

Delayed Sleep Phase Syndrome

Delayed sleep phase syndrome (DSPS) is the most common circadian rhythm sleep-wake phase disorder. It is typically seen in teenagers, although it can start at any age. People who DSPS have trouble keeping a normal sleep schedule, with their bedtime and rise time occurring much later than the usual desired time. This results in a shortened sleep time. This often leads to problems with how well a person performs at work or school or in social situations. For information about healthy sleep at various ages, see ATS Patient Information Series at www.thoracic.org/patients.



What is DSPS?

DSPS is a disorder in which a person's bedtime is delayed by 2 or more hours beyond the socially acceptable or usual bedtime for people of the same age. If you have DSPS, you have trouble falling asleep and difficulty waking up because your internal body clock (circadian rhythm) is out of phase with the typical sleeping and waking times. For example, you might not be able to go to sleep until 4 am and find it hard to wake up until the afternoon. DSPS may be due to the body clock not being sensitive enough to environmental cues or an imbalance in some of the hormones that help to maintain the sleep-wake cycle, such as cortisol or melatonin. DSPS may run in families. There is at least one gene mutation linked to DSPS so far.

What is the circadian rhythm?

The circadian rhythm is a 24-hour internal "body clock" located in the brain that cycles alertness and sleepiness. It is controlled by levels of hormones, including cortisol and melatonin, as well as cues in your environment, such as sunrise, clock alarms, exercise, and meal times. Your "body clock" needs to match the light and dark cycle in the world around you. If it doesn't, this can cause a circadian rhythm sleep-wake disorder, such as DSPS. Melatonin plays a big role in the regulation of the sleep-wake cycle and in your core body temperature. Normally, when you are sleeping deeply, your core body temperature is at its lowest level and the melatonin level is at its peak. In the morning, the melatonin level is at its lowest level and the core body temperature increases.

What are common symptoms in DSPS?

Difficulty falling asleep (insomnia) is one of the common complaints of people with DSPS. Usually a person with DSPS has no problem staying asleep, but will complain of being unable to fall asleep. With DSPS, a person also can have trouble waking up at a reasonable time. These problems lead daytime sleepiness, problems with school or work performance, and depression. When a person with DSPS is able to sleep undisturbed for a normal amount of time, he or she will wake feeling refreshed.

Why is DSPS more common in teens?

There are changes going on in the internal body clock around the time of sexual maturation (puberty). During puberty two biological changes in sleep regulation occur. First, in most people, the melatonin levels start to increase steadily between 7PM to 11PM and reach its peak values (maximum sleepiness) between 2AM to 4AM. Then, melatonin levels decrease in the morning (alertness). Changes in the light-dark cycle affect the melatonin level. If there is a delay when melatonin increases at night, it can cause a shift in your body clock and lead to a problem like DSPS. Second, the sleep desire in teens is altered because of social and lifestyle demands.

How is DSPS diagnosed?

There is no a specific test that will show whether a person has DSPS. If you suspect that you or your child may have DSPS, you will want to see a sleep specialist.

He or she will ask you detailed questions about your sleep patterns and sleep environment. You or your child may be asked to keep a diary of sleep-wake times. Sometimes an actigraph (wrist watch-like device) is used to measure the sleep-wake pattern for a period of 2 weeks.

How is DSPS treated?

You can take actions to improve your sleep hygiene. For suggestions on healthy sleep practices, refer to ATS Patient Information Series at www.thoracic.org/patients.

The goal of treatment is to shift your sleep- schedule to an earlier time and maintain the new schedule. A sleep specialist can help you to move your bedtime and rise time each day, until you start sleeping on a normal schedule. This is called chronotherapy. You must follow the new sleep-wake cycle plan strictly to assure it works for you.

Other treatment options include taking melatonin, and/or exposure to bright light in the early morning upon awakening.

Melatonin, an over-the-counter medication, is often used for insomnia. Melatonin can make you feel sleepy at night to reduce the time you take to fall asleep. You can use melatonin to readjust your body clock to the desired time by taking it and advancing your sleep to an earlier time. However, you should discuss the dose and when to take melatonin with your sleep specialist or healthcare provider. If you do not take melatonin at the right time, it can cause more of a delay in your body clock.

It is very important to keep in mind the bright blue light from computer screens can lower your natural melatonin levels and stop you from feeling as sleepy at night. For this reason, you should avoid using your computer or other electronic devices for one hour before your planned bedtime, and adjust them to limit the amount of blue light emitted. You should also avoid bright light during the evening hours.

The timing of the light therapy to help advance your body clock is critical. Light therapy involves getting exposure to morning light, either through natural sunlight or from a light box that is designed for this purpose. This is normally done for about an hour after you wake up when the core body temperature reached its maximum level. If it is done before this rise in your core body temperature it can delay further your body clock.

It is very important that you keep your bedtime and wake up time as constant as possible. Try not to have a big difference between your schedule on weekdays and weekends (no more than 2 hours).

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Rx Action Steps

If you have trouble with going to sleep and waking up on time:

- ✓ Look at your sleep pattern and review healthy sleep tips
- ✓ Talk with your healthcare provider
- ✓ Keep a diary of your sleep pattern to share with your healthcare provider, including when you go to bed, when you wake up and what you are doing just before you go to sleep
- ✓ If daytime sleeping is interfering with your quality of life, including your safety, then you should seek medical attention.

Healthcare Provider's Contact Number:

Resources:

American Thoracic Society

- www.thoracic.org/patients/
 - Healthy Sleep in Adults, Teens, Children, Infants
 - Circadian Rhythm
 - Sleep & Performance

American Sleep Association

- <https://www.sleepassociation.org/sleep-disorders/more-sleep-disorders/delayed-sleep-phase-syndrome/>

Sleep Health Foundation (Australia)

- <http://www.sleephealthfoundation.org.au/pdfs/Delayed-Sleep-Phase-Syndrome.pdf>

National Institute of General Medical Sciences

- https://www.nigms.nih.gov/education/Pages/Factsheet_CircadianRhythms.aspx

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