

# Shift work sleep disorder

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## Shift work sleep disorder

(SWSD) is a circadian rhythm sleep disorder characterized by insomnia and excessive sleepiness affecting people whose work hours are scheduled during the typical sleep period. There are numerous shift work schedules, and they may be permanent, intermittent, or rotating; consequently, the manifestations of SWSD are quite variable.

## Shift work sleep disorder

*Classification and external resources*

**ICD-10** G47.2

(<http://apps.who.int/classifications/apps/icd/icd10online/?gg40.htm#g472>)

**ICD-9** 307.45 (<http://www.icd9data.com/getICD9Code.ashx?icd9=307.45>)

## Contents

- 1 Diagnosis
- 2 Causes and co-morbidities
- 3 Treatment
  - 3.1 Prescribed sleep/wake scheduling
  - 3.2 Bright light treatment
  - 3.3 Melatonin treatment
  - 3.4 Medications that promote alertness
  - 3.5 Medications that promote daytime sleep
- 4 See also
- 5 References
- 6 External links

## Diagnosis

The primary symptoms of SWSD are insomnia and excessive sleepiness associated with working (and sleeping) at non-standard times. Total daily sleep time is usually shortened by several hours despite attempts to optimize the sleep environment. Sleepiness is manifest as a desire to nap, unintended dozing, impaired mental acuity, irritability, reduced performance, and accident proneness. Shift work is often combined with extended hours of duty, so fatigue can be a compounding factor. The symptoms coincide with the duration of shift work and usually remit with the adoption of a conventional sleep-wake schedule. The boundary between a "normal response" to the rigors of shift work and a diagnosable disorder is not sharp.

## Causes and co-morbidities

Insomnia and wake time sleepiness are related to misalignment between the timing of the non-standard wake/sleep schedule and the circadian (endogenous) propensity for sleep and wake. In addition to circadian misalignment, attempted sleep at unusual times can be interrupted by noise, social obligations, and other factors. Finally, there is an inevitable degree of sleep deprivation associated with sudden transitions in sleep schedule. For example, a night worker who stays awake for 24 hours on the first night of a tour of duty is acutely sleep deprived by morning.

There have been many studies suggesting health risks associated with shift work. For example, a 2007 study led by the IARC (International Agency for Research on Cancer) showed that shiftwork has been associated with cancer.<sup>[1]</sup> Other studies have reported that night workers have an increased incidence of heart disease, digestive disorders and menstrual irregularities.<sup>[2]</sup> Because a formal diagnosis of SWSD was not typically made in these studies, it remains unclear whether the reported risks apply to the subset of shiftworkers who qualify for a diagnosis of SWSD or apply to all shiftworkers.

## Treatment

### Prescribed sleep/wake scheduling

Experts agree that there is no such thing as an "ideal" night work schedule, but some schedules may be better than others. For example, rotating shifts every two weeks in a forward (delaying) direction was found to be easier than rotation in a backward (advancing) direction.<sup>[3]</sup> Gradual delays ("nudging" the circadian system about an hour per day) has been shown in a laboratory setting to maintain synchrony between sleep and the endogenous circadian rhythms,<sup>[4]</sup> but this schedule is impractical for most real world settings. Some experts have advocated short runs (1 to 2 days) of night work with time for recovery; however, in the traditional heavy industries, longer (5 to 7 day) runs remain the rule. In the end, scheduling decisions usually involve maximizing leisure time, fairness in labor relations, etc. rather than chronobiological considerations.

Many night workers take naps during their breaks, and in some industries, planned napping at work (with facilities provided) is beginning to be accepted. A nap (if possible) before starting a night shift is a logical prophylactic measure. However, naps that are too long (over 20-30 minutes) may generate sleep inertia, a groggy feeling after awakening that can impair performance. Therefore brief naps (10 to 30 minutes) are preferred to longer naps (over 30 minutes). Also, long naps may also interfere with the main sleep bout.

In the transportation industry, safety is a major concern, and mandated hours of service rules attempt to enforce rest times.

### Bright light treatment

The light-dark cycle is the most important environmental time cue for entraining circadian rhythms of most species, including humans, and bright artificial light exposure has been developed as a method to improve circadian adaptation in night workers. The timing of bright light exposure is critical for its phase shifting effects. To maximize a delay of the body clock, bright light exposure should occur in the evening or first part of the night, and bright light should be avoided in the morning. Wearing dark welder's goggles (avoiding bright light) during the morning commute home from work can improve circadian adaptation,<sup>[5]</sup> although this cannot be recommended to someone who is driving. For workers who want to use bright light therapy, appropriate fixtures of the type used to treat winter depression are readily available<sup>[6]</sup> but patients need to be educated regarding their appropriate use, especially the issue of timing. Bright light treatment is not recommended for patients with light sensitivity or ocular disease.

### Melatonin treatment

Melatonin is a hormone secreted by the pineal gland for about 12 hours at night. Taking melatonin resets the body clock in the opposite direction from light exposure; that is, taking melatonin in the evening causes the clock to reset to an earlier time, while taking melatonin in the morning causes the clock to reset to a later time. Melatonin has been shown to accelerate the adaptation of the circadian system to a night work schedule.<sup>[7]</sup> Melatonin may benefit daytime sleep in night workers by an additional direct sleep promoting mechanism. In the US and

Canada, melatonin is not classified as a drug; it is sold as a nutritional supplement. Although it is not licensed by the FDA as a treatment for any disorder, there have been no serious side effects or complications reported to date.

## Medications that promote alertness

Caffeine is the most widely used alerting drug in the world and has been shown to improve alertness in simulated night work.<sup>[8]</sup> Modafinil and armodafinil are non-amphetamine alerting drugs originally developed for the treatment narcolepsy that have been approved by the FDA (the US Food and Drug Administration) for excessive sleepiness associated with SWSD.<sup>[9]</sup>

## Medications that promote daytime sleep

Obtaining enough sleep during the day is a major problem for many night workers. Hypnotics given in the morning can lengthen daytime sleep; however, some studies have shown that nighttime sleepiness may be unaffected.<sup>[10]</sup>

## See also

- Shift work
- Human factors
- Human reliability

## References

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## External links

- Shift Work Sleep Disorder (uni-marburg.de) (<http://web.uni-marburg.de/sleep/enn/database/asdadefs/def1c2.htm>)
- (IARC/usnews) (<http://health.usnews.com/usnews/health/healthday/071205/night-shift-work-may-heighten-risk-for-cancer.htm>)

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