



AIR SICKNESS

By Flying Officer Gareth Iremonger - Aerospace Physiologist

Flying Officer Gareth Iremonger is an Aerospace Physiologist at the Royal New Zealand Air Force Aviation Medicine Unit. He trained under the United States Air Force School of Aerospace Medicine and now instructs on Aviation Medicine and manages Human Performance Research and Development activities for the unit.

Photo composite of Terry Delore by Geoff Soper



Air sickness or motion sickness is something that I am sure we have all experienced at some stage in our life. Most of us know the characteristic feeling of stomach discomfort, usually accompanied by symptoms such as belching, a feeling of bodily warmth, salivation, pallor, drowsiness, headache and apathy. With sustained exposure those symptoms can progress to nausea, sweating and eventually, but not always, vomiting. It can be highly debilitating to the physical, cognitive and emotional performance of a pilot or passenger and we must therefore be aware of the significant implications for flight safety and general performance.

So why do we get sick? Well, air sickness, a form of motion sickness is a common physiological response to unfamiliar real or apparent motion. For us humans, we evolved sensory systems to orientate ourselves on the ground and not up soaring. Orientation and movement through the environment is inferred by two principal sensory systems: the visual sense and the two components of the vestibular system of the inner ear. This system includes the semi-circular canals, which detect angular acceleration, and the otolith organs, which sense linear acceleration (other proprioceptive sensations have a minor contribution to motion sickness). It is generally considered that conflict between different sensory cues, as an explanation for motion sickness, has been in existence for more than a century. However, it is only in recent years that the definitive neural mismatch theory has become established and widely accepted. The fundamental basis of this theory is that air sickness is the result of contradictory sensory cues. A "central conflict" may occur between different sensory inputs to the central nervous system; this may be either visual-vestibular, visual-proprioceptive (seat of the pants), or between any other two or more sensory systems involved, irrespective of the possible origins of the sensation. In addition, a connection between anxiety and air sickness can combine to augment and some in cases, through conditioning, initiate sickness even in absence of motion or flight³. Some people can also start to feel sick by association of certain smells, such as fumes or even just the smell of the inside of an aircraft.

Thermaling, high G and the multi-axial accelerations of soaring creates a highly provocative environment for air sickness to develop. It is common for pilots to experience some form of air sickness during initial training. But it is not uncommon for air sickness to continue to be a problem in some qualified and experienced pilots¹²⁴.

So, what can you do to combat air sickness? It is considered that the most important factor to build adaption to the environment is frequency of exposure. You might have noticed not feeling the best after a few months off. Gradual introduction to the environment is very important. As acclimation increases, the number of manoeuvres causing the sickness can also increase. A gradual introduction will increase confidence in your ability to control the progression of symptoms while providing positive closure on a flight. Proper pre-flight preparation will also help decrease anxiety associated with learning new manoeuvres. Keep a positive mental attitude and make up your mind that air sickness will not shake your determination to fly.

As always it is essential that you maintain a good diet and hydration level. Individuals operating in the flight environment require a long-term energy source for optimum performance. Complex carbohydrates provide the energy source the body needs over an extended period of time. Do not over-indulge; eat enough to satisfy hunger and hydrate the body. The initial focus should be on foods that are spongy and porous, such as breads or muffins, which absorb gastric juices and promote digestion. Avoid greasy, fatty, and acidic

foods/beverages (i.e. oranges, tomatoes, or grapefruit), caffeinated and carbonated drinks along with dairy products, (coffee, tea, chocolate milk or sodas). Eat meals and consume a water/sports drink combination (50/50 water/drink mix). Get enough rest – 7-9 hours of peaceful sleep is recommended. Adequate rest improves tolerance to G, heat, and psychological stress.

What about in-flight management? If air sickness symptoms begin to appear, you can adopt several measures. Perform deep but slow diaphragmatic breathing. Maintain visual focus on a static point on the horizon. Direct air vents towards your neck or wrists. Ask for control of the glider if you are a passenger. Otherwise, after asking the pilots permission, keep your fingertips on the stick when the pilot has control. Be careful of rapid head movements. With turns, first move the eyes to a reference point, and then follow with your head. Maintain situational awareness and don't be caught surprised by rapid turns.

What about medications? Treatment of air sickness with medication should be avoided unless under prescription from a qualified Aviation Medicine Doctor. Anti air sickness medications can be highly sedating and can reduce your performance. Alternative medicine remedies are becoming increasingly popular and many have been recommended for treatment of motion sickness. The most popular herbal preparation for nausea is ginger root given in candied form, powdered in capsules, or as a tea. Although there is much anecdotal evidence that ginger is beneficial, controlled trials have found no anti-motion sickness activity. There is a plethora of over the counter homeopathic preparations (Cocculus, Nux Vomica, Petroleum, Tabacum, Kreosotum, Borax and Rhus Tox). These preparations have not been found to be consistently effective and the scientific evidence is confusing at best. There are also various forms of acupuncture therapy available as alternative treatments for air sickness. Commercial acupressure therapy devices have not been found to be effective at reducing motion sickness.

At the end of the day the most important lesson is to remember that air sickness is not a reflection of your skills as a pilot and is a normal physiological response. If you do get air sickness, tell your instructor. They may be able to help you through it. For others, make sure you support them and look after one another out there.

Till next time, safe soaring.

For more information on the Aviation Medicine Unit, hypoxia awareness training or general inquiries please contact the Aviation Medicine Unit on (09) 417 8932 or email AKAMUTRAINING@nzdf.mil.nz

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- 2 Cheung B, Hofer K (2002-2003). Lack of gender differences in motion sickness induced by vestibular Coriolis cross-coupling. J Vestibular Research;12:191-200.
- 3 Fox S, Arnon I, (1988). Motion sickness and Anxiety. Aviation Space and Environmental Medicine 62:776-8, 59:728-33.
- 4 Gillingham KK, Previc FH. Spatial orientation in flight. In: DeHart RL. Fundamentals of Aerospace Medicine. 2nd ed. Maryland, Williams & Wilkins, 1996.