Case study

Understanding Mal de Debarquement syndrome (MdDS), persistent postural perceptual dizziness (3PD) and somatoform disorders: and the role of vestibular rehabilitation therapy (VRT)

Abstract

It is well established that complaints of dizziness, vertigo, unsteadiness, and internalized motion are commonly reported by patients to health care providers. It is estimated that dizziness is the 3rd most common complaint heard in physicians' offices across all age groups, preceded only by headache and lower back pain. It has been observed by clinicians for over 100 years, that there is a sizable segment of this population of patients with or without a precedent vertigo episode who report difficulty coping and ambulating comfortably within a visually dynamic world. The purpose of this article is to provide the reader with an understanding of these conditions. This will include definitions of the conditions and a review of their symptoms and management options. The authors will provide a case study to highlight the complex nature of these conditions and successful management approach utilizing Vestibular Rehabilitation Therapy.

Keywords: Mal de debarquement, persistent postural perceptual dizziness, motor conversion disorder, vestibular rehabilitation therapy, virtual reality

Volume 16 Issue 1 - 2024

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Received: December 20, 2023 | **Published:** January 02, 2024

Abbreviations: MdDS, Mal de debarquement syndrome; 3PD, persistent postural perceptual dizziness; VRT, vestibular rehabilitation therapy; BPPV, benign paroxysmal positional vertigo; CBT, cognitive behavioral therapy

Introduction

Investigators as long ago as the 1880's have written about the overlay of psychological manifestations with patients presenting to physicians with complaints of dizziness or spatial disorientation.[1] A progression or worsening of symptoms may be more likely based on the patient's personality and psychological state rather than an organic vestibular condition or disorder. Table 1 presents an historical overview of the various labels ascribed to these conditions as well as the investigators and year of publication. In the recent past, newer labels have been given to these conditions, as greater understanding of their nature has been examined. These conditions may have a genesis ranging from well-established organic disorders such as vestibular neuritis to an unexplained collection of symptoms without a definitive onset or causation. Figure 1 depicts the most commonly associated co-morbidities with manifestation of internalized motion and subjective dizziness. Patients who present with seemingly odd, non-vestibular like onset and complex symptoms, with unknown etiologies often have histories including; migraine, anxiety, obsessive compulsive disorder (OCD), histrionic and somatoform personalities.

These patients are often referred to otolaryngology or rehabilitation services as a waste basket destination. Invariably, laboratory and imaging studies often prove unremarkable, further confounding, complicating and often delaying proper triage and management. Yet their symptoms may be chronic, even debilitating, but rarely acute. This often results in a disruption of activities of daily living, which is further exacerbated by the individual's predisposition to anxiety. A brief overview of these conditions is provided to familiarize the reader with the nature of each respective condition. Readers are encouraged to revert to the references provided for each condition for a comprehensive examination of the subject.

Table 1 Historical overview of conditions by name, investigator(s) and year

Condition Name	Investigators	Publication year
Fear of Marketplace (Agoraphobia)	Westphal	1870
Supermarket Syndrome	McCabe	1975
Space and Motion Discomfort	Jacob et al.	1989
Visual Vertigo	Bronstein	1995
Chronic Subjective Dizziness	Staab et al.	2004
Migraine Anxiety Related Dizziness (MARD)	Furman et al.	2005
Motorist Vestibular Disorientation Syndrome	Page and Gresty	1985
Mal de Debarquement Syndrome (MDDS)	Brown and Baloh	1987
Persistent Postural Perceptual Dizziness(3PD)	Staab et al.	2017

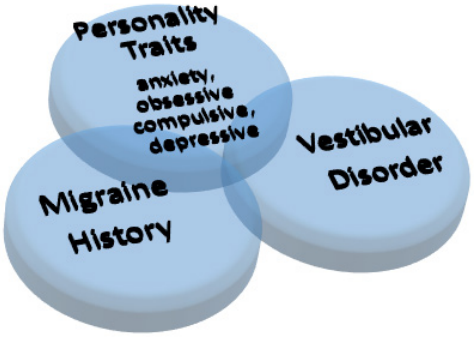

Figure 1 Common co-morbidities associated with manifestation of conditions with subjective internalized motion.

