The Sleepy Teenager
by Kyle P. Johnson, M.D.

The rapid physiological, emotional, and social changes of adolescence often have disturbing effects on sleep. Teenagers need more sleep than school age children but usually get less, and the shortfall causes many problems. Daytime fatigue and drowsiness may affect schoolwork by reducing concentration and short-term memory. Sleepy teenagers are more easily injured, especially in traffic accidents, and lack of sleep raises the risk of depression and the use of alcohol and illicit drugs.

A standard way to measure daytime drowsiness is the Multiple Sleep Latency Test (MSLT). The person taking the test is asked to try to take a nap every couple of hours, and the time it takes to fall asleep (sleep latency) is recorded. Anyone who falls asleep within ten minutes probably has not been getting sufficient sleep at night. It turns out that — by this standard or more informal standards — teenagers ordinarily need eight and a half to nine and a quarter hours of sleep a night to be fully rested. But surveys indicate that during the school week, average sleep time ranges from about seven hours, 40 minutes in 13-year-olds, to barely over 7 hours in 19-year-olds. Only 15% of adolescents sleep as long as eight and half hours on school nights, and 26% say they usually sleep six and a half hours or less. They try to compensate on weekends by sleeping nearly two hours longer on average.

The main reason adolescents don’t get enough sleep is that they simply don’t make enough time for it, because of early school hours, homework, part-time jobs, and other demands. The typical high school student falls asleep at 11 or later. One reason is that many teenagers cherish the late night as one of the few times they have all to themselves. Another, possibly more important cause is their biological “phase delay”— a tendency to fall asleep and wake up later because of changes that occur at puberty in the internal body clock governing circadian (24-hour) biological rhythms.

A common circadian rhythm disturbance is known as delayed sleep phase syndrome (DSPS). Adolescents with DSPS cannot fall asleep until the early hours of the morning and often lie awake in bed for a long time. The problem is especially serious during the school year, when they have to get up early on weekdays and may sleep well into the afternoon on weekends to compensate. Meanwhile, they feel constantly drowsy during waking hours — except in summer, when they may sleep from 2 a.m. to noon. If allowed to persist, the syndrome is sometimes complicated by conditioning that associates bed and bedroom with wakefulness. Adolescents with DSPS are also at risk of developing poor sleep habits, such as using the bed for other purposes besides sleep. DSPS often leads to poor schoolwork and family conflict; it may be an unrecognized cause of behavior that looks like adolescent rebelliousness or delinquency. DSPS can also be mistaken for depression.

Some teenagers are drowsy during the day even though they seem to be sleeping normal hours. There could be several reasons for this. Sleep can be disrupted by drugs (including alcohol and caffeine), by the rebound effect when a drug leaves the body, and by medical conditions such as chronic pain or gastroesophageal reflux (heartburn). Psychiatric disorders are another cause of disrupted sleep and daytime sleepiness in teenagers. Either insomnia (especially difficulty in falling asleep) or, occasionally, excessive sleep may be a sign of depression in an adolescent patient. Anxiety disorders, post-traumatic stress, bipolar (manic-depressive) disorder, or the onset of a psychosis may also be contributing to the problem. Involuntary limb movements, including restless legs syndrome, are another possible source of unrefreshing sleep.

In trying to understand some adolescent sleep problems, it is important to recognize that sleep is not a uniform state. It has a structure sometimes described as sleep architecture, which is most evident in the cycle of REM (rapid eye movement) and non-REM sleep. During non-REM sleep, body temperature falls, breathing and heartbeat are regular, and brain waves are slow and rhythmical. We have
little conscious experience at these times. REM sleep begins about an hour and a half after we fall asleep and returns four or five times a night, becoming more frequent toward morning. This state of consciousness is completely different physiologically from non-REM sleep, more closely resembling the waking state. Muscles (except for the eyes and diaphragm) are almost completely paralyzed, but brain activity is at waking levels, and we have vivid dreams. Charting sleep architecture, especially the pattern of REM and non-REM periods, is often useful in diagnosing sleep disturbances and disorders; for example, the REM sleep of many depressed people begins unusually early in the night. Specialists can measure sleep patterns objectively in a laboratory with a polysomnogram (PSG), which records brain waves, body movements, breathing, and heart rate.

Two relatively rare but extremely serious causes of sleepiness in teenagers are narcolepsy and obstructive sleep apnea. Narcolepsy is a neurological syndrome that afflicts about 1 person in 2,000. Its chief symptoms, apart from daytime sleepiness, are cataplexy—a sudden loss of muscle tone (going limp) induced by strong emotions—and sudden attacks of REM sleep in the daytime. Other symptoms are sleep paralysis (inability to move although fully conscious during the onset of sleep or while waking) and hypnagogic hallucinations (dream-like auditory or visual hallucinations at the onset of sleep). These symptoms arise when REM (dreaming) sleep intrudes into waking periods. The diagnosis is made with the help of a polysomnogram and the Multiple Sleep Latency Test.

Narcolepsy has a strong genetic component, although scientists have not discovered a consistent pattern of hereditary transmission. In recent research, it has been linked to decreased numbers of the brain cells that produce a substance called hypocretin. But in more than four out of five cases, the disorder is precipitated by sleep deprivation, irregular sleep patterns, head trauma, infections, psychological stress, and other environmental influences.

