



Motion Sickness: An Overview

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Abstract

Motion sickness is not a disease, it is a phenomenon. It causes much distress and inconvenience to the person being affected by it & major annoyance to the other fellow travelers. This is caused by a conflict in the kinetic input, often with an excessive vestibular stimulation. It is experienced by people while travelling by road, air or waterways. This phenomenon is usually characterized by dizziness, nausea and vomiting. A complex interrelation between lack of effective vestibular compensation, idiosyncratic perceptual style, migraine and anxiety is at play during the bouts. Photo-and phonophobia are key diagnostic symptoms that should be specifically looked into as they are easily missed by the clinician. The most important aspect of management after the correct diagnosis is a clear explanation of the condition to the individual. This is very essential to boost up the confidence of the harrowed traveler who is suffering. The pathophysiology involved in this is the role of vestibulo-ocular reflex (VOR) which is responsible for the ability to maintain fixation on a target during head movement. The VOR functions to stabilize images on the retina during head movements, simultaneously and at the same rate, in direction opposite to head movement. The vestibular system receives inputs on “three channels”: inner ear, vision and somatosensory (i.e. tactile & proprioception). The inputs go to the central processor for processing. At the central level, the inputs are compared and should corroborate each other. Disagreement results in motion sickness. A multifaceted approach is taken up in the management of motion sickness in form of certain drugs, appliances, exercises, precautions and psychotherapy or counselling. Thus, this is a humble attempt to present an overview of this phenomenon in a nutshell.

Keywords: *Motion sickness, Dizziness, Vestibular Ocular Reflex, Somatosensory, Psychotherapy.*

Introduction

Motion sickness is not a disease it's a physiological phenomenon. It causes much distress to the individual being affected by it & major annoyance to other fellow travelers. Experienced by people while traveling by road, waterways, air, while trying to enjoy rides at amusement parks, during watching movies / videos etc. During these times a feeling of queasy, clammy or sick to stomach may occur.

Definition: In simple words, when brain can't make sense of information sent from the eyes, ears & body. In Medical parlance, a complex interrelation between lack of effective vestibular compensation & idiosyncratic perceptual style. Migraine & Anxiety is at play during the bouts. This caused by a conflict in the kinetic input, often with an excessive vestibular stimulation.

Incidence & Prevalence: One third of the population i.e. 1 in 3 people are usually affected but it may affect anyone. Almost half of the people traveling by water / seas are susceptible. Usually women & children (2 to 12 years) are at most risk. Physical conditions, Introverts & Emotional state of the individual also plays a role.



Fig 1. Motion sickness in car

Factors increasing chances of Motion Sickness: Family history of motion sickness, Hormonal birth control, Inner ear disorders, Menstrual periods, Migraines, Parkinson's disease, Pregnancy.

Symptoms: Dizziness, Cold Sweats, Headache, Fatigue, Irritability, Nausea & Vomiting, Inability to concentrate, Increased saliva, Pale skin, Rapid breathing or gulping for air.

Pathophysiology: Brain receives signals from motion-sensing parts of the body i.e. the eyes, inner ears, muscles & joints. When these parts send conflicting information, the brain doesn't know whether one is stationary or moving. Brain senses a disconnect among these messages. Brain's confused reaction gives the sick feeling.

Role of Vestibular System: The VOR is responsible to maintain fixation on a target during head movement. The gain of VOR (eye velocity / head velocity) should be equal to 1. If this reduces, then the disability results.

The vestibular system receives inputs on “three channels”: inner ear, vision & somato-sensory (i.e. tactile & proprioception). The inputs go to the brainstem vestibular nuclei and to the cerebellum for processing. At the central level, the inputs are compared and should corroborate each other. Disagreement i.e. sensory conflict results in vertigo, disequilibrium & motion sickness.

Trigger Actions: Riding in a car, bus, train, plane or boat/ship, Reading while in motion. Amusement Park rides and virtual reality experiences. Video games & movies.



Fig 2. Motion sickness in sea

Theories/Classification; Neural Mismatch Theory (Reason & Brand; 1975). Type I: Vestibular mismatch, Type II (a): Visual- vestibular mismatch, Type II (b): Canal Otolithic or Intravestibular mismatch. Susceptibility of a person to M.S. depends on: Receptivity (High & Low) and Adaptability (Very fast does not develop M.S. & Slow-suffers M.S.) as their system is unable to cope up quickly.



Fig 3. Motion sickness in plane

Diagnosis / Prognosis: History taking is important, Complete physical examination, Detailed Eye & Ear examination and Thorough Otoneurologic examination.

Management:

Drugs, 1. Antihistaminic-Dimenhydrinate/Sedating anti- histaminic/Promethazine (Phenergan), HCl or theoclate/Antiemetics- Meclizine, Dramamine, Metoclopramide (to be taken 30-60 minutes before traveling). Scopolamine patch behind the ears.4 hours before traveling. After 3 days, the skin patch is to be removed & a new one applied. This can cause dry mouth & is approved only for adults. This is a very essential item for the seafarers. Chloroform / Tincture of belladonna is also documented by Lancet.

Sitting Positions: One should always face forwards while travelling. Place of sitting can make a difference to minimize disruptive motion. 1. Car-- Sit in front passenger seat. 2. Bus--Choose a window seat. 3. Train-- Choose a forward-facing window seat. 4. Boat-- Sit in middle of the boat or upper deck. 5.Cruise Ship-- Book a cabin towards the front or middle of the ship. If possible, choose one on a lower level, closer to the water. 6. Airplane--Sit in the wing section.

Complications of Motion Sickness: Dehydration- Due to excess vomiting, Hypotension- Low blood pressure, Extra Heart Beats, Hallucinations and Seizures.

Preventive Measures: 1. Herbs- Breathe in soothing mint, ginger/ lavender scents. Suck on hard candies made with peppermint or ginger. 2- Diet & Drink: Choose to eat low fat, bland, starchy foods before traveling. Avoid heavy meal & greasy, spicy or acidic foods which can upset the stomach. Drink plenty of water. Carbonated drink without caffeine is recommended. Avoid Alcohol & Smoking. 3. Fresh Air- Direct vents to blow towards the potential candidates to be affected. Windows of cars should be rolled down. 4. Distant Gaze-Mobile phones / Tabs. / Books should be put down. Instead, one should look at an object in the distance or at the horizon. 5. Lie Back- Recline, if possible & eyes to be closed. 6. Pressure Points: Acupressure wrist bands. 7. Need for Barf Bags. 8. The need to train the susceptible individual for certain adaptation (habituation) techniques & teach the person some behavior measures.

Glasses to cure Motion Sickness: Dubbed as “BOARDING RING”. Essentially, the glasses feature four rings full of blue liquid that move around the eyes to “recreate the horizon” and put the senses of the affected individual back in sync. There is no lenses in the frames, which means that it can be worn over the actual glasses or it can be shared with fellow travelers. It can be used by children > 10 years i.e. when the inner ear has finished growing.



Fig 4. Citroen Glasses for Curing Motion Sickness

Trivia items for Motion Sickness: Amazon is marketing / selling different items /brands these days-efficacy of these are yet to be determined scientifically: 1. Wrist bands / EmeTerm Relieve Nausea Electrode Stimulator. 2. Reliefband Sport Anti- Nausea Wristband. 3. BONINE (Meclizine) chewable Raspberry flavor M.S. relief tablets.

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