

# JET LAG, SHIFT WORK AND CIRCADIAN RHYTHM DISORDERS

Commonly known as the 'body clock', the circadian rhythm is an innate cyclical rhythm that regulates many bodily functions automatically throughout the day and does not require conscious control.

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Keep to a regular sleep schedule to help avoid sleep difficulties.



There are those that are apparent to us, such as the sleep-wake cycle and the digestive cycle, for which we feel sleepy or hungry when we reach a certain time of the day. There are also those that are not so obvious, such as core body temperature and the release of hormones into the bloodstream.

In human beings, this innate rhythm cycles between the duration of 24.2 to 24.9 hours, just slightly longer than a day. This could potentially create a messy situation where we could fall asleep or need to eat at very inconvenient timings, over a period of time.

Fortunately, this 'clock' is synchronised to the 24-hour day by environmental inputs, most importantly by sunlight, as well as by social rhythm, such as common meal times, work schedules and physical exercises.

**Genetics** largely influence the variations between individuals, hence there are people whom we recognise as 'larks' (preferring to sleep early in the night) and 'night owls' (ability to stay up late into the night).

Genetics also determines the ability of individuals to adapt to time cues in the daily cycle, and hence the ability to 'tune their clocks'.

**With age**, this innate rhythm can also change in its cycle length, commonly reflected through changes in sleep pattern as one grows older.

## PROBLEMS WITH CIRCADIAN RHYTHM

It is important that you keep to a regular sleep schedule, as this maintains synchrony of the 'body clock' with the demands of social activities and duties. Any situation that desynchronises the circadian rhythm and the social rhythm will result in sleep difficulties, as well as problems in maintaining alertness.

The most common causes of disruption to circadian rhythm are jet lag, shift work and circadian rhythm disorders.

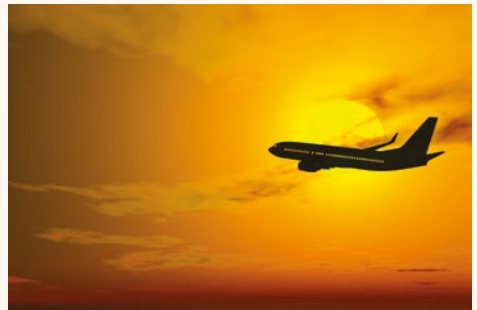
## 1. Jet Lag

This is a transient condition in which the circadian rhythm is temporarily out of synchronisation with the external environment when a person travels across several time zones rapidly.

### Symptoms

The symptoms are usually daytime fatigue and sleepiness, insomnia, stomach upsets, moodiness and feeling of unsteadiness. Some may also experience chills, and others have episodes of feeling hot and sweaty.

As our body clock runs slightly longer than 24 hours, **jet lag is worse when we travel eastwards than when we travel westwards**. It is easier to lengthen the day (delaying going to bed) than to shorten it (trying to fall asleep earlier). After travelling from east to west, early waking is the main problem, as opposed to difficulty falling asleep when travelling from west to east.



Flying westwards can cause less jet lag.

Our circadian rhythm will eventually synchronise with the local time at the destination, at a rate of roughly one day per hour of time difference.

### **Tips for managing jet lag:**

1. If you are able to, choose a destination that involves flying westwards.
2. Choose daytime flights to avoid losing sleep.
3. Use sleeping aids such as blindfolds, ear plugs, and neck rests to help you sleep during the flight.
4. Adjust to local time by keeping to local routines at your destination, such as taking meals and staying awake when the locals do.
5. Try to keep awake during daytime. Staying in a brightly lit environment will facilitate the adjustment of the body clock.
6. If necessary, naps should be short, and planned so as not to affect night time sleep.
7. Melatonin supplement may be helpful for jet lag symptoms and improving sleep when taken near bedtime.
8. Exercise during the day.
9. Caffeine may help in maintaining alertness.
10. Plan ahead for your journey and make allowances for adjustments where possible.

## **2. Shift Work**

Shift workers are people who work non-traditional hours, which may be exclusively at night, or on rotating shifts. They often face problems similar to jet lag, even without crossing time zones. The differences between their 'day' during which they are working, and the natural day-night cycle have resulted in a desynchronised circadian rhythm. While some may have no problems adapting to this demand, many suffer from sleep problems.

They may experience insomnia, and may not get enough sleep during the day as the brain remains active, culminating in sleep deprivation. This eventually leads to wake time sleepiness and impaired work performance. They may have sleep problems even on their days off.

The main objective of managing shift work sleep problems is to try to resynchronise the circadian rhythm to the work schedule as



Adjust your body clock to manage shift work sleep problems.

quickly as possible. In addition, we try to improve on the quality and duration of sleep at bedtime to reduce effects of sleep deprivation.

This is typically easier to achieve for people who work regular shifts, and treatment is similar to that for jet lag, which is to adjust the body clock to a new 'daytime'.

### **What if I work rotating shifts?**

**The day before night shift:** Get up at your usual time and have meals as usual. Take a two to three hour nap in the late afternoon or early

evening to reduce your sleep debt before the start of your duties.

**During the shift:** Take a power nap for 30 minutes if possible to reduce the sleep debt. Avoid too long a nap as you may have more difficulty getting into an alert state.

**Day after the night shift:** If you have to work another night shift, get six to eight hours of sleep when you get home. If you cannot get a long enough sleep, nap in the late afternoon or early evening as described earlier. If you do not have to work nights again, catch a short two to three hour nap after you get home and stay awake till your normal bedtime.

### **Tips to cope with rotating night shifts:**

1. Maintain a regular sleep routine on normal work days and on rest days.
2. Plan naps to reduce sleep debt during night shift periods, and catch up on sleep on rest days.
3. Eat properly and maintain sufficient exercises to provide cues for maintenance of circadian synchronisation.

### Tips to sleep better during the day:

1. Maintain general sleep hygiene principles. Avoid strenuous exercises, caffeine and nicotine four hours before bedtime.
2. On your way home from night shift, use dark sunglasses to reduce the effects from the bright morning sunlight which may influence the circadian rhythm.
3. Keep a conducive sleep environment: Use dark curtains and ear plugs, if necessary.
4. Learn some relaxation skills and avoid trying too hard to get to sleep.
5. Avoid the temptation to defer sleep to attend to personal administrative or social tasks – plan to do these after your rest period.
6. If necessary, see your General Practitioner (GP) for short-term prescription of sleeping aids. Use these medications on an as needed basis only.

Scheduling enough time to sleep is important and should be actively prioritised and planned for. Good sleep is essential to well-being, and allows one to function efficiently and safely.

### 3. Circadian Rhythm Disorders

These include the delayed sleep phase syndrome ('night owl') or the advanced sleep phase syndrome ('morning lark').

Delayed sleep phase syndrome is more commonly seen in teenagers and may be related to a combination of physiologic and environmental factors.

Developmental changes in the brain's circadian centres during adolescence – poor sleep hygiene associated with increasing amounts of school work, and the widespread use of computer devices and smartphones late into the night (which activate special receptors in the eye), combine to delay the body's intrinsic sleep cycle. This results in the affected patients being only able to fall asleep in the early morning hours and waking up in the late morning or early afternoon, regardless of whether they are trying to fall asleep or not.

This can cause significant disruptions to their schooling or work performance.

Advanced sleep phase syndrome is more commonly seen in the middle-aged and elderly. This may be due to the natural shortening of our internal sleep cycle with increasing age but it may also be contributed by poor sleep hygiene and changing sleep habits that elderly people commonly experience.

Sufferers go to sleep very early in the evening and wake up in the wee hours of the morning and are unable to go back to sleep again.

Apart from the inconvenience and the inability to partake in evening social events, insomnia in the early mornings, poor quality sleep, daytime fatigue and sleepiness as well as depression are common associated complaints.

## TREATMENT OF ADVANCED OR DELAYED SLEEP PHASE SYNDROME

Consultation with a sleep specialist is essential for accurate diagnosis and to exclude other common sleep conditions. An individualised treatment plan can then be tailored accordingly and this may include the following:

1. Optimise sleep hygiene and maintain regular sleep-wake cycles, even on weekends
2. Timed bright light exposure with a special phototherapy device at specific and individualised timings
3. Timed melatonin administration

For enquiries, contact SingHealth Duke-NUS Sleep Centre at:

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