

Circadian Rhythm Sleep-Wake Disorder, Delayed Sleep Phase Type

DSM-5-TR 307.45 | ICD-10-CM G47.21

Endogenous sleep-wake timing shifted hours later than social demands, producing sleep-onset insomnia and profound morning sleep inertia.

PREVALENCE

~0.5-3% adults; ~7-16% teens

TYPICAL ONSET

Adolescence, around puberty

SEX RATIO

Slight male predominance

COURSE

Persistent; relapses on taper

CLINICAL PICTURE

- Patients cannot fall asleep before roughly 2 to 6 a.m. and cannot wake for school or work, yet sleep normally when allowed their own schedule.
- The presenting complaint is sleep-onset insomnia plus severe morning sleep inertia, chronic lateness, and absenteeism rather than poor sleep quality.
- Weekend and vacation sleep runs late but is consolidated, adequate in length, and refreshing, which separates this from insomnia disorder.
- Daytime somnolence peaks in the morning and clears by late afternoon or evening, when patients report feeling most alert and productive.
- Chronic sleep restriction on school nights produces irritability, poor concentration, and low mood that is often misattributed to a mood disorder.
- A 1 to 2 week sleep diary with actigraphy documents a delayed but stable phase; dim-light melatonin onset confirms it when the picture is ambiguous.

DIAGNOSTIC CRITERIA AT A GLANCE

- Persistent or recurrent sleep disruption caused by a mismatch between the endogenous circadian system and the sleep-wake schedule the environment requires.
- The delayed phase type requires habitual sleep onset and wake times several hours later than desired or than social and occupational obligations allow.
- Sleepiness, insomnia, or both must cause clinically significant distress or impairment in social, academic, or occupational functioning.
- Specify episodic when at least 1 month but under 3 months, persistent at 3 months or longer, and recurrent for two or more episodes within a year.
- A familial specifier and an overlapping non-24-hour type exist; a sleep diary or actigraphy over at least 7 days is recommended to establish the pattern.

NEUROBIOLOGY & PHYSIOLOGY

- The suprachiasmatic nucleus drives a near-24-hour rhythm entrained each day by retinal light arriving through the retinohypothalamic tract.
- Intrinsically photosensitive retinal ganglion cells containing **melanopsin** respond maximally to short-wavelength blue light near 480 nm.
- The phase response curve is the operating principle: light after the core body temperature minimum advances the clock, light before it delays.
- Many patients carry a longer intrinsic circadian period, a reduced capacity to phase-advance, or heightened sensitivity to evening light.
- Clock gene variants segregate in families, and a gain-of-function CRY1 allele that lengthens circadian period has been linked to the delayed phenotype.
- Puberty shifts melatonin onset roughly 1 to 2 hours later and slows homeostatic sleep pressure buildup, making adolescence the peak risk window.

PSYCHOLOGICAL MECHANISMS

- Conditioned anxiety about not sleeping layers onto the circadian delay, so insomnia-type cognitions persist even after the phase is corrected.
- Evening screens, late caffeine, and social or gaming activity deliver phase-delaying light and arousal exactly during the delay portion of the curve.
- Sleeping in by 2 or more hours on weekends re-delays the clock every week, a social jet lag pattern that erases weekday progress.
- Patients often adopt a night-owl identity and value the autonomy of late hours, which quietly undermines adherence to advancing schedules.
- Repeated failure at morning obligations breeds learned helplessness, while family and school frame the pattern as laziness or defiance.

DIFFERENTIAL & COMORBIDITY

- Insomnia disorder yields short and unrefreshing sleep on any schedule, whereas delayed phase sleep is normal in length and quality once it begins.
- Rule out insufficient sleep syndrome, shift work disorder, and non-24-hour sleep-wake rhythm disorder, which is common in totally blind patients.
- Depression, bipolar disorder, ADHD, and adolescent substance use co-occur frequently and both worsen and mimic circadian delay.
- Depressive symptoms often remit with phase correction, so address the circadian problem before escalating antidepressant trials.
- Screen for obstructive sleep apnea and restless legs when sleepiness persists despite adequate sleep duration on a freely chosen schedule.

Treatment EVIDENCE-BASED MANAGEMENT

PHARMACOLOGIC

- Melatonin 0.5-3 mg** taken 4 to 6 hours before habitual sleep onset advances phase, and timing matters far more than the dose chosen.
- Higher doses taken at bedtime act as a hypnotic rather than a chronobiotic and can blunt or even reverse the intended phase advance.
- Melatonin is regulated as a dietary supplement in the US with wide variation in actual content, so recommend USP-verified products.
- Ramelteon 8 mg** is a melatonin receptor agonist option, while **tasimelteon** is approved for non-24-hour disorder in blind adults, not for DSPD.
- Avoid chronic hypnotics and stimulants, which mask the phase problem without entraining the clock and add tolerance and dependence risk.

PSYCHOTHERAPY

- CBT-I** adapted for circadian disorders over 4 to 8 sessions combines stimulus control, a fixed wake time, and motivational work on adherence.
- Gradual phase advance moves bedtime and wake time earlier by 15 to 30 minutes every few days, paired with morning light on the new schedule.
- Motivational interviewing addresses the ambivalence that sinks most schedules, since treatment costs patients their preferred evening hours.
- Adolescent protocols include family and school: negotiated screen curfews, later first-period placement, and monitored weekend wake times.
- Treat residual sleep-onset anxiety with cognitive restructuring, because conditioned arousal frequently outlives the corrected phase.

ADJUNCT & SUPPORTIVE

- Bright light of **2,000-10,000 lux** for 30 to 60 minutes immediately on waking is the core intervention, and outdoor daylight works at no cost.
- Restrict evening light after roughly 8 p.m. using dim warm lamps, blue-blocking lenses, and device night modes on every screen.
- Hold one wake time all seven days, since allowing more than about a 1 hour weekend delay reliably re-delays the circadian clock.
- Track outcome with sleep diaries, wrist actigraphy, the **Morningness-Eveningness Questionnaire**, and salivary melatonin onset when available.
- School start times of 8:30 a.m. or later increase adolescent sleep duration and reduce tardiness, absenteeism, and drowsy driving crashes.

- ☆ **CLINICAL PEARLS**
- Normal sleep at the wrong clock time is a circadian problem, not insomnia.
 - Melatonin timing beats melatonin dose: small, and hours before habitual sleep.
 - Morning light plus a fixed wake time; one late weekend undoes the whole week.

References

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NOTE

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