Delayed Sleep Wake Phase Disorder in Adolescents: Chronotherapy and Best Practices

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Here: suggested strategies for assessment and management of this circadian sleep disorder commonly seen in adolescents.

Delayed sleep wake phase disorder (DSWPD) is a circadian rhythm sleep disorder characterized by a mismatch between a person’s internal biological clock (or circadian rhythm) and societal norms. As a result of attempting to sleep out of sync with the internal biological clock, individuals with DSWPD report a significantly prolonged sleep onset, difficulties waking in the morning, suboptimal sleep duration, and excessive daytime sleepiness. If the preferred schedule is allowed (eg, the individual goes to bed late and sleeps late into the morning), sleep duration and maintenance are normal.

Onset of DSWPD often occurs during adolescence as a result of behavioral and physiological factors. Prevalence estimates of DSWPD in adolescents vary; however, ranges from 3.3% to 16% have been reported.1-3 Assessment of DSWPD

Presenting symptoms of DSWPD often mimic those of other sleep disorders, including insomnia or hypersomnia. Polysomnography is not indicated unless symptoms of other sleep disorders are present. Suggested strategies for assessment of DSWPD are provided in Table 1.

Assessment of sleep patterns including bedtime routines, bedtimes, sleep-onset latency, wake times, and sleep environment are critical to an effective differential diagnosis. Differentiating the features from insomnia entails understanding the adolescent’s schedule during school compared with weekends or holidays. Individuals with DSWPD often report normal sleep-onset latency and sleep duration on weekends, holidays, or school vacations when they are allowed to sleep on their preferred schedule. In contrast, those with insomnia will report lengthy sleep-onset latency regardless of the time they go to bed. In addition, those with insomnia may report difficulties with sleep maintenance—a feature not as characteristic of DSWPD.

Sleep hygiene is also an important area of assessment. Adolescents with DSWPD may develop compensatory behaviors to manage frustrations related to lengthy sleep-onset latency. Such behaviors often function to alleviate frustration at sleep onset (eg, phone use) or compensate for daytime sleepiness (eg, napping). However, restriction of the sleep-inhibiting behaviors as a stand-alone treatment rarely helps decrease sleep-onset latency in DSWPD.

Sleep logs/actigraphy

Because assessment and management of circadian rhythm disorders rely on granular information on night-to-night sleep patterns, sleep logs are typically recommended. Differentiating schedules and sleep-onset latency between school days and weekends can provide evidence toward a delayed sleep phase relative to insomnia. The adolescent should be coached on maintaining the sleep logs for approximately 2 weeks, as parents often have limited information on their teen’s sleep patterns. Actigraphy entails the use of a portable device, worn on the non-dominant wrist over a period of time to track movement. It is commonly used in research and in clinical practice. Actigraphy can be invaluable in both the assessment of DSWPD and the evaluation of intervention. In clinical practice, actigraphy can be difficult to obtain outside of a sleep setting, and interpretation of data requires some expertise. Commercial devices (eg, FitBit) are less reliable than actigraphy and typically should not be used as a substitute.

DSWPD treatment

Management strategies include use of timed sleep schedules, melatonin, bright light therapy, and chronotherapy. There is insufficient evidence to recommend use of hypnotics at sleep onset or use of stimulants to promote wakefulness. This is in contrast to what is customary in many medical practices. A summary of treatment options can be found in Table 2.

Comprising 2 phases—the active phase and the maintenance phase—chronotherapy is an intensive...
intervention that helps reset the internal clock. The active phase involves a sequential delay of bed and wake times by 2 to 3 hours daily until a desired sleep schedule is achieved. After the active phase of treatment, a strict sleep schedule must be maintained making this treatment challenging to implement. From a clinical perspective, the benefits of the intervention include quickly shifting the schedule, which can be critical if the patient is frequently absent or late for school.

**CASE VIGNETTE**

Kate, a 14-year-old, presents to the pediatric sleep clinic because of difficulties with sleep onset. At baseline, she describes sleep-onset latency of 3 to 5 hours with a bedtime of 10 pm, with several nocturnal arousals. On school days, because of the bus schedule, she wakes up between 5 and 6 am. She reports significant fatigue, especially during her morning classes.

On weekends, Kate goes to bed at 2 am; consequently, sleep-onset latency is shorter and she is able to sleep until 9 am. She reports increased energy on weekends when she sleeps on her preferred schedule.

Sleep-inhibiting activities at sleep onset include use of her phone and computer in bed. She also spends significant time in bed not sleeping as a means to escape from negative interactions with her parents and because she prefers to do her homework in her room.

During the initial evaluation, there are no concerns related to sleep-disordered breathing, narcolepsy, or parasomnias.

Kate describes her sleep as a mild problem, although she notes it can negatively affect her mood. She states that she is about to enter high school and plans on being heavily involved in athletics and other extracurricular activities. She believes that her sleep problems would limit her ability to engage in such activities.

Kate’s parents described her sleep concerns as within the moderate range. They describe significant difficulties helping her wake up in the morning, which leads to increased tension that persists throughout the day. In addition, her parents express significant frustration with Kate’s afternoon naps—they feel the naps exacerbate her sleep problems.

Given Kate’s decreased sleep-onset latency and improved sleep maintenance when allowed to have her preferred sleep schedule, the initial assessment indicates a need for more information related to DSWPD. It is recommended that Kate maintain sleep logs for 2 weeks.

At the second visit, the sleep logs support a diagnosis of DSWPD. Kate and her parents are provided with information on DSWPD to diffuse the tension surrounding Kate’s sleep patterns. When discussing treatment options, the family expresses a preference not to use melatonin because of frustrations related to past use. In addition, her parents do not think it is feasible for Kate to wake up earlier to use bright light therapy. Given the significant delay in sleep onset as well as the need to quickly adjust her bedtime to help Kate remain in school, chronotherapy is the best option.

The active phase of therapy means that the bedtime/wake time moves “around the clock” for 6 to 8 days. Keeping the sleep time to less than the recommended 9 hours for adolescents is used to increase sleep drive. Chronotherapy begins with a 3 am bedtime on day 1. This time is selected in the hope of decreasing sleep-onset latency. Subsequent days are outlined with the family, and a chronotherapy schedule is provided (Table 3).

At the conclusion of the active phase, Kate’s progress is reviewed during the third visit. She reports that she is able to be adherent throughout the week and is maintaining a regular bed and wake time, but she continues to be fatigued upon waking. Emphasis is placed on maintaining the same bed and wake times regardless of whether it is a school day or a weekend (maintenance phase).

Problem-solving occurs during this visit to account for special activities (eg, prom, sleepovers). The maintenance phase lasts about 2 months. During this time, it is critical to keep to the same bedtimes and wake times to “set” the internal clock. The recommended sleep time for Kate is 10 pm to 5:30 am.

A final visit is scheduled 2 months later to assess the maintenance phase. Kate reports that her weekend activities help her maintain the sleep schedule because they promote early waking. She no longer naps and falls asleep within 30 minutes of bedtime, and she is able to sleep for 7.5 hours a night. Given the maintenance of gains, visits are moved to an as-needed basis.

**Conclusion**

Kate is a relatively straightforward patient with no comorbid psychiatric or medical diagnoses. Modifications would need to be made in the case of psychiatric diagnoses in which the patient should not be unsupervised for long periods (eg, depression with suicidal ideation, substance abuse). In these situations, we have had parents go through the active phase of chronotherapy with their child.
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To provide monitoring and support. Sleep deprivation can also exacerbate depression, and close monitoring is needed with such patients.

DSWPD is a circadian sleep disorder commonly seen in adolescents. Thorough and careful assessment is critical to differentiating features of DSWPD from other common sleep problems. DSWPD can affect the patient’s mood and result in chronic sleep deprivation. Several options exist to help manage DSWPD—all of which require close follow-up because relapse is common.

| TABLE 1. Assessment of DSWPD in adolescents |
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| TABLE 2. Treatment of DSWPD in adolescents |

| TABLE 3. Sample chronotherapy schedule |

**Disclosures:**

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**References:**


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