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Mal de Debarquement

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Mal de Debarquement

- Mal de Debarquement – understanding the signs and symptoms of this syndrome offers the binocular vision specialist the opportunity to help patients receive symptomatic relief while helping to educate other health care professionals the benefits of binocular vision rehabilitation through optometric vision therapy.

Mal de Debarquement

■ Definition –

MAL DE DEBARQUEMENT - literally a "sickness of disembarkment," refers to inappropriate sensations of movement after exposure to motion from a boat or plane.

- Also referred to as MDD, MdD, MdDS

Signs & Symptoms of Mal de Debarquement Syndrome

- Hx: 1 month of rocking or swaying following an excursion on a boat, ship or airplane trip (*of at least 4 hours in duration*).
- Sx: Symptoms usually include vague unsteadiness and disequilibrium or sensations of rocking and swaying, but not rotational vertigo.
- Predominantly affects middle-aged females 35-50, but can affect men.

Research – Literature

- Mair reported all subjects were female, with ages ranging from 15 to 66 years.
- Hain, et al; all subjects were female
- Mair noted that sex differences have been previously shown to exist in susceptibility to motion sickness and in the degree to which visual cues are used for orientation.

Symptoms - The symptoms of MdDS are many, and vary for each individual. The most commonly reported symptoms include:

- Rocking/Bobbing/Swaying Sensation
- Difficulty Concentrating
- Bouncing/Shimmering Vision
- Sensitivity to Light and/or Sound
- Disorientation
- Headaches
- Intolerance of busy patterns
- Imbalance/Staggering Gait
- Confusion
- Ear pain/fullness
- Fatigue
- Anxiety
- Depression

Literature Search – Published Findings Research from

- From the Departments of Neurology and Otolaryngology, Northwestern University Medical School, Chicago, Ill (Dr. Hain); the Department of Neurology, Baylor University, Houston, Tex (Dr Hanna); and Berlex Laboratories, Richmond, Calif (Ms Rheinberger).
- Hain TC, Hanna P, Rheinberger M. [Mal de Debarquement](#) Syndrome. Archives of Otolaryngology-Head Neck Surgery, 1999;125:615-620,

Other similar symptoms

Table 1. Symptoms of Mal de Debarquement in 27 Survey Subjects

Symptoms	No. (%)
Rocking	25 (93)
Swaying	22 (81)
Imbalance	20 (74)
Ear symptoms	15 (56)
Tilting	14 (52)
Nausea	10 (37)
Headache	9 (33)
Jumping vision	6 (22)
Blurred vision	5 (19)
Perioral tingling	4 (15)
Spinning (vertigo)	3 (11)
Diplopia	1 (4)
Vomiting	1 (4)
Other*	3 (11)

* Includes eye twitch, fuzzy-headed/woozy, and pulling/numbness in foot or lower leg.

Differential Diagnosis

- MDD or MdDS is often mistaken for other vestibular disorders, particularly
- Meniere's Disease
- Benign Paroxysmal Positional Vertigo
- Vertigo
- Dizziness
- Motion Sickness
- Inner ear problems

Not Meniere's Disease: The published literature shows

- The symptoms of these subjects are clearly not consistent with Ménière disease.
- They do not typically experience attacks of rotational vertigo, which is one of the defining hallmarks of Ménière disease.

Differential Diagnosis of Mal de Debarquement Syndrome

- **Mal de débarquement** is distinguished from motion sickness, airsickness, simulator sickness, or seasickness (*mal de mer*) because subjects are predominantly symptom free during the period of motion.
- Mal de débarquement is distinguished from "landsickness" or "postmotion vertigo" by duration.

POTENTIAL ETIOLOGIC FACTORS IN MDD

- Migraine
- Hormones
- Inner Ear Pathology (Ménière Disease)
- Persistent Central Nervous System Adaptation to the Seagoing Environment
- Psychogenic Cause
- Internal Model Theory

Provoking factors

- Authors describe increased symptoms just after further motion exposure, such as flights, car rides, or boat rides. (Yet others say it provides some relief.)
- Symptoms were also increased by anxiety and stress (in 21 [81%]), positional changes (in 19 [73%]), rapid head movement (in 17 [65%]), and "various other factors including visual stimuli".

Treatment recommendations for MDD

Syndrome from Hain TC, Hanna P, Rheinberger M. [Mal de Debarquement Syndrome](#). Archives of Otolaryngology-Head Neck Surgery, 1999;125:615-620.

- **Positive effect of benzodiazepines and amitriptyline.**
- **Meclizine and scopolamine were entirely ineffective.**
- **Medications that speed adaptation** (eg, stimulants, such as amphetamines) might be tried. To our knowledge, these medications have not been studied for MDD.
- **Brown and Baloh, Murphy, and Mair all recommend vestibular rehabilitation or exercise for the MDD syndrome. Findings document only a limited response to vestibular rehabilitation (1.4%).**
- **Procedures aimed at accelerating adaptation might be tried.**

Summary of MDD

- Persistent MDD is a prolonged sensation of rocking, swaying, imbalance, or other motion typically triggered by a seagoing voyage.
- The disorder appears to occur almost exclusively in women, with age of onset typically in the 40s.
- Cause is unclear.
- Symptoms usually diminish with time, but can last for years. Most patients consider it debilitating to their life*.

Hain, et. al theory & explanation of "Internal Model Theory"

- People develop a predictive model of the boat motion, and use their prediction to adjust to the boat motion (and avoid falling).
- People develop an internal model of periodic motion on the boat so that they predict and cancel out input (visual or somatosensory) that is phase-locked to pitch rotation, and enhance visual input due to surge that is not.
- Persons with MDD are unable to dispose of this internal model, which is only useful when they are exposed to periodic motion (such as when driving a car).
- How does the brain figure out the context with the same visual stimuli ?

Hain Suggests Treatment Modalities

- Situations where there is a direct confrontation between the rocking sensation of MDD and a very clear and normal sensorium seems like a reasonable approach to treatment. In other words, walking outside (on a calm day), on a firm surface, where you can see the horizon, might be helpful.
- Suggest that treatment approaches should be considered that assist people in **changing their mental processing of motion**, rather than searches for vestibular suppressant medication or physical therapy that includes more motion. The disconnect between the entrenched internal model and the person's actual surroundings, he believes, is what spawns the disease's disorienting symptoms.

Treatments – What works in a majority of cases.

- Symptoms were reported to be alleviated while driving in 17 subjects (63%) and by other movement in 7 (26%).
- In other words, 89% of the patients had relief while moving through space!
- Does this suggest that adaptation of the organism in environments that predominantly stimulate ambient visual processing helps relieve symptoms?

according to Baloh

- “The condition may be related to the brain areas that sense movement, the temporal and parietal lobes.”. “We want to see if there are differences in the way people process visual motion.”

Questions

- Do you suspect a problem with these patients' ability to process ambient visual information?
- Is there a difference in head injured patients with balance and/or persistent motion issues and patients with MdD?
- Can the treatment we use for head injured patients with persistent motion, be used to help patients with MdD from their rocking and swaying symptoms?
- How do you test for impaired focal or ambient visual function?
- What would you do to treat these patients and why?

References

- **Mal de Debarquement** [Timothy C. Hain, MD; Philip A. Hanna, MD; Mary A. Rheinberger](#) *Arch Otolaryngol Head Neck Surg.* 1999;125:615-620.
- Stott JR. Adaptation to nauseogenic motion stimuli and its application in the treatment of airsickness. In: Crampton GH, ed. *Motion and Space Sickness*. Boca Raton, Fla: CRC Press; 1990.
- Graybiel A. Structural elements in the concept of motion sickness. *Aerospace Med.* 1969;40:351-367.
- Cohen H. Vertigo after sailing a nineteenth century ship. *J Vestib Res.* 1996;6:31-35.
- Gordon CR, Spitzer O, Doweck I, Melamed Y, Shupak A. Clinical features of mal de débarquement: adaptation and habituation to sea conditions. *J Vestib Res.* 1995;5:363-369.
- Brown JJ, Baloh RW. Persistent mal de débarquement syndrome: a motion-induced subjective disorder of balance. *Am J Otolaryngol.* 1987;8:219-222. [ISI](#)
- Murphy TP. Mal de débarquement syndrome: a forgotten entity? *Otolaryngol Head Neck Surg.* 1993;109:10-13.
- Mair IWS. The mal de débarquement syndrome. *J Audiol Med.* 1996;5:21-25.
- Jacobson GP, Newman CW. The development of the Dizziness Handicap Inventory. *Arch Otolaryngol Head Neck Surg.* 1990;116:424-427.