

# CIRCADIAN RHYTHM SLEEP-WAKE DISORDERS

*Circadian Rhythm Sleep-Wake Disorders (CRSDs) involve a problem in the timing of sleep. Sleep is disrupted due to a misalignment between the body's internal rhythm and the individual's desired sleep-wake cycle. People with CRSDs are not able to fall asleep when they want or be as fully awake as they wish or need to be. This problem may stem from internal/bodily or external/environmental factors. It is estimated that 35 million Americans suffer from CRSDs.*

## What Are Circadian Rhythms?

Circadian rhythms are 24-hour rhythms that control human sleep and other bodily functions. “Circadian” stems from the Latin *circa diem* meaning “about a day.” Sleep and wakefulness are controlled in part by an “internal clock” located in a region of the brain called the suprachiasmatic nucleus (SCN). As the body’s master clock, the SCN sends out signals that change the levels of hormones (e.g., melatonin and cortisol) and body temperature over a 24-hour period. Regular exposure to light and dark are necessary to synchronize the internal clock with the external day. Bright light (e.g., sunlight) received by the eye and projected to the SCN resets the clock every morning to keep it on a regular daily schedule. If the clock does not receive the light and dark signals at the right times, it malfunctions, producing hormones at the wrong time of day. Over time, this can result in insomnia at night and excessive sleepiness during the day, potentially causing serious distress and impaired functioning. Recent research suggests that certain wavelengths of light in the blue range are most responsible for regulating the circadian cycle. This finding has led to novel ways to reduce light exposure at critical times (see Light Avoidance below).

## CRSD Types

There are five different CRSD types. In all types, the sleep schedule differs from the conventional pattern and is often a cause for concern.

### *Delayed Sleep Phase Disorder (DSPD)*

People with DSPD have a sleep schedule that is timed much later than usual or desired. Their preference is to stay up late into the night and wake up in the late morning or early afternoon. If they are unable to maintain this preferred schedule, they will have symptoms including difficulty falling asleep, difficulty waking in the morning, and excessive morning sleepiness. DSPD is the most common CRSD. It can be present at any age, but is seen most frequently in adolescents and young adults (affecting up to 16% of this population), often interfering with school and work. DSPD involves more extreme behavior than the natural tendency of people in their teens and 20s to stay up late and sleep late. (This young person’s night-owl pattern can often be changed by consistently using a fixed wake-up time and other good sleep habits—see Sleep Hygiene below). The increase in LED lighting and, especially, electronic screens in laptops, smartphones, and some e-readers has added late-night bright lights to the environment of many individuals. This bright light suppresses the normal se-

## What Is Cognitive Behavior Therapy?

Behavior Therapy and Cognitive Behavior Therapy are types of treatment that are based firmly on research findings. These approaches aid people in achieving specific changes or goals.

Changes or goals might involve:

- A way of acting, like confronting our feared thoughts
- A way of feeling, like helping a person be less scared, less depressed, or less anxious
- A way of thinking, like evaluating the probability of an event occurring
- A way of dealing with physical or medical problems, like lessening back pain or helping a person stick to a doctor’s suggestions.

Behavior Therapists and Cognitive Behavior Therapists usually focus more on the current situation and its solution, rather than the past. They concentrate on a person’s views and beliefs about their life, not on personality traits. Behavior Therapists and Cognitive Behavior Therapists treat individuals, parents, children, couples, and families. Replacing ways of living that do not work well with ways of living that work, and giving people more control over their lives, are common goals of behavior and cognitive behavior therapy.

**HOW TO GET HELP:** If you are looking for help, either for yourself or someone else, you may be tempted to call someone who advertises in a local publication or who comes up from a search of the Internet. You may, or may not, find a competent therapist in this manner. It is wise to check on the credentials of a psychotherapist. It is expected that competent therapists hold advanced academic degrees and training. They should be listed as members of professional organizations, such as the Association for Behavioral and Cognitive Therapies or the American Psychological Association. Of course, they should be licensed to practice in your state. You can find competent specialists who are affiliated with local universities or mental health facilities or who are listed on the websites of professional organizations. You may, of course, visit our website ([www.abct.org](http://www.abct.org)) and click on “Find a CBT Therapist.”

*The Association for Behavioral and Cognitive Therapies (ABCT) is an interdisciplinary organization committed to the advancement of a scientific approach to the understanding and amelioration of problems of the human condition. These aims are achieved through the investigation and application of behavioral, cognitive, and other evidence-based principles to assessment, prevention, and treatment.*

cretion of melatonin in the evening and may exacerbate DSPD.

#### *Advanced Sleep Phase Disorder (ASPD)*

ASPD is characterized by sleeping times that are several hours earlier than usual or desired. People with ASPD generally go to sleep between 6 and 9 p.m. and wake up between 2 and 5 a.m. Symptoms of ASPD include late day sleepiness and early morning insomnia. ASPD may impair cognitive functioning, social interactions, and personal safety, especially at the end of the day. About 1% of middle-aged adults suffer from it, and it increases with age. A family history of ASPD is common in people with the disorder.

#### *Irregular Sleep-Wake Disorder (ISWD)*

ISWD is the absence of a regular sleep pattern. There is no major sleep period, and sleep is fragmented into a series of naps over each 24-hour period. People with ISWD generally display short periods of sleep across the day with the longest stretch (usually shorter than 4 hours) occurring sometime between 2 and 6 a.m. Symptoms of ISWD also include insomnia or excessive sleepiness, depending on time of day. ISWD is most commonly associated with neurological disorders (e.g., dementia, developmental delay), traumatic brain injury, and some medical and psychiatric conditions in which there is social isolation and/or lack of light and structured activities in the conventional daytime.

#### *Non-24-Hour Sleep-Wake Disorder (Non-24)*

Non-24 is most common among blind persons who have no light perception (impacting about half of these individuals). It has sometimes been observed with severe psychiatric disorders. Classic symptoms include cyclic insomnia in which individuals will cycle between insomnia and normal sleep for weeks or months. However, many individuals with Non-24 may always have poor sleep as they try, and fail, to get back into a more regular sleep pattern.

#### *Shift Work Disorder (SWD)*

SWD is seen in persons who work the night shift or who have frequently changing work shifts. In affected individuals, these work patterns cause the sleep-wake schedule to be out of synch with the body's internal rhythms, leading to insomnia when trying to sleep during the day and excessive sleepiness when trying to be awake at work at night. About 25% of shift workers (or 5% of the U.S. workforce) suffer from SWD. What's worse is that SWD may lead to other psychiatric and medical problems.

### **Evaluation**

Therapists assess CRSDs by collecting a detailed history of the problem using sleep questionnaires, sleep diaries (in which the patient tracks daily sleep information such as into and out-of bed times), a wrist sensor (actigraph) that measures sleep indirectly through wrist movement, and interviews with the person. Medical and psychiatric problems are also evaluated, and treatment can be recommended at this time, too. Patients are screened for primary sleep disorders, such as Obstructive Sleep Apnea, which may lead to a recommendation for an overnight sleep study in a sleep lab. For some people, chronic insomnia may also play a part with CRSD in the problem and may re-

quire its own assessment and treatment (see Cognitive Behavior Therapy for Insomnia below.)

## **Treatments**

### *Good Pre-Sleep Habits or Sleep Hygiene*

In the treatment of all sleep disorders, the reinforcement of good sleep hygiene is a good place to start. Maintenance of healthy sleep habits supports good sleep in general and prevents unnecessary sleep disrupting factors. Avoidance of alcohol and caffeine close to bedtime, a wind-down period, and a comfortable sleep environment are examples of good Sleep Hygiene. Getting enough light, exercise, and cognitive stimulation during the day are also recommended.

### *Bright Light Therapy*

Light is the strongest cue for synchronizing your own circadian clock with the external environment. Bright light therapy, using safe levels of intense bright light administered at the appropriate time, can delay and advance sleep schedules to restore regular patterns for many patients – morning light for DSPD, evening light for ASPD, and bright light during the night shift for SWD. Natural sunlight has traditionally been used for these purposes. "Light boxes," available from a number of companies, provide strong light to the eye and have the advantage over sunlight of being available whenever needed and of filtering out harmful ultraviolet (UV) wavelengths. Increasing light exposure during the day may help with dementia patients who have irregular and fragmented sleep (ISWD).

### *Light Avoidance*

Limiting light exposure at scheduled times is often used in conjunction with bright light therapy. This is most useful for those who are phase-delayed (have DSPD). Avoidance of bright light and illuminated screens in the evening is recommended for these individuals. Wearing orange (blue-blocking) glasses and removal of blue light from electronic screens via online programs (e.g., [www.f.lux.com](http://www.f.lux.com)) have recently been suggested as novel ways to achieve "virtual darkness" in the evening.

### *Melatonin*

Over-the-counter melatonin pills have long been used to help people sleep, but with mixed results. However, melatonin, strategically timed and in low doses (e.g., 0.3 mg), is now considered a possibility for phase shifting in conjunction with bright light therapy or on its own when light treatment is not feasible. Taken in the evening, melatonin can shift the sleep-wake schedule to an earlier time. Early morning administration can shift the schedule later. For night workers with SWD, melatonin pills taken prior to daytime sleep may be recommended. Melatonin, taken at the same time each evening, has also been found to be particularly useful for Non-24 individuals.

### *Other Medications*

Sleeping pills are often prescribed to induce sleep in general and for some CRSDs, but may have negative effects, especially decreased alertness during the night and following day. Newer melatonin-like medications (e.g., Ramelteon, Tasimelteon) may help realign the sleep-wake cycle. Similarly,

there are medications (e.g., Modafinil) that enhance alertness and are FDA-approved for treating SWD.

### *Lifestyle Changes*

Lifestyle changes can help ease the realignment of one's schedule. Planned naps and strict sleep/wake schedules are among the methods frequently used.

### *Cognitive Behavior Therapy*

Cognitive Behavior Therapy for Insomnia (CBT-I), an evidence-based approach without drugs is considered a first-line treatment for chronic insomnia and is more effective in the long run than sleeping pills. CBT-I can be employed to address the insomnia issues that are frequently presented by the CRSD patient. CBT-I techniques are tailored to the individual, and include sleep restriction, which consolidates sleep by initially reducing time in bed to match actual sleep time; stimulus control, which involves strengthening the association between the bed and sleep; and cognitive therapy, which works to change patient's maladaptive cognitions in relation to sleep.

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***For more information or to find a therapist:***

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