American Academy of Sleep Medicine

Circadian Rhythm Sleep Disorders

Circadian rhythm sleep disorders all involve a problem in the timing of when a person sleeps and is awake. The human body has a master circadian clock in a control center of the brain known as the *suprachiasmatic nucleus* (SCN). This internal clock regulates the timing of such body rhythms as temperature and hormone levels. The primary circadian rhythm that this body clock controls is the sleep-wake cycle. The circadian clock functions in a cycle that lasts a little longer than 24 hours.

The circadian clock is "set" primarily by visual cues of light and darkness that are communicated along a pathway from the eyes to the SCN. This keeps the clock synchronized to the 24-hour day. Other time cues, know as *zeitgebers*, also can influence the clock's timing. These cues include meal and exercise schedules. Circadian rhythms and their sensitivity to time cues may change as a person ages.

Each circadian rhythm sleep disorder involves one of these two problems:

- You have a hard time initiating sleep.
- You struggle to maintain sleep, waking up frequently during the night.
- You tend to wake up too early and are unable to go back to sleep.
- You sleep is nonrestorative or of poor quality.

Types of Circadian Rhythm Sleep Disorders

- **Delayed sleep phase disorder (DSP):**
  DSP occurs when a person regularly goes to sleep and wakes up more than two hours later than is considered normal. People with DSP tend to be "evening types" who typically stay awake until 1 a.m. or later and wake-up in the late morning or afternoon. If able to go to bed at the preferred late time on a regular basis, a person with DSP will have a very stable sleep pattern. DPS is more common among adolescents and young adults with a reported prevalence of 7-16%. It is estimated that DPS is seen in approximately 10% of patients with chronic insomnia in sleep clinics. A positive family history may be present in approximately 40% of individuals with DPS.

- **Advanced sleep phase disorder (ASP):**
  ASP occurs when a person regularly goes to sleep and wakes up several hours earlier than most people. People with ASP tend to be “morning types” who typically wake up between 2 a.m. and 5 a.m. and go to sleep between 6 p.m. and 9 p.m. If able to go to bed at the preferred early time on a regular basis, a person with ASP will have a very stable sleep pattern. ASP affects approximately 1% in middle-aged and older adults and increases with age.

- **Jet lag disorder:**
  Jet lag occurs when long travel by airplane quickly puts a person in another time zone. In this new location the person must sleep and wake at times that are misaligned with his or her body clock. The severity of the problem increases with the number of time zones that are crossed. The body tends to have more trouble adjusting to eastward travel than to westward travel. Jet lag affects all age groups. However, in the elderly, symptoms may be more pronounced and the rate of recovery may be more prolonged than in younger adults. Sleep deprivation, prolonged uncomfortable sitting positions, air quality and pressure, stress and excessive caffeine and alcohol use may increase the severity of insomnia and impaired alertness and function associated with transmeridian travel. Jet lag is a temporary condition with symptoms that begin approximately one to two days after air travel across at least two time zones. Exposure to light at inappropriate times may prolong the time of adjustment by shifting the circadian rhythms in the opposite direction.

- **Shift work disorder:**
  Shift work disorder occurs when a person’s work hours are scheduled during the normal sleep period. Sleepiness during the work shift is common, and trying to sleep during the time of day when most others are awake can be a struggle. Shift-work schedules include night shifts, early-morning shifts and rotating shifts. Depending on the type of shift, diurnal or circadian preferences may influence the ability to adjust to shift work. For example, individuals described as morning types appear to obtain shorter daytime sleep after a night shift. Persons with comorbid medical, psychiatric and other sleep disorders such as sleep apnea and individuals with a strong need for stable hours of sleep may be at particular risk.

- **Irregular sleep-wake rhythm:**
  This disorder occurs when a person has a sleep-wake cycle that is undefined. The person’s sleep is fragmented into a series of naps that occur throughout a 24-hour period. Sufferers complain of chronic insomnia, excessive sleepiness or both. A low-amplitude or irregular circadian rhythm of sleep-wake pattern may be seen in association with neurological disorders such as dementia and in children with mental retardation.

- **Free-running (nonentrained) type:**
  This disorder occurs when a person has a variable sleep-wake cycle that shifts later every day. It results most often when the brain receives no lighting cues from the surrounding environment. Occasionally, the disorder is associated with mental retardation or dementia. It has also been suggested that there may be an overlap between circadian rhythm sleep disorder, delayed sleep phase type, and circadian rhythm sleep disorder, free-running type.

Prevalence

- The prevalence of circadian rhythm sleep disorders in the general population is unknown.

Risk Groups

- ***DSP*** is more common in ***teens and young adults***, occurring at a rate of 16 percent
- ***ASP*** is more common ***as people age***, occurring in about one percent of middle-aged and older adults.
- ***Irregular sleep-wake rhythm*** may occur in ***nursing home residents*** and other people who have little exposure to time cues such as light, activity and social schedules.
- ***Free-running (nonentrained) type*** occurs in more than half of all people who are totally ***blind***.
- ***Jet lag*** can affect anyone who travels by air, but symptoms may be more severe and may last longer in ***older people*** and when anyone travels in an ***eastward direction***.
- ***Shift work disorder*** is most common in people who work ***night shifts*** and ***early-morning shifts***

Effects

These are some of the effects that can occur because of a circadian rhythm sleep disorder:

- Sleep loss
- Excessive sleepiness
  Insomnia
- Depression
  Impaired work performance
- Disrupted social schedules
- Stressed relationships

Treatments

- **Lifestyle changes:**
  People may cope better with certain circadian rhythm sleep disorders by doing such things as adjusting their exposure to daylight, making changes in the timing of their daily routines, and strategically scheduling naps

- **Sleep hygiene:**
  These instructions help patients develop healthy sleep habits and teach them to avoid making the problem worse by attempting to self-medicate with drugs or alcohol.

- **Bright light therapy:**
  This therapy synchronizes the body clock by exposing the eyes to safe levels of intense, bright light for brief durations at strategic times of day.

- **Medications:**
  A hypnotic may be prescribed to promote sleep or a stimulant may be used to promote wakefulness

- **Melatonin:**
  This hormone is produced by the brain at night and seems to play a role in maintaining the sleep-wake cycle. Taking melatonin at precise times and doses may alleviate the symptoms of some circadian rhythm sleep disorders.

2510 North Frontage Road
Darien, IL 60561
(630) 737-9700
www.aasmnet.org