<td>Trauma</td>
<td>Migraine with features</td>
</tr>
<tr>
<td></td>
<td>Cervical loading</td>
<td>Stress or Medical situatio</td>
</tr>
<tr>
<td>Tempo</td>
<td>Distinct association</td>
<td>Migraine triggers</td>
</tr>
<tr>
<td></td>
<td>Distinct association &amp;/or features</td>
<td>Migraine triggers</td>
</tr>
<tr>
<td>Prin c/o</td>
<td>V/V</td>
<td></td>
</tr>
<tr>
<td>Disability</td>
<td>Neck dysfunction</td>
<td>Severe episodes, increasing disabling motion sensitivity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(movement and visual)</td>
</tr>
<tr>
<td>Findings</td>
<td>Cervical Abnormalities and Cervicogenic</td>
<td>Nystagmus, borderline caloric losses, more tender cervical findings</td>
</tr>
<tr>
<td>Treatment</td>
<td>Manual Therapy Traction</td>
<td>Lifestyle changes, medication, habituation/visual motion desensitization/painful, postural control as episodes stabilize</td>
</tr>
<tr>
<td></td>
<td>Cervicobraqueal Muscle Dysfunction &amp; Endurance</td>
<td>Stabilizing, balance/proprioception awareness, applied relaxation w/ habituation/visual motion desensitization, balance confidence</td>
</tr>
</tbody>
</table>
## Differential Diagnosis

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</thead>
<tbody>
<tr>
<td><strong>Onset</strong></td>
<td>Associated with cervicogenic triggers: trauma (e.g. MVA, whiplash), critical changes in degenerative condition</td>
<td>Crisis onset with migraine features (light/sound sensitivity, nausea)</td>
<td>Sudden onset (anxiety or other medical condition)</td>
</tr>
<tr>
<td><strong>Triggering factors</strong></td>
<td>Cervical spine movement (vs. head movement), loading</td>
<td>Known migraine triggers (dietary, hormonal, sleep/wake, dehydration, emotional)</td>
<td>Stress or medical condition that disturbs posture</td>
</tr>
<tr>
<td><strong>Tempo</strong></td>
<td>Chronic with some episodes associated with cervical complaints</td>
<td>Definite disabling episodes with some mild persistence</td>
<td>Chronic persistent symptoms with mild wax/waning</td>
</tr>
<tr>
<td><strong>Primary subjective report</strong></td>
<td>Neck pain; dizzy but not vertigo; kinesthetic disconnect; head motion intolerance; floating/pacey; imbalance</td>
<td>Disabling throbbing headache, vertigo episodes, persistent motion intolerance, sensory hypersensitivities (light, sound, motion), imbalance</td>
<td>Vague dizziness, situational specific intolerance/avoidance</td>
</tr>
<tr>
<td><strong>Primary disability</strong></td>
<td>Neck pain/dysfunction associated with dizziness; neck movement sensitivity; imbalance</td>
<td>Severely disabling episodes, persistent sensory hypersensitivity (light, sound, motion, nausea), postural instability</td>
<td>Visual motion intolerance, generalized low balance confidence</td>
</tr>
<tr>
<td><strong>Oculomotor findings</strong></td>
<td>Positive smooth pursuit neck torsion test (SPNT)</td>
<td>Static positional nystagmus, direction-changing gaze evoked nystagmus</td>
<td>Likely none</td>
</tr>
<tr>
<td><strong>Cervical Findings</strong></td>
<td>Symptoms ease with traction; ROM abnormalities, muscle function impairments (e.g. deep neck flexor weakness/poor timing, neck extensor fatiguability), active trigger points that provoke dizziness</td>
<td>May have active trigger points, guarding, may have normal findings</td>
<td>Mild ROM deficits, generalized decreased stabilization efficiency</td>
</tr>
<tr>
<td><strong>Cervicogenic testing (e.g. JPE, SPNT, Traction, head movement control)</strong></td>
<td>Positive (at least one)</td>
<td>Mild to non-specific</td>
<td>Normal to non-specific</td>
</tr>
<tr>
<td><strong>Primary treatment</strong></td>
<td>Traction; normalize cervical impairments (e.g. strength, ROM) and sensorimotor abnormalities (e.g. JPE); balance training</td>
<td>Lifestyle changes, medication management, habituation/visual motion desensitization, postural control training as migraines stabilize</td>
<td>Habituation and balance retraining with heavy emphasis on visual motion desensitization, balance confidence, reducing fear/anxiety-related responses</td>
</tr>
</tbody>
</table>
Migraine Assessment Tool

1. Did the headaches start within 2 weeks of a head injury, trauma, or medical illness?
   YES  NO  (If no, proceed to next question.)

2. Do you have any brain abnormality, like tumors or hydrocephalus?
   YES  NO  (If no, proceed to next question.)

3. Do you have a headache everyday or take over-the-counter or prescription pain or headache medications (eg, Excedrin) more than 4 days per week?
   YES  NO  (If no, proceed to next question.)

4. Do you have an intermittent or constant headache?
   Constant  Intermittent  (If intermittent, proceed to the next question.)

5. How long does each individual headache episode last?
   <2 hours  ≥2 hours  (If ≥2 hours, proceed to next question.)

6. Do you have any of the following neurological symptoms immediately before or during your headache episodes:
   Visual scotoma (blind or black spots in the vision)
   Visual hallucination (zigzag or wavy lines, colored lights or balls, shimmering patterns)
   Weakness or numbness on one side of your body

   If YES, diagnose MIGRAINE. No further questions needed.
   If NO, proceed with question 7.

7. Do you have at least 2 of the following symptoms with your headache?
   Pain is on one side of the head during a headache episode
   Pain feels like throbbing or pulsing sensation
   Pain limits, restricts, or interferes with routine activities
   Pain is made worse by performing routine activities, such as stair climbing

   NO (STOP! No diagnosis of migraine)  YES (If yes, proceed to next question.)

8. Do you have at least 1 of the following symptoms with your headache?
   Nausea or vomiting
   Markedly increased sensitivity to BOTH normal room lighting AND conversational speech (You need to turn down or off lights, close curtains or blinds, turn down or off radio or television, or need to retreat to dark, quiet room.)

   If YES, then diagnose MIGRAINE.  If NO, no diagnosis of migraine.

For therapist use only:

☐ EVAL  ☐ REVAL  SCORE______ / 10

INITIALS ____________

Date ________________

Indicate the amount of dizziness you experience in the following situations by placing **one vertical mark** at the appropriate place on the scales below. On the scale, 0 represents no dizziness and 10 represents the most dizziness. However, **do not write in numbers**—follow the example below.

DON’T DO ANY OF THESE: [X] 0 8

DO THIS: [ ]

Walking through a supermarket aisle

Being a passenger in a car

Being under fluorescent lights

Watching traffic at a busy intersection

Walking through a shopping mall

Going down an escalator

Watching a movie at the movie theater

Walking over a patterned floor

Watching action television
References
Differentiating Migraine, Cervicogenic and Anxiety-related Dizziness CSM 2016


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