CEU Update

A semi-annual publication of the
National Association for Health Professionals

JANUARY 2009

Issue #0109

Sleep Disorders

Parasomnias

Parasomnias are disruptive sleep-related disorders. They are characterized by undesirable physical or verbal behaviors or experiences. Parasomnias occur in association with sleep, specific stages of sleep or sleep-awake transition phases.

Parasomnias may be divided into the following categories:
Primary parasomnias are the disorders of sleep states. They are further classified according to the stage of sleep in which they originate: rapid eye movement (REM) (a stage of sleep in which the eyes move rapidly and dreaming occurs) or non-rapid eye movement (NREM) (stage of sleep in which eye movement does not take place).
Secondary parasomnias are disorders of other organ systems that may manifest during sleep, for example, seizures (convulsions), respiratory dyskinesias (difficulty in performing respiratory movements), arrhythmias (abnormal heart rhythms), and gastroesophageal reflux (food or liquid regurgitating from the stomach into the foodpipe).

Nightmare disorder
Nightmare disorder is also called dream anxiety attack. Most patients with nightmare disorder are children. Nightmares are frightening dreams that occur during REM sleep and are associated with an increase in heart rate (tachycardia), an increase in the rate of breathing (tachypnea), profuse sweating, and arousal. Most of the time, the patient remembers the scary dream in detail and responds to soothing and comforting by a parent or caregiver.

Sleep terror disorder
Sleep terror disorder is characterized by extreme panic and a sudden, loud, terrified scream during sleep, followed by physical activities such as hitting objects or moving in and out of the bedroom. Persons with this disorder can injure themselves. Sleep terror is a disorder of arousal that primarily occurs during stages III and IV of NREM sleep. Subsequent recollection of the episodes either does not occur or is partial.