Diagnosing and Treating Hypersomnia in Youth
Sleep Disorders Are Common in People Who Have Disabilities
by John Garcia, M.D.

The most common consequences of sleep disorders are fatigue and irritability. But in youth — especially children who have brain injuries or developmental disabilities — the consequences of sleep disorders can be more pervasive.

For example, in addition to exacerbating pain, sleep disorders can impair learning and complicate healing. As youth accumulate sleep debts, their quality of life, mood and memory often deteriorate significantly. Sleep deprivation also can harm a child’s cardiovascular, immune and metabolic systems.

Although numerous types of sleep disorders exist, this article focuses on hypersomnia: daytime sleepiness that persists despite adequate sleep. In cases of hypersomnia, neither night-time sleep nor daytime napping is restorative. Something else gets in the way.

Diagnosing and treating that “something else” is the key to improving clinical outcomes.

Signs and Symptoms
Although hypersomnia might seem uncommon, providers who routinely ask about patients’ sleep patterns will find plentiful instances of the condition.

Some signs of hypersomnia are clear. Although many children give up naps at about age 5, that phenomenon is more culturally created than physiologically based. One red flag appears when children who have grown up naps resume them. Such behavior points to a sleep disorder until proven otherwise. In addition, a child who is too sleepy to complete homework is similar to an adult who is unable to complete work. Such patients deserve evaluation by a physician specializing in sleep disorders.

Primary causes of hypersomnia are rare. They include:
- Narcolepsy: a deficiency of the neurotransmitter orexin/hypocretin — including myotonic dystrophy, Prader-Willi syndrome, Niemann-Pick disease and brain injury — exhibit orexin/hypocretin deficiency as part of the disease.
- Idiopathic hypersomnia, a condition that is associated with hypersomnia but does not meet diagnostic laboratory criteria for narcolepsy.

- Kleine-Levin syndrome (recurrent hypersomnia), which is seen in teens and young adults.

The Particular Case of Traumatic Brain Injuries
Sleep disorders are one of the most common symptoms of minor brain trauma in children and young adults. One study found that 75 percent of patients reported nighttime sleepiness one month after a traumatic brain injury (TBI). That compares to 41 percent of people who experienced trauma without a brain injury and 3 percent of a non-trauma control group.

Gillette Opens Brainerd Lakes Clinic
Gillette has opened a permanent hub for assistive-technology services in the Brainerd Lakes area. Our Brainerd Lakes Clinic, located in Baxter, Minn., offers services tailored to children, teens and adults who have:
- Bone and muscle problems, including spasticity
- Brain and spinal cord injuries
- Cerebral palsy

The new clinic houses an on-site assistive-technology laboratory for fittings, fabrication and adjustments. The clinic offers full custom orthoses (braces); adjustments to the Gillette Cuffable-orthosis; custom seating and mobility systems; augmentative and alternative communication consultations and devices; and consultations regarding computer access.

Gillette will continue to partner with Brainerd Medical Center to provide rehabilitation medicine services to children, teens and adults.

To make an appointment or to refer a patient to the Brainerd Lakes Clinic, call 218-842-5001 or 800-578-4296. You also can visit Gillette online at www.gillettechildrens.org.

GHS Opens Brainerd Lakes Clinic

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discuss their own sleep patterns ("self-report") because of neurotransmitter made in the lateral hypothalamus. Cognitive difficulties.

severe brain trauma, 90 percent of respondents could not report sleepiness. The study divided groups into patients suspected of having a diagnosis manifesting as hypersomnia. A clinical history and sleep logs will help a practitioner sort through night-to-night variability in sleep patterns. One of the benefits of actigraphy is that it can be done at home, rather than in a sleep laboratory where sleep patterns are fragmented. That means patients should feel better and not require treatment. For example, patients who have restless leg syndrome receive iron or pramipexole. Patients who have seizures need evaluations and treatments from a neurology team. Patients who have obstructive sleep apnea receive surgery or use a device to deliver continuous positive airway pressure. Patients with a primary hypersomnia are treated with stimulant medication or modafinil.

The prognosis for patients with hypersomnia is good. This is one of the most satisfying areas of sleep medicine because a diagnosis is generally identified and effective treatments are available. (The exception is Kleine-Levin syndrome, for which there is no known effective treatment.) Treatment usually improves the patient’s quality of life dramatically.

References
1 Brain Inj. 2006 Mar;20(3):327-32.

John Garcia, M.D.
A board-certified sleep specialist at Gillette Children’s Specialty Healthcare in St. Paul, Minn., and director of Gillette’s Sleep Medicine Clinic. He works with patients who have disabilities and associated sleep disorders, including obstructive sleep apnea, sleepwalking, circadian rhythm disorders, and restless leg syndrome.

Dr. Garcia is a graduate of the University of Iowa School of Medicine. He completed a residency in pediatrics and one year of fellowship training in behavioral/developmental pediatrics at Riley Hospital for Children in Indianapolis, Ind. He then completed a sleep fellowship equivalent at the Minnesota Regional Sleep Disorders Center in Minneapolis. Dr. Garcia holds clinics at Gillette’s main campus in St. Paul and at its Burnsville Clinic.

His professional associations include the American Board of Sleep Medicine and the American Board of Pediatrics.
Researchers hypothesize that sleepiness following a TBI is caused by an injury to the posterior lateral hypothalami, which decreases levels of the excitatory hypothalamic neurotransmitter hypocretin-I (orexin). Orexin is an alerting neurotransmitter made in the lateral hypothalamus. Because orexin is broadly distributed both to the cortex and to the brainstem, it’s easy to see how the forces of a TBI could disrupt its production. One study found deficient levels of hypocretin in 55 percent of patients who experienced acute moderate to severe TBIs.

Studies have shown that long-term outcomes from severe brain injuries can be compromised when patients experience sleep disorders. Once you eliminate sleep disorders, cognitive deficits might improve or disappear.

### DIAGNOSING HYPOSOMNIA

A clinical history and sleep logs will help a practitioner sort through the differential diagnosis of hypersomnia. Patients suspected of having a diagnosis manifesting as hypersomnia should undergo actigraphy, an overnight polysomnogram, and a multiple sleep latency test.

#### The 24-Hour History

One initial way to uncover sleep disorders is to ask patients or families to describe their sleep patterns during 24 typical hours. Begin with the dinnertime hour, then continue by asking the nonthreatening question, “What happens next?” Keep track of responses, including information about:

- Bedtime routines
- Frequency, character and duration of arousals
- Time it takes to wake patient (awakening spontaneous or aided by a parent?)
- Routine necessary to get patient out of bed
- Daytime behavior
- Timing and duration of naps

Determine whether daytime behavior is consistent with excessive daytime sleepiness. Ask patients whether they are falling asleep in school. If they admit to resting their head on their desk, chances are they are falling asleep during the day.

In at least half of all cases, a 24-hour sleep history will uncover a sleep-disorder diagnosis.

#### Sleep Log

Another helpful tool for measuring the effects of a sleep disorder is a sleep log. A sample is available online at [www.gillettechildrens.org/SleepLog](http://www.gillettechildrens.org/SleepLog). The log is an easy way for patients, or their parents, to provide an overview of information concerning sleep habits.

To complete a sleep log, patients or their parents:

- Note the time they went to bed.
- Mark the hours during which they were asleep.
- Mark the time they got out of bed for the day.
- Indicate times they exercised, consumed caffeine or took medication.

A physician specializing in sleep medicine can use the information to diagnose and treat sleep disorders.

#### Actigraphy

Actigraphy is useful in clinically evaluating excessive sleepiness. The patient wears an activity sensor, the size of a wristwatch, to measure gross motor activity for up to several weeks. A computer algorithm correlates inactivity with sleep. Actigraphy gathers data that helps us map any sleep-related variability in sleep patterns.

One of the benefits of actigraphy is that it can be done at home, rather than in a sleep laboratory where sleep patterns can differ from a patient’s usual experiences. It is especially useful in evaluating insomnia.

#### Multiple Sleep Latency Test

Ultimately, the diagnosis of hypersomnia as an entity separate from fatigue is best made with a multiple sleep latency test. Otherwise, it is nearly impossible to differentiate fatigue and sleepiness from one another.

Fatigue is generally defined as a temporary loss of strength and energy. Hypersomnia is defined as the ability to fall asleep. Although fatigued people might describe themselves as sleepy, they cannot fall asleep when given the opportunity.

In a multiple sleep latency test, a patient is offered five opportunities to nap. Those opportunities are spaced two hours apart throughout the day. In prodromal children, a mean sleep latency of less than 15 minutes is considered consistent with a diagnosis of hypersomnia.

The multiple sleep latency test usually takes place after the overnight test, which rules out obstructive sleep apnea and other sleep disorders.

#### Treatment and Prognosis

The goal of treatment should be to return patients to normal alertness. That means patients should feel better and not require naps. Treatment should include the judicious use of medication (beyond hypnotic drugs), with an emphasis on nonpharmacological management. Stimulant medications, including methylphenidate and amphetamines, are generally very effective. When side effects — including headache, stomach ache, appetite suppression and tics — are troublesome, modafinil can be an effective option.

If an overnight sleep exam confirms the existence of a disorder fragmenting sleep, that disorder too, can be treated. For example, patients who have restless leg syndrome receive iron or pramipexole.

### References

4. 24-Hour History

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Patients who have seizures need evaluations and treatments from a neurology team. Patients who have obstructive sleep apnea receive surgery or use a device to deliver continuous positive airway pressure. Patients with a primary hypersomnia are treated with stimulant medication or modafinil.

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Sleep Disorders Are Common in People Who Have Disabilities

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The most common consequences of sleep disorders are daytime fatigue and irritability. But in youth — especially children who have brain injuries or developmental disabilities — the consequences of sleep disorders can be more pervasive. For example, in addition to exacerbating pain, sleep disorders can impair learning and contribute to behavioral issues. As youth accumulate sleep debts, their quality of life, mood and memory often deteriorate significantly. Sleep deprivation also can harm a child’s cardiovascular, immune and metabolic systems. Although numerous types of sleep disorders exist, this article focuses on hypersomnia. Daytime sleepiness that persists despite a child’s full sleep in cases of hypersomnia, night-time sleep or daytime napping is restorative. Something else gets in the way. Diagnosing and treating that “something else” is the key to improving clinical outcomes.

Signs and Symptoms

Although hypersomnia might seem uncommon, providers who routinely ask about patients’ sleep patterns will find plentiful instances of the condition. Some signs of hypersomnia are clear. Although many children who wake up early or who nap a lot about school, that phenomenon is more culturally created than physiologically based. One red flag appears when children who have given up naps resume them. Such behavior points to a sleep disorder until proven otherwise. In addition, a child who is too sleepy to complete homework is similar to an adult who is unable to complete work. Such patients deserve evaluation by a physician specializing in sleep disorders. Primary causes of hypersomnia are rare. They include:

- Narcolepsy, a deficiency of the neurotransmitter orexin/hypocretin; some syndromes — including myotonic dystrophy, Prader-Willi syndrome, Niemann-Pick disease and brain injury — exhibit orexin/hypocretin deficiency as part of the disease.
- Idiopathic hypersomnia, a condition that is associated with hypersomnia but does not meet diagnostic laboratory criteria for narcolepsy.
- Kleine-Levin syndrome (recurrent hypersomnia), which is seen in teens and young adults and may wax, between periods of hypersomnia, patients experience typical sleep patterns.

In patients with neurological disorders, such as cerebral palsy or muscular dystrophy, daytime sleepiness also can be a symptom of hypercarbia. Hypercarbia is caused by restrictive lung disease, muscle weakness and difficulty managing secretions. More often, primary-care providers will see hypersomnia resulting from secondary causes, such as brain injuries (see next section) and disorders that fragment nighttime sleep. Disorders that fragment sleep include restless leg syndrome, sleep apnea, nocturnal seizures, and periodic limb movement disorder. In addition, sleep disorders often occur secondary to developmental disabilities. For example, sleep problems affect about 30 percent of children who have cerebral palsy, epilepsy, brain injuries and spinal cord injuries. Between 25 and 50 percent of children who have attention deficit hyperactivity disorder also have sleep disorders. Brain tumors and their treatment also can cause brain injuries and subsequent hypersomnia.

The Particular Case of Traumatic Brain Injuries

Sleep disorders are one of the major symptoms of minor brain trauma in children and young adults. One study found that 70 percent of patients reported daily sleepiness one month after a traumatic brain injury (TBI). That compares to 41 percent of people who experienced trauma without a brain injury and 3 percent of a non-trauma control group.
Hypersomnia: A Case Study

A 10-year-old girl sustained a traumatic brain injury after a motor vehicle accident. She displayed slow responses and showed trouble processing information. Because obstructive sleep apnea and hypersomnia were suspected, she had a consultation with a sleep medicine specialist.

A polysomnogram showed that she fell into rapid eye movement (REM) sleep immediately upon falling asleep. That symptom is common in patients with narcolepsy. Typically, REM sleep occurs relatively late in the night; seeing it in the first hour of sleep is abnormal. A multiple sleep latency test showed that her mean sleep latency averaged 10 minutes. (Sleep latency of less than 15 minutes is considered abnormal in children.)

Further investigation found that a nutritional supplement, which the family was giving the girl, had caused it. When that supplement was replaced with a stimulant medication, the girl’s sleep improved.

References


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If an overnight sleep exam confirms the existence of a disorder (fragmenting sleep, that disorder too, can be treated. For example, patients who have restless leg syndrome receive iron or pramipexole. Patients who have seizures need evaluations and treatments from a neurology team. Patients who have obstructive sleep apnea receive surgery or use a device to deliver continuous positive airway pressure. Patients with a primary hypersomnia are treated with stimulant medication or modafinil.

The prognosis for patients with hypersomnia is good. This is one of the most satisfying areas of sleep medicine because a diagnosis is generally identified and effective treatments are available. (The exception is Kleine-Levin syndrome, for which there is no known effective treatment.) Treatment nearly always improves the patient’s quality of life dramatically.

Sleep Log

Another helpful tool for measuring the effects of a sleep disorder is a sleep log. A sample is available online at www.gillettechdrens.org/SleepLog. The log is an easy way for patients, or their parents, to provide an overview of information concerning sleep habits.

To complete a sleep log, patients or their parents:

• Note the time they went to bed.
• Mark the hours during which they were asleep.
• Mark the time they got out of bed for the day.
• Indicate times they exercised, consumed caffeine or took medication.

A physician specializing in sleep medicine can use the information to diagnose and treat sleep disorders.

Sleep Disorders

Sleep disorders are a common occurrence, and the effects of sleep deprivation are significant. Sleep disorders can interfere with academic and job performance, and interfere with quality of life dramatically. It is especially important to address sleep disorders in children, as early intervention can prevent complications that may arise later in life.

Sleep-Wake Disorders

Sleep-wake disorders, or sleep disorders, are a group of conditions that can affect the ability of a person to sleep. These conditions can range from mild to severe and can be caused by a variety of factors, including stress, medication, and underlying health conditions.

One of the most common sleep-wake disorders is insomnia, which is characterized by a difficulty in falling asleep, staying asleep, or both. Insomnia can be caused by a variety of factors, including stress, medication, and underlying health conditions.

Another sleep-wake disorder is narcolepsy, which is characterized by sudden episodes of sleepiness and cataplexy, a temporary loss of muscle tone.

A third sleep-wake disorder is sleep apnea, which is characterized by episodes of breathing暂停 during sleep. Sleep apnea can be caused by a variety of factors, including a large or obstructive airway, or a neurological condition.

Diagnosis and Treatment

The diagnosis of sleep-wake disorders often requires a comprehensive evaluation by a sleep medicine specialist. This evaluation can include a medical history, physical examination, and various tests and procedures, such as polysomnography, which is a sleep study that can help identify the specific sleep-wake disorder.

Treatment options for sleep-wake disorders can vary depending on the specific disorder and the individual's needs. These may include medication, behavioral therapy, and lifestyle changes.

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Diagnosing and treating that “something else” is the key to improving clinical outcomes.

Signs and Symptoms
Although hypersomnia might seem uncommon, providers who routinely ask about patients’ sleep patterns will find plentiful instances of the condition.

Some signs of hypersomnia are clear. Although many children who are kept up about age 4, that phenomenon is more culturally created than physiologically based. One red flag appears when children who have given up naps resume them. Such behavior points to a sleep disorder until proven otherwise. In addition, a child who is too sleepy to complete homework is similar to an adult who is unable to complete work. Such patients deserve evaluations by a physician specializing in sleep disorders.

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- Idiopathic hypersomnia, a condition that is associated with hypersomnia but does not meet diagnostic laboratory criteria for narcolepsy
- Kleine-Levin syndrome (recurrent hypersomnia), which is seen in teens and young adults, mostly males; between periods of hypersomnia, patients experience typical sleeping patterns
- In patients with neuromuscular disorders, such as cerebral palsy or muscular dystrophy, daytime sleepiness also can be a symptom of hypercarbia. Hypercarbia is caused by restrictive lung disease, muscle weakness and difficulty managing secretions.

More often, primary-care providers will see hypersomnia resulting from secondary causes, such as brain injuries (see next section) and disorders that fragment nighttime sleep. Disorders that fragment sleep include restless leg syndrome, sleep apnea, nocturnal seizures, and periodic limb movement disorder.

In addition, sleep disorders often occur secondary to developmental disabilities. For example, sleep problems affect about 30 percent of children who have cerebral palsy, epilepsy, brain injuries and spinal bifida. Between 25 and 50 percent of children who have attention deficit hyperactivity disorder also have sleep disorders. Brain tumors and their treatment also can cause brain injuries and subsequent hypersomnia.

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