Definitions

Mal de Debarquement Syndrome (MdDS)

The sensation of continued motion is not uncommon after a day on a fishing boat or several days spent on a cruise. When the sensation lingers however for days, weeks or even months, following the trip, it is commonly referred to as Mal de Debarquement syndrome (MdDS).[2] It is considered a rare and poorly understood disorder that causes the sensation of continuous motion even when the person is not moving. The symptoms are typically described as a feeling of rocking, swaying, or bobbing. The condition is often triggered by travel, especially by boat or plane.

In most cases, MdDS symptoms go away within 24 hours. However, for some people, the symptoms can persist for months or even years. The cause of MdDS is not fully understood. However, it is postulated that this is due to the central vestibular and nervous systems' inability to recalibrate within the brain's areas which are responsible for balance and spatial orientation. There does not need to be a precedent history of a vestibular event. In the authors experience, neurodiagnostic testing including; VideoNystagmography with caloric, rotary chair, cervical and ocular Vestibular Evoked Myogenic Potentials and Computerized Dynamic Posturography are usually unremarkable.

The symptoms of MdDS can be very disruptive to the extent of disabling, yet there are no outward signs of the usual physical characteristics of a vestibular dysfunction. Investigators have reported that MdDS is most commonly seen in females with a history of migraine. Not surprisingly, the symptoms associated with MdDS, other than the sense of internalized motion, are also consistent in individuals with a history of migraine.[3]

Symptoms may include:

1. An internal sensation of rocking, swaying or floating
2. Nausea and vomiting
3. Dizziness
4. Headache
5. Fatigue
6. Trouble concentrating
7. Anxiety and Depression

Management

Numerous centers have focused on developing treatment for MdDS. At UCLA researchers reported that clonazepam was successful in treating 80% of their MdDS patients while administration of valium was at 50% More recently at Mount Sinai in New York City, the MdDS team has a used a treatment which includes Optokinetic (OKN) stimulation. This articles first author successfully used OKN stimulation in the early 1980's to foster central compensation in laboratory animals following unilateral labyrinthine ablation. Other investigators have reported using OKN as a treatment for a variety of vestibular and spatial orientation conditions.[4]

Management options may include:

- Medications- anti anxiety
- Cognitive Behavioral Therapy (CBT)
- Vestibular Rehabilitation Therapy (VRT)

Persistent Postural Perceptual Dizziness (3PD)

A more complex collection of symptoms and subjective complaints than MdDS, has recently been termed Persistent Postural Perceptual Dizziness, or more easily stated 3PD. While the publications of the Barany Society group in 2017[5] and others have been the most comprehensive and have provided guidelines for the classification or 3PD as a disorder, it is not newly recognized. While prior authors have reported a strong psychological overlay to these complaints, Staab et al.,[6] suggest there are physiological aspects, despite the apparent prevalence of personality types and history of migraine as common co-morbidities. The disorder was named persistent postural-perceptual dizziness to reflect its main diagnostic criteria of persistent non-vertiginous dizziness, unsteadiness, and non-spinning vertigo that are exacerbated by postural challenges and perceptual sensitivity to space-motion stimuli.

Diagnosis Criteria & Symptoms: All five criteria must be fulfilled to make the diagnosis

1. One or more symptoms of dizziness, unsteadiness, or non-spinning vertigo are present on most days for 3 months or more.
   - Symptoms last for prolonged (hours-long) periods of time but may wax and wane in severity
   - Symptoms need not be present continuously throughout the entire day.
2. Persistent symptoms occur without specific provocation, but are exacerbated by three factors:
   - Upright posture,
   - Active or passive motion without regard to direction or position, and
   - Exposure to moving visual stimuli or complex visual patterns.
3. The disorder is precipitated by conditions that cause vertigo, unsteadiness, dizziness, or problems with balance including acute, episodic, or chronic vestibular syndromes, other neurologic or medical illnesses, or psychological distress.
   - 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 course.
   - When the precipitant is a chronic syndrome, symptoms may develop slowly at first and worsen gradually.
4. Symptoms cause significant distress or functional impairment.
5. Symptoms are not better accounted for by another disease or disorder.

