Call 651-726-2899. To schedule an appointment, see the "Contact Us" section in this edition of *Pediatric Perspective*. For more information about Gillette’s sleep services, visit the Sleep Health Clinic at www.gillettechildrens.org/sleep.

**Referral Information**

Gillette accepts referrals from physicians, community professionals and outside agencies. To schedule an outpatient appointment, contact Patient Appointments at 651-229-4707, Monday through Friday between 8 a.m. and 5 p.m. Physicians who are on staff can admit patients by calling 651-229-3000.

**Patient Appointments**

651-229-4707

**Center for Cerebral Palsy**

651-229-4712

**Center for Craniofacial Disorders**

651-229-3335

**Center for Earl and Motion Analysis**

651-229-3356

**Center for Pediatric Neurosciences**

651-229-1717

**Center for Pediatric Orthopaedics**

651-229-1716

**Center for Pediatric Rehabilitation**

651-229-2315

**Center for Pediatric Rheumatology**

651-229-3993

**Center for Spina Bifida**

651-339-2478

**Gillette Lifetime**

651-643-9413

**Specialty Healthcare**


**Gillette Sleep Health Clinic Receives Accreditation**

The American Academy of Sleep Medicine (AASM) has granted accreditation to the Sleep Health Clinic at Gillette Children’s Specialty Healthcare. AASM is committed to ensuring that sleep-medicine specialists provide excellent health care and enhance the awareness of sleep as an important element of health, public safety, and quality of life.

Gillette’s sleep health team works with children and adults who have disabilities. The team works closely with neurologists to identify seizures, such as tonic, that might be affecting sleep. Using electroencephalograms, Gillette’s sleep medicine specialists record electrical currents in the brain and identify the cause of sleep disturbance. The team also measures heart rate, limb movements, and oxygen and carbon dioxide levels to better understand a patient’s unique situation.

Sleep clinic appointments are available at Gillette’s St. Paul campus, Burnsville Clinic, and the Gillette Sleep Health Clinic at St. Paul – Phalen Clinic. For more information about Gillette’s sleep services, call 651-726-2899. To schedule an appointment, call 651-229-3995.

**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); 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 218-842-5051 or 800-578-4266. You also can visit Gillette online at www.gillettechildrens.org.

**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 a lack of 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 and adults report that about 41 percent of people who have hypersomnia, or “sleep是一个 symptom of hypercarbia. Hypercarbia is caused by restrictive lung disease, muscle weakness and difficulty managing secretions.

More, 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 spina 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.

The Particular Case of Traumatic Brain Injuries

Sleep disorders are one of the main symptoms of minor brain trauma in children and young adults. One study found that 52 percent of patients reported daytime 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 traumatic control group.

To return to the top of the page, click here.
That supplement was replaced with a stimulant because of cognitive difficulties.

Researchers hypothesize that sleepiness following a TBI is caused by an injury to the posterostratal hypothalamus, which decreases levels of the excitatory hypothalamic neuropeptide hypocretin-1 (orexin). Orexin is an alerting neuropeptide made in the lateral hypothalamus. Because orexin is broadly distributed both to the cortex and to the brainstem, it is easy to see how the forces of a TBI could disrupt its production. One study found 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 defects might improve or disappear.

Diagnosing Hypersomnia

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 travel hours, 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 (is 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. 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 make any night-to-night variability as 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.

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. If the family was giving the girl, had caffeine in it.

References


John Garcia, M.D., is 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.

John Garcia, M.D.

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

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

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—such as 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. 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.
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neurotransmitter made in the lateral hypothalamus. Orexin is an alerting neuropeptide called orexin-1 (orexin). Orexin is an alerting neuropeptide called orexin-1 (orexin). Because orexin is broadly distributed both to the cortex and to the brainstem, it is easy to see how the forces of a TBI could damage its production. One study found levels of hypocretin-1 in 55 percent of patients who experienced acute moderate to severe TBIs.

Researchers hypothesize that sleepiness following a TBI is caused by an injury to the posterolateral hypothalamus, which decreases levels of the excitatory hypothalamic neuropeptide hypocretin-1 (orexin). Orexin is an alerting neuropeptide called orexin-1 (orexin).

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• 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 Log

The 24-Hour History

One initial way to uncover sleep disorders is to ask patients or their families to describe their sleep patterns during 24 typical hours. Begin with the patient in a calm environment, then continue by asking the nonthreatening question, “What happens next?”

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One initial way to uncover sleep disorders is to ask patients or their families to describe their sleep patterns during 24 typical hours. Begin with the patient in a calm environment, then continue by asking the nonthreatening question, “What happens next?”

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 prepubertal children, a mean sleep latency of fewer than 15 minutes is considered consistent with a diagnosis of objective hypersomnia.

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.)

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 hypnotics or sleep aids), with an emphasis on pharmacological management. Stimulant medications, including methylphenidate and amantadine salts, are generally very effective. When side effects occur — including headache, stomachache, appetite suppression, and tics — treatment of medication can be an effective option.

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References


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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 compromise 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 an adult’s life. In cases of hypersomnia, neither nighttime 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 who have been sleep deprived report that about 15 percent of a trauma-free control group.

One study found that 35 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 57 percent of patients reported disrupted daytime sleep 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 trauma-free control group.
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neuropeptide hypocretin-1 (orexin). Orexin is an alerting
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 95 percent of patients who

• Timing and duration of naps
• Daytime behavior
• Routine necessary to get patient out of bed
• Frequency, character and duration of arousals
• Time it takes to wake patient (is awakening spontaneous or
aided by a parent?)
• Routine necessary to get patient out of bed
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One initial way to uncover sleep disorders is to ask patients
or families to describe their sleep patterns during 24 typical
hours. Begin with sleep duration, then continue by
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To complete a sleep log, patients or their parents:
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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.  

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
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During treatment of hypersomnia,

The goal of treatment should be to return patients to normal
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Stimulant medications, including methylphenidate and amphetamine salts, are generally very effective. When side effects — including headaches, stomach ache, appetite decrease and tics — are troublesome, modafinil may be an effective option.  

If an overnight sleep exam confirms the existence of a disorder
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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.  

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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 and teens complain about sleepiness, abnormalities that are 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.

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 criteria for narcolepsy
- Kleine-Levin syndrome (recurrent hypersomnia), which is seen in teens and young adults
- Other sleep disorders such as narcolepsy, sleep apnea, nocturnal seizures, and periodic limb movement disorder

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 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.

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Revised by John Garcia, M.D.

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