

Circadian Rhythm Disorders

What are circadian rhythm disorders?

Circadian rhythm disorders are disruptions in the circadian rhythm—a name given to the “internal body clock” that regulates the (approximately) 24-hour cycle of biological processes in animals and plants. The term “circadian” comes from Latin meaning “around the day.”

The key feature of circadian rhythm disorders is a continuous or occasional disruption of sleep patterns. The disruption results from either a malfunction in the “internal body clock” or a mismatch between the “internal body clock” and the external environment regarding the timing and duration of sleep. As a result of the circadian mismatch, individuals with these disorders usually complain of insomnia at certain times and excessive sleepiness at other times of the day, resulting in work, school, or social impairment.

The following is a brief description of the more common circadian rhythm disorders.

- **Delayed Sleep Phase Disorder** is a circadian rhythm disorder most common in adolescents and young adults whose “night owl” tendencies delay sleep onset – often until 2 a.m. or later. If allowed to sleep in late (often as late as 3 p.m.), sleep deprivation does not occur. However, earlier wake up times can lead to daytime sleepiness and impaired work and school performance. These individuals are often perceived as lazy, unmotivated, or poor performers who are chronically tardy for morning obligations. People with delayed sleep phase syndrome are often most alert, productive, and creative late at night.
- **Advanced Sleep Phase Disorder** is usually seen in the elderly. This disorder is identified by regular early evening bedtimes (6 p.m. – 9 p.m.) and early morning awakenings (2 a.m. – 5 a.m.). People with advanced sleep phase syndrome are “morning larks” and typically complain of early morning awakening or insomnia as well as sleepiness in the late afternoon or early evening.

- **Jet Lag** results from a conflict between the pattern of sleep and wakefulness between the internal biological clock and that of a new time zone. Individuals find it hard to adjust and function optimally in the new time zone. Eastward travel is more difficult than westward travel because it is easier to delay sleep than to advance sleep.
- **Shift Work Sleep Disorder** affects people who frequently rotate shifts or work at night. Work schedules conflicts with the body’s natural circadian rhythm and some individuals have difficulty adjusting to the change. Shift work disorder is identified by a constant or recurrent pattern of sleep interruption related to the work schedule that results in insomnia or excessive sleepiness.

The diagnosis of circadian rhythm disorders is challenging and often requires a consultation with a sleep specialist. Keeping a detailed sleep history and a sleep diary for one to two weeks is essential. It is also important to exclude other sleep and medical disorders, including narcolepsy, which often mimics delayed sleep phase disorder. Sleep diaries are often complemented by actigraphy, a method of estimating sleep and wake using a wrist motion monitor for a period of days to weeks. Overnight and daytime sleep testing may be required. Sleep studies must be tailored to address the sleep pattern of the individual. This may require that testing be performed at unconventional times, for example, an ‘overnight’ sleep study might be performed during the day in a shift worker.

Treatment Options

Treatment options for circadian rhythm disorders vary based on the type of disorder and the degree to which it affects the individual’s quality of life. Individualizing the treatment of patients with circadian rhythm disorders improves the chance of success. Treatment options include:

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Behavior Therapy such as maintaining regular sleep-wake times, avoiding naps, engaging in a regular routine of exercise, and avoiding caffeine, nicotine, and stimulating activities within several hours of bedtime is important in the treatment of circadian rhythm disorders. People with delayed sleep phase syndrome should minimize exposure to light in the evening and during the night by reducing indoor illumination and avoiding bright TV and computer screens. Those with advanced sleep phase syndrome should increase light exposure in the evenings by keeping lights on in the home or spending time outdoors.

Bright Light Therapy is used to advance or delay sleep. The timing of this treatment is critical and requires guidance from a sleep specialist. Bright light therapy works by resetting the circadian clock. A high intensity light (10,000 lux) is required and the duration and timing of exposure varies from thirty to sixty minutes.

Medications such as melatonin, wake-promoting agents, and short-term sleep aids may be used to adjust and maintain the sleep-wake cycle to the desired schedule.

Chronotherapy is a progressive advancement or delay (1-2 hours per day) of sleep time depending on the type and the severity of the disorder. This type of therapy requires a firm commitment on the part of the patient and caregiver as it can take weeks to successfully shift the sleep-wake cycle. Once the desired schedule is achieved, a regular sleep-wake schedule is maintained.

RESOURCES

The Cleveland Clinic Guide to Sleep Disorders by Nancy Foldvary-Schaefer, DO