Somatoform disorder- conversion

In some rare instances the overarching symptoms of what is initially thought to be MdDS or other neurological disorders including multiple sclerosis,[7] are more pronounced and apparent, manifesting in outward physical changes and characteristics which are far more extreme than the patient's internal subjective sensation of motion. Conversion disorder (also known as functional neurological symptom disorder or FNS) is a mental health condition that causes physical symptoms that cannot be explained by a medical condition. The symptoms are real and can be disabling, but they are not intentionally produced or feigned.

Citation: Gans RE, Rutherford K, D'Alessandro A. Understanding Mal de Debarquement syndrome (MdDS), persistent postural perceptual dizziness (3PD) and somatoform disorders: and the role of vestibular rehabilitation therapy (VRT). *J Otolaryngol ENT Res.* 2024;16(1):1–5. DOI: 10.15406/joentr.2024.16.00538

Symptoms may include multiple systems:

- **Sensory system:** Blindness, deafness, numbness, and tingling.
- **Motor system:** Paralysis, weakness, and tremors.
- **Visceral system:** Difficulty swallowing, vomiting, and incontinence.

In some cases, the symptoms of conversion disorder can be very severe. A patient with conversion disorder might become completely paralyzed, or they might have seizures that are indistinguishable from epileptic seizures. This is referred to as Pseudo Non-Epileptic Seizures (PNES).[8] However, the symptoms are always temporary. They can last for a few hours, a few days, or even a few weeks, but they will eventually go away. The exact cause of conversion disorder is unknown. However, it is thought to be caused by a combination of psychological and biological factors.

Psychological and biological factors that may contribute to conversion disorder include:

- Stress
- Anxiety
- Trauma
- Depression
- Subconscious conflict
- Abnormal brain activity
- Abnormal levels of neurotransmitters
- Genetic predisposition

The diagnosis of conversion disorder can be challenging. This is because the symptoms are often similar to those of other medical conditions, such as stroke, multiple sclerosis, or epilepsy. In order to make a diagnosis of conversion disorder, attending physicians will need to rule out all other possible medical causes. Once other medical conditions have been ruled out, a neurologist or psychiatrist may make a diagnosis of conversion disorder based on the following criteria:

- The symptoms are not intentionally produced or feigned.
- The symptoms are not caused by a medical condition.
- The symptoms are caused by psychological factors.
- The symptoms cause significant distress or impairment in social, occupational, or other important areas of functioning.
- **Age:** Conversion disorder is most common in young adults, but it can occur at any age.
- **Gender:** Conversion disorder is more common in women than in men.
- **Prevalence:** The prevalence of conversion disorder is estimated to be about 1% of the population.
- **Course:** The course of conversion disorder is variable. Some people experience only a single episode of symptoms, while others have recurrent episodes.

There is no one-size-fits-all treatment for conversion disorder. However, the most effective treatments are typically those that address the underlying psychological factors that are contributing to the disorder. With treatment, most people with conversion disorder can make a full recovery. However, the symptoms may recur in some cases.

Management options may include:

- **Psychotherapy:** This can help the person to understand the psychological factors that are contributing to their symptoms, and to develop coping mechanisms for dealing with stress and anxiety.
- **Cognitive-behavioral therapy:** This type of therapy helps the person to identify and challenge negative thoughts and beliefs that are contributing to their symptoms.
- **Physical therapy:** Including vestibular and balance rehabilitation protocols
- **Support groups:** These groups can provide the person with a safe and supportive environment to share their experiences and learn from others who are coping with similar challenges.

The role of vestibular rehabilitation therapy (VRT)

VRT has been well-recognized as an invaluable non-medical management tool for the full continuum of conditions with subjective complaints of dizziness and motion intolerance.[9] Patients presenting with MdDS, 3PD or even Motor Conversion diagnoses pose a different set of challenges and require a different approach and set of protocols. Likewise, while all patients do better with coaching and encouragement, the addition of Cognitive Behavioral Therapy (CBT) in combination with vestibular rehabilitation has shown to be particularly important for this patient population.[10]

Case study

This Case Study is an example, of a patient not uncommonly seen in Physical Therapy services with a precedent vestibular condition, a unilateral BPPV, who after successful treatment months later reports feeling dizzy and unsteady, with increased anxiety and near panic-attacks with situational and environmental triggers. This is suggestive of a 3PD profile post-vestibular event. Treatment intervention included in-clinic enhanced with positive coaching consistent with CBT and supplemented by home-based vestibular rehabilitation.[11]

Demographics

- 57-year-old female
- Past Medical History (PMH) positive for migraine

History of condition and symptoms

- DX and TX for right ear posterior canal PC-BPPV.
- Feb 2022 onset of positional vertigo and was Dx and treated for BPPV. Summer 2022 patient reports to continue to feel unsteady and never fully recovered from the events of Feb 2022. Summer, August 2022, reports to have decline in function with increased anxiety and nervousness about engaging in daily activities.
- **Functional restrictions:** Cannot be around crowds due to the visual motion would cause increased unsteadiness. Heights now bother her where they did not previously. Busy environmental visual stimuli will cause her to feel off balance. Grocery stores: reported if she goes in and needs to scan and look on shelf for things, she will have to leave. She reports "not a spinning dizziness like before". Feels more unsteady with motion. Sitting still with complex visual stimuli will still bother her.

Symptoms:

- Dizziness is reported to feel unsteady with onset of nausea causing fear and anxiety.

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- **Duration:** seconds, minutes, as long as complex stimuli is present and shortly after it is gone, will return to baseline of not feeling unsteady.
- **Aggravating factors:** quick movements, turning, walking, complex visual stimuli, movements
- **Alleviating factors:** no body movement, no head movement, no visual stimuli, (also reported he would close her eyes to remove visual stimuli)

Initial Testing:

- **Activities-specific Balance Confidence (ABC) Scale:** 63.8%
- **Dizziness Handicap Index (DHI):** 32
- **Dynamic Gait Index (DGI):** 20/24
- **Static standing balance tested** with busy visual stimulus to attempt to reproduce symptoms due to functional testing such as dynamic gait index unable to capture impairments.
- **Static standing with busy visual target no movement** would elevate dizziness from 0/10 to 3/10
- **Static standing with busy visual target with slow vertical movement:** elevate dizziness from 0/10 to 9/10
- **Static standing with busy visual target with slow horizontal movement:** elevate dizziness from 0/10 to 6/10

Plan of Care:

In-clinic therapy 2x/week for 4 weeks with integration of CBT into sessions, predominantly of encouragement and positive coaching during session. Discharge was at week 5 (one follow up visit was on week 5) supplemented by home-based protocols.

Goals:

- Short term | Three weeks | Patient will be able to stand statically independently and look at a busy target for at least 30 seconds and report less than or equal to 1/10 unsteadiness/dizziness feeling to improve ability to stand safely with busy visual targets needed for safety with changing visual targets in the home.
- Long term | Six weeks | Patient will be able to stand statically independently and look at a busy target and it be moved vertically up/down for at least 30 seconds and report less than or equal to 2/10 unsteadiness/dizziness feeling to improve ability to stand safely with busy visual targets needed for safety with changing visual targets in the home.
- Long term | Six weeks | Patient will improve ABC scale score from 64% to at least or greater than 80% to demonstrate improved confidence with mobility and improving safety with mobility.

Rehabilitation included both in-clinic and home-based protocols:

In-clinic: Conducted in-clinic with therapist

- **Education** on condition, education on stimulus progression and habituation to stimuli. Promotion of positive thoughts with positive outcomes to stimuli progression.
- **Habituation** for bed mobility, mass practice to noxious functional movement and to reduce fear and anticipation of dizziness onset with bed mobility.
- **Optokinetic:** HEP included use of YouTube videos using grocery store videos to practice incremental increases to visual stimuli.
- **Virtual Reality (Virtualis):** optokinetic stimuli in grocery store, boat, tunnel, forest. Sitting >standing progression and habituation dosing.
- **VOR cancellation**, visual motion sensitivity training: trunk movements in various directions progressed with visual targets to scan during trunk movements.
- **Standing balance:** eyes closed activities and changing base of support
- **Functional movement:** steps, stepping over and up on obstacles, various directions.
- **Functional activities** with VRT progressed to standing and walking with moving visual stimulus. Moving targets during walking, scanning on moving targets during walking, Marson ball in standing.

Home exercise program: Daily protocols.

- OPK stimulus on YouTube for moving visual stimulus.
- Standing balance, trunk rotations and pivot turns with visual targets and target scanning.
- Functional movements, step ups and lateral walking. Standing balance with head turns and eyes closed.
- Behavior progressions for community integration: identifying areas in public that he would attend and identifying small dosing at a time: example: go to grocery store and walk down 2 aisles and leave. Progression later to more aisles and more time spent in complex visual stim locations as graded exposure, then when return to PT, discuss positive experience with progressions and continued goals in public locations.

Outcomes: At discharge

Subjective:

- Reports no problems currently. Even went on airplane and had turbulence and felt fine. No issues with walking through busy airport. Even went on moving sidewalk and stood on it without dizziness. Was in crowds and loud noise and felt fine. Reported no limitations. No issues with bed mobility. No dizziness with stairs.

Objective:

- ABC scale: 88.8%
- DHI: 0%
- DGI: 24
- All goals listed above met

Conclusion

The successful evaluation and non-medical management of patients with equilibrium and spatial disorientation complaints should be an awareness by practitioners that this population may also include a psychological overlay to any physiological or organic dysfunction. These manifestations may be on a spectrum from mild annoyance to motion or moving visual surroundings to avoidance of daily activities to significant psychiatric manifestations seen in Conversion Disorders. It will be incumbent on the practitioner to follow the guidelines of treating psyche as well as soma with this challenging, underdiagnosed and often misunderstood patient population.

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Acknowledgments

None.

Conflicts of interest

The author declare that there are no Conflicts of interest.

References

1. Kuch K, Swinson RP. Agoraphobia: what westphal really said. *Can J Psychiatry*. 1992;37(2):133–136.
2. Smith L, Pyke W, Wilkinson D, et al. Psychological Aspects of Vestibular Disorders: A National Survey of Clinical Practice; 2002.
3. Cha YH, Baloh RW, Cho C, et al. Mal de débarquement syndrome diagnostic criteria: consensus document of the classification committee of the bárány society. *J Vestib Res*. 2020;30(5):285–293.
4. Cha YH. Mal de debarquement syndrome: new insights. *Ann N Y Acad Sci*. 2015;1343(1):63–68.
5. Pavlou M. The use of optokinetic stimulation in vestibular rehabilitation. *J Neurol Phys Ther*. 2010;34(2):105–110.
6. Staab JP, Eckhardt-Henn A, Horii A, et al. Diagnostic criteria for persistent postural-perceptual dizziness (PPPD): Consensus document of the committee for the classification of vestibular disorders of the bárány society. *J Vestib Res*. 2017;27(4):191–208.
7. Staab, Jeffrey P. Behavioral Aspects of Vestibular Rehabilitation. *NeuroRehabilitation*. 2011;29(2):179–183.
8. Ozdemir D, Sahni S. Conversion Disorder (Functional Neurological Symptom Disorder) masquerading as multiple sclerosis: a case report. *Cureus*. 2019;11(6):e4893.
9. Chohan S, Chohan A, Asif M. Psychogenic nonepileptic seizures (pnes) in the setting of trauma and schizophrenia. *Case Rep Psychiatry*. 2023;2023:6644876.
10. Whitney SL, Alghwiri A, Alghadir A. Physical therapy for persons with vestibular disorders. *Curr Opin Neurol*. 2015;28(1):61–68.
11. Kristiansen L, Magnussen LH, Wilhelmsen KT, et al. Efficacy of intergrating vestibular rehabilitation and cognitive behaviour therapy in persons with persistent dizziness in primary care- a study protocol for a randomised controlled trial. *Trials*. 2019;20(1):575.