Diagnosis, Cause, and Treatment Approaches for Delayed Sleep-Wake Phase Disorder

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KEYWORDS

• Delayed sleep phase • Circadian rhythms • Homeostat • Melatonin • Phototherapy • Delayed sleep • Bright light • Circadian phase

KEY POINTS

- Delayed sleep-wake phase disorder (DSWPD) is a circadian rhythm sleep disorder associated with misalignment of the circadian pacemaker and the desired sleep-wake cycle, and manifests as delayed sleep-wake timing relative to societal norms.
- Approximately 10% of patients with chronic insomnia are reported to have DSWPD, suggesting the requirement of strict diagnostic criteria to differentiate DSWPD from sleep onset insomnia.
- Current treatment options have short-term efficacy, but relapse to a delayed sleep time is likely to occur if patients are noncompliant.
- Diagnosis and evaluation of treatment outcomes are typically based on subjective patient reports, but may be improved with the incorporation of an objective circadian measure.
- Future research should examine the efficacy of combined treatment approaches for DSWPD.

INTRODUCTION

Circadian rhythms are endogenous, entrainable biological rhythms with an approximate oscillation of 24 hours. Circadian rhythms regulate aspects of biology and appropriately time behavior to coordinate physiologic functions with specific times of day or night.

Circadian misalignment is defined as an altered or inappropriate relationship between sleep-wake timing relative to internal circadian timing. During

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circadian misalignment, sleep is often attempted at an internal circadian time when the clock is strongly promoting wakefulness. It is important to note that insufficient sleep is an extrinsic factor that can also lead to a degree of circadian misalignment.[1]

Circadian misalignment leads to impaired cognition[2,3] and disturbed sleep,[3,4] and is associated with negative health consequences.[5–7] Circadian misalignment occurs in response to alterations in light-dark and/or wake-sleep schedules, such as in shift work and jet lag, as well as in circadian rhythm sleep-wake disorders[8] (CRSWDs). Shift work and jet lag disorders are considered extrinsic CRSWDs. In contrast, other CRSWDs are intrinsic in origin and include irregular sleep-wake rhythm disorder, non–24-hour sleep-wake disorder, advanced sleep-wake phase disorder, delayed sleep-wake phase disorder (DSWPD), and CRSWD not otherwise specified.[8] However, regardless of origin, CRSWDs are associated with difficulty maintaining normal work/life/social schedules and typically result in significant impairments in daytime function and overall quality of life.

This article focuses on the specific diagnosis, cause, and treatment approaches for DSWPD.

CLASSIFICATION OF DELAYED SLEEP-WAKE PHASE DISORDER

The *International Classification of Sleep Disorders, 3rd Edition* (ICSD-3), defines DSWPD as having the following criteria: "(a) there is a significant delay in the phase of the major sleep episode in relation to the desired or required sleep time and wake-up time, as evidenced by a chronic or recurrent complaint by the patient or a caregiver of inability to fall asleep and difficulty awakening at a desired or required clock time; (b) the symptoms are present for at least three months; (c) when patients are allowed to choose their ad libitum schedule, they will exhibit improved sleep quality and duration for age and maintain a delayed phase of the 24-h sleep-wake pattern; (d) sleep log and, whenever possible, actigraphy monitoring for at least seven days (preferably 14 days) demonstrate a delay in the timing of the habitual sleep period. Both work/school days and free days must be included within this monitoring; and (e) the sleep disturbance is not better explained by another current sleep disorder, medical or neurological disorder, mental disorder, medication use, or substance use disorder"[8] (Fig. 1).

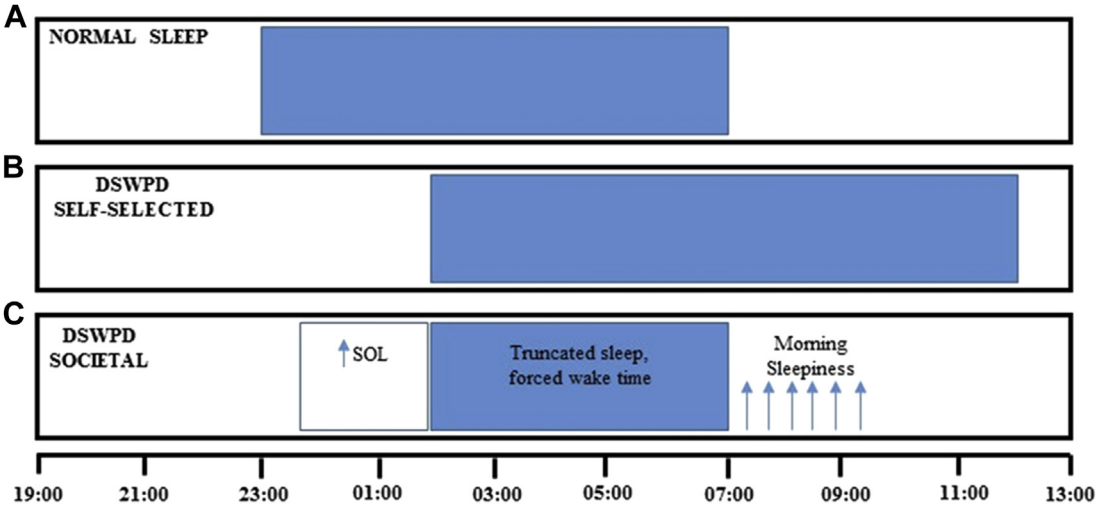

Fig. 1. The timing of sleep episodes in normal sleepers (*A*), individuals with DSWPD when given the opportunity to self-select sleep-wake timing (*B*), and individuals with DSWPD when sleep is truncated because of the need to wake up for school or work activities during the daytime (*C*). Comparisons of sleep episodes in normal sleepers and patients with DSWPD differ in the timing of bedtimes and wake times. Here, the blue bar (*A*) represents the timing of sleep in a normal sleeper with a duration of approximately 8 hours. Compared with patients who have DSWPD under self-selected times (*B*), individuals have a delayed sleep and wake time (represented by the blue bar) and may have extended sleep duration. In contrast, in situations in which patients with DSWPD have daytime commitments (*C*), patients may attempt an earlier (required) sleep time, resulting in a longer sleep onset latency (SOL). In addition, the sleep episode is truncated in the morning to meet daytime commitments and the level of sleepiness is increased.