Obstructive sleep apnea is the repeated interruption of breathing during sleep because the passage to the lungs is physically blocked. Symptoms include loud snoring, mouth breathing, and morning headaches as well as daytime drowsiness. Sleep apnea is diagnosed in the sleep laboratory with the aid of a polysomnogram. The disorder is common in middle-aged and elderly people, and it raises the risk of coronary artery disease, high blood pressure, and stroke. It rarely occurs in adolescents unless they are vastly overweight, have enlarged tonsils, or suffer from a physical malformation such as an unusually small jaw.

When physicians or other professionals evaluate sleep troubles in adolescents, they begin with a detailed clinical history of sleep problems in the patient and the patient's family, as well as interviews with the patient, family members, and sometimes school staff. They need a careful description of the patient's bedtime routines and environment, including middle-of-the-night awakenings, wake-up times, morning routines, daytime alertness, and sleep schedules. It is often helpful to have the adolescent describe a typical weekday, weekend day, and vacation day. The patient should keep a sleep diary for two weeks. Of course, a medical and psychiatric history are also essential, and it is important to know which drugs the patient is taking or has been taking in the past. A physical examination is necessary to check for sleep apnea. It may also be useful to have the patient wear a wrist actigraph, a device about the size of a wrist watch that measures and times physical activity in both sleeping and waking hours over a period of several weeks. Physicians will need to call on a sleep medicine specialist if the standard treatments fail, and also in special cases such as suspected narcolepsy, periodic limb movements, or sleep apnea.

The key to successful treatment is building rapport with adolescents and identifying their concerns and goals. No matter what the cause of insufficient sleep, education and motivational counseling will help. Beyond that, treatment depends on the underlying cause. Many teenagers will have fewer problems if they are allowed to start school at a time that accommodates their biological tendency to delay circadian rhythms. Several school districts across the country have taken this measure, and systematic studies in Minnesota suggest that it is effective. Adolescents with severe DSPS may need more; well-timed exposure to bright light and doses of the hormone melatonin, which regulates the internal body clock, are often useful.

Antidepressants and psychotherapy (including cognitive and interpersonal therapies) are recommended for depression or anxiety. For conditioned (learned) insomnia, useful approaches include behavior therapy and improved sleep hygiene—regular exercise, a regular bedtime, avoiding alcohol and caffeine. Stimulant medications, including...
methylphenidate (Ritalin) and the novel drug modafinil (Provigil), are used to prevent daytime sleepiness caused by narcolepsy. Drugs that suppress REM sleep, such as the tricyclic antidepressants, may be prescribed for cataplexy. Sleep apnea can be treated by the use of continuous positive airway pressure (CPAP) — a device that keeps the breathing passage open by pumping air directly into the lungs through a face mask.

IN BRIEF

Heroin Addicts In the Long Run

For aging heroin addicts, quitting is difficult and the outlook is poor. That’s the conclusion of a 33-year follow-up of 571 California men admitted to a compulsory addiction program for criminal offenders in the early 1960s. Records were checked and interviews were conducted in 1975, in 1985–86, and finally in 1996–97. By then most were in late middle age (average age 57), but nearly half (284) were dead. The most common cause of death (22%) was accidental poisoning or drug overdose — 45 deaths from heroin and 16 from other drugs. Another 39% died of cancer, heart disease, or chronic liver disease, and 19.5% (55) by homicide, suicide, or accidents.

Of the remaining addicts, 242 were contacted for interviews and urine tests. Only about half of them (56%) tested negative for opiates, and 21% tested positive; the rest refused testing (10%) or were in prison (14%). Forty-one percent admitted using heroin during the previous year. More than two-thirds were also smokers, and many drank heavily and used marijuana and cocaine. The rate of physical and mental health problems was high (42% had hepatitis and 44% were receiving disability payments); 20% had been incarcerated in the previous year, and 60% were unemployed. Nevertheless, the abstinence rate was higher than it had been in 1985–86, when only 41% tested negative for opiates and 32% tested positive.

Many of the men had stopped using heroin for long periods; 47% had been abstinent for more than five years at some time. But long-term abstinence was not easy. Only 15% of the men who reported heroin use in 1986 were abstinent in 1997, and 25% of men who remained abstinent for 15 years eventually relapsed (according to the authors, alcoholics rarely relapse after five years of abstinence.)

On average, between 1985 and 1997, 7–9% of the original group of 571 had been using heroin every day, 2–3% had been using it occasionally, 20–22% were abstaining, and 2–6% were on methadone maintenance. (The rest were dead, in prison, or untraceable.) Even among the abstainers, many drank heavily and used other illicit drugs. Still, men who had been abstinent for five years at the time of the 1997 interview had lower rates of disability (33% versus 53%), depression, smoking, daily drinking, and criminal activity (8% versus 31% imprisoned in the previous year), and a much higher rate of employment (56% versus 15%). They did not differ from the others in age, race, or the likelihood of having hepatitis, HIV, and sexually transmitted diseases.

The authors point out that these men — who started using heroin, on average, at age 18 and were assigned to compulsory treatment after arrest and conviction in their early 20s — are not necessarily typical heroin users or even typical heroin addicts. But they suggest that, at least for this kind of addict, lifelong abstinence is probably an unrealistic goal.


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