

Jet Lag Hurts Both Mental and Physical Performance

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STORY AT-A-GLANCE

- › Jet lag occurs when travel across time zones disrupts your internal body clock, resulting in mental, emotional and physical symptoms such as lethargy, irritability, poor concentration, headache and general malaise
- › Research suggests jet lag can have a significant effect on your physical and athletic performance as well – a finding of particular importance for athletes who travel
- › You can re-synchronize your body clock to your destination by giving yourself a couple of extra days on site, or by altering your wake-sleep schedule at home.

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Jet lag, also known as flight fatigue, time zone change syndrome or desynchronosis, occurs when travel across time zones disrupts your internal body clock, resulting in mental, emotional and physical symptoms such as:^{1,2}

- Daytime sleepiness and lethargy followed by nighttime insomnia
- Anxiety, irritability, confusion and poor concentration
- Constipation or diarrhea
- Headache, nausea, indigestion, dehydration and/or general malaise

The mental effects are fairly well-established, but research suggests jet lag can have a significant effect on your physical performance as well – a finding of particular importance for athletes who travel to participate in games and races.

Jet Lag Takes Toll on Physical Performance

Looking at Major League Baseball data culled from more than 40,000 games over two decades, including the players' travel schedules, researchers found "subtle but detectable" effects when players traveled across one or two time zones for a game.^{3,4} As reported by Time Magazine:⁵

"For example, teams from eastern states who had just returned home from a game out west tended to have fewer stolen bases, doubles and triples, and were subject to more double plays, than those who hadn't traveled as recently ...

The effects are enough to erase a team's home-field advantage ... The effects of west-to-east travel were stronger than those of east-to-west travel, supporting the argument that they are due to the body's circadian clock – not just time on an airplane or scheduling issues in general ..."

According to Dr. Ravi Allada, associate director of the Center for Sleep and Circadian Biology at Northwestern, the reason for this decline in physical performance is likely due to the fact that your muscle cells are tied in to your circadian clock.

Hence, "it makes sense that one might see an impairment in muscle activity or muscle efficiency, as a result of this misalignment," he says.

Helpful Tips to Minimize Jet Lag

As a general rule, your body will adjust to the time zone change at a rate of one time zone per day. To prevent athletic deterioration due to jet lag, Allada suggests baseball teams may want to make sure their starting pitchers are on location a day or two earlier when cross-country travel is required.

This would allow their internal body clocks to adjust to the local time zone, allowing them to perform at their best. Other athletes would be wise to follow the same advice – especially if you're traveling eastward, which tends to desynchronize your internal clock more severely than westward travel.

If you cannot squeeze in an extra day or two, you could fake it by pretending you're in your destination time zone while still at home.⁶

This suggestion may be particularly helpful if you're traveling with young ones. It's hard to rest and recuperate when you have one or more bright-eyed and bushy-tailed children rearing to go at 4 a.m. once you reach your destination.⁷

To do this, simply wake up and go to bed according to the destination time rather than your local time. In the morning, be sure to expose yourself to bright full-spectrum light. If the sun is not yet up, use a clear incandescent light bulb along with a cool-blue spectrum LED to shut down melatonin production.

As an example, if you were to travel from New York to Paris, start going to bed an hour earlier each day, three days ahead of your flight, and avoid bright light for two to three hours before going to bed.

This may necessitate closing the blinds or shades, and turning off all lights and electronic screens. Avoid stimulants such as caffeine and nicotine. When you wake, be sure to get some bright sunlight exposure.

If it's still dark out, use a light box or the artificial light combination mentioned above. Also be sure to shift your mealtimes accordingly.

Wear your blue-blocking glasses on the plane if you are traveling at night and continue wearing them until you get to bed. The excess blue light without the balanced red and near-infrared will seriously impair your melatonin production.

Once you get to your destination, it is best to get up close to sunrise and go outside and look in the direction of the sun. You can safely do this for about an hour after sunrise. This will help to reset your melatonin production. If weather and circumstances allow, it would be best to do this outdoors with your bare feet on the ground.

Effects of Chronic Jet Lag Can Be Severe

Other research has investigated the health effects of jet lag by focusing on airline professionals like pilots and flight attendants, who end up struggling with jet lag on a chronic, long-term basis.⁸ Here, population-based studies have found flight crews have higher rates of cancer than the general population, including melanoma and cancer of the breast and prostate.

While cosmic radiation exposure is thought to be a factor that increases this risk, circadian rhythm disturbance also plays a significant role. Animal research has confirmed that chronically jet lagged mice indeed have higher rates of breast cancer than non-jet lagged controls.

Chronic jet lag also appears to speed up cognitive decline – an effect associated with elevated cortisol levels.

In one study, long-distance flight crews were found to have higher cortisol levels than ground crews, and flight crew members who had worked there the longest scored lower on memory tests compared to those with fewer years on the job.

Inconsistent Sleeping Habits May Have Similar Effects

It's worth noting that you don't necessarily have to go anywhere to experience the effects of jet lag. A very similar scenario is created if you stay up really late and sleep in on the weekend and then have to get up early on Monday morning.

If you have something important going on that day, say an athletic competition, written test or a presentation, your performance may suffer. Ditto for those who work night shifts on a rotating basis. If you have no other choice, then the following suggestions can help minimize the health risks:

- When you get up at night, get some blue light exposure, as this will help wake you up. I suggest using a conventional clear incandescent bulb in combination with a bright cool white (blue-enriched) LED bulb.

You need both, not one or the other, as the LED will give you the blue and the incandescent the balancing red and near infrared spectrum.

Ideally, start with incandescent light immediately after getting up, thereby simulating sunrise. After half an hour or so, add the LED light, mimicking the sun's ascent toward high noon. Using the LED light for 15 to 30 minutes will help you to establish your new circadian rhythm.

Once you feel the photonic energy boost, you can stop the LED use, since too much will do more harm than good. (Bluish LED light generates excessive amounts of free radicals if not adequately balanced by red and near infrared light.)

- After this, avoid further exposure to blue light. This means using only incandescent bulbs at home and at work. Alternatively, wear blue-blocking glasses to avoid any additional exposure to LED or fluorescent bulbs.

These strategies are better than nothing, but please be aware that by working nights, you are depriving yourself of natural sunlight, which is a really crucial component for health. The sun's rays not only are the catalyst that allows your skin to produce vitamin D, but sunlight also plays a role in mitochondrial health, biological energy production, and is really important for healthy vision.

What About Using Melatonin?

Your master biological clock resides in the suprachiasmatic nucleus of your brain (SCN), which is part of your hypothalamus. Based on signals of light and darkness, your SCN tells your pineal gland when it's time to secrete melatonin and when to turn it off. Melatonin is often recommended when traveling across time zones to help reset your internal clock.

According to a government survey, 3.1 million Americans report using melatonin supplements for jet lag and insomnia. However, it's important to realize what you're really doing here. More than being a simple "sleep hormone," melatonin is a biological

marker for darkness. Routinely exposing yourself to bright lights and simply taking melatonin is inadvisable. As reported by The Guardian:⁹

"Researchers at MIT, in Cambridge, Massachusetts, who originally patented synthetic melatonin as a sleeping aid in 1995, reported the ideal dose to be between 0.3 mg and 1 mg, and argued that prolonged use of larger doses could change how the body responds to the hormone, potentially undermining sleep."

That said, if you're traveling or rotating on and off the night shift, it can definitely be useful for helping you realign your internal clock.¹⁰ According to a 2002 Cochrane Database review,¹¹ people who traveled across five or more time zones who took melatonin close to bedtime at their destination experienced less severe jet lag symptoms compared to placebo.

The greatest benefits were reported by those traveling eastward, those crossing the greatest number of time zones, and those taking doses closer to 5 mg (which is FAR more than typically recommended). Epileptics and those taking warfarin (a blood thinner) need to beware they're at increased risk for harmful side effects when taking a melatonin supplement.

Optimal Health Depends on Optimal Sleep

Remember, when your circadian rhythm is disrupted, your body produces less melatonin, which means it has less ability to fight cancer, and less protection against free radicals that may accelerate aging and disease. Suffering from jet lag due to occasional travel is not going to have any significant long-term effects, but can certainly deteriorate your mental and physical functioning over the following day or two.

If you're expected to perform at your best – either mentally or physically – it would be wise to take steps to re-synchronize your body clock to the local time at your destination, either by giving yourself a couple of extra days to reacclimatize, or by altering your wake-sleep schedule while still at home.

If you're chronically jet lagged, either from shift work or frequent travel across time zones, you can minimize the health risks by working with artificially created light and dark exposure – bright light when you're supposed to be awake, and darkness when you're supposed to be asleep.

Sources and References

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