

Circadian Rhythm Disorders

Definition

Circadian rhythms are the physiological and behavioural changes occurring in the body approximately every 24 hours. These rhythms need to be entrained to the environment on a daily basis. There are five types of circadian rhythm sleep disorders (see below). Delayed and Advanced Sleep Phase Disorders will be discussed in greater detail.

Delayed Sleep Phase Disorder (DSPD)

This is characterised by an inability to fall asleep until 2-6 hours after usual sleep onset times (10pm to midnight) resulting in extreme difficulty with waking. When left to sleep, sleep length is generally normal or extended. DSPD has a prevalence of 7-16% in adolescents and young adults. Individuals with DSPD may be misdiagnosed with chronic insomnia disorder, ADHD, depression, or other psychiatric conditions which can also co-exist. When forced to be out of bed at conventional wakeup times, patients with DSPD experience a short-sleep duration and feel "jet lagged". This potentially leads to impairments in performance, quality of life, and comorbid chronic medical and psychiatric illness.

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

The sleep/wake cycle is longer than 24 hours, resulting in sleep onset times becoming progressively later to the point where there is continual forward sleep cycling with daytime sleep until it moves again to nighttime.

Advanced Sleep Wake Phase Disorder (ASWPD)

There is early evening sleepiness and accompanying early sleep onset at 6-8pm. Wake time is then in the early hours of the morning. Total sleep time can be shortened.

Irregular Sleep-Wake Disorder (ISWD) A condition of irregular sleep and wake periods, containing at least three sleep periods per day.

Shift Work Disorder A condition in which circadian rhythms are disturbed due to an inability to adapt to shift work schedules (working predominantly at night) with insomnia type symptoms. High levels of sleepiness are present which is generally uncommon in insomnia (refer to information sheet on **Shift Work Disorder**).

Delayed Sleep Phase Disorder (DSPS)

Typical scenario

- Usually an adolescent or young adult presenting with a history of taking "hours" to get to sleep, with difficulty waking in the morning for school, university or work. They often describe themselves as a "night owl". Misunderstandings between parents and adolescents re sleep timing and getting up in the morning may negatively impact on family dynamics.

Clinical Presentation

- Insomnia symptoms but with sleepiness especially during the early part of the day.
- Alertness improves in the afternoon or evening.

What to Ask

- Family history: difficulty initiating sleep until the early hours of the morning.
- Change in the pattern and length of sleep between the working/school week and the weekend?
- Earliest time that the patient can initiate sleep and how long to fall asleep from then?
- Ask about depression and anxiety.

What investigations to order

- Sleep diary for at least 2 full weeks to assess sleep patterns during the working/school week and weekends.
- Consider actigraphy (eg actiwatch) to document sleep-wake pattern objectively.
- Commercial activity monitor (eg "fitbit") may supplement sleep diary, but beware limited or no validation.

The diary or actigraphy are used to determine the patient's core body temperature minimum (CBTmin), usually about 2 hours before habitual wake time, which is the key to resetting the delayed clock with light exposure.

Initial treatment plan

Educate

1. Light after the CBTmin advances sleep and shortens the sleep wake cycle – no hat or sunglasses for 40 mins

On-the-spot management Circadian Rhythm Disorders



in outside light where possible. Where CBTmin cannot be determined (or if getting up times are variable), a conservative approach would be to suggest light exposure after the latest getting up time, gradually moving this earlier every 3 days.

2. Combine exercise with light and changing sleep patterns. It also improves mood.
3. Avoid light before the CBTmin as it will further delay sleep onset. Reduce afternoon and evening light exposure. Use ordinary sunglasses when outside, and if using electronic devices reduce the screen light or use amber glasses to block the blue spectrum.
4. Discuss with the patient that it is highly unlikely that he/she will be able to have a sleep onset time earlier than 11pm to midnight.
5. Avoid long sleep-ins on the weekend as this can easily shift the patient back into a more delayed pattern.

Prescribe

1. Consider low dose evening Melatonin (1mg, immediate-release, from a compounding chemist) to aid in resetting the endogenous clock. Take approximately 4.5 hours prior to current bed time (eg. if patient is going to bed 3am suggest Melatonin at 10.30pm).
2. Slowly advance the time of Melatonin administration by ½ hour every 3 days. When sleep onset becomes more stable around midnight, then a reduced dose of Melatonin (eg. 0.5mg) 1 to 2 hours before bedtime (ie 10pm) will be able to stabilise sleep onset times.

Future management

Review once stabilised after 3-6 months, or earlier if there are ongoing difficulties.

Refer: May require Sleep Physician or Sleep Psychologist intervention, management often difficult, especially with co-morbid depression.

Advanced Sleep Phase Disorder (ASPD)

Typical scenario

- ASPD is usually seen in an older person, often living alone, who may have lost a lifelong partner. It may develop in Winter with the person going to bed earlier due to darkness or the cold climate.

Clinical Presentation

- The patient describes being sleepy early in the evening and falls asleep on couch, or goes to bed around 8pm, because they are unable to stay awake.
- Early morning awakening generally unable to return to

sleep and feeling wide awake. May be misinterpreted as insomnia with early morning awakening.

What to Ask

- Ask if other family members have a similar sleep/wake pattern
- What is the actual length of sleep attained? It is usually normal in length but much earlier.

What investigations to order

- A sleep diary of at least 2 weeks.

Initial treatment plan

Educate

1. The importance of afternoon or evening bright light to delay sleep onset. Encourage the patient to do activities outside at this time of the day such as walking, gardening or sitting and reading.
2. Good to combine exercise with changing sleep patterns. Do this in the afternoon or early evening to improve alertness. Try light weight lifting exercises whilst watching TV/sitting down in the evening.
3. In Winter, can use blue light (glasses or a light box) in the late afternoon or early evening.
4. Discourage morning light after the CBTmin as this will advance sleep time and maintain the early evening sleep onset. Wear hats and sunglasses in the morning when outside.
5. A shift back to an earlier bedtime on a regular basis will result in return of advanced sleep phase.

Future management

Review once stabilised after 3-6 months, or earlier if there are ongoing difficulties.

Refer: May require Sleep Physician or Sleep Psychologist intervention, management often difficult, especially with co-morbid depression.

Where to access patient information:

www.sleephealthfoundation.org.au/public-information/fact-sheets-a-z.html

<https://sleepfoundation.org/sleep-topics/sleep-drive-and-your-body-clock>

Where to access in-depth clinician information:

<https://sleepfoundation.org/category/circadian-rhythm-disorders>

www.sleep.org.au/professional-resources/health-professionals-information/the-medical-journal-of-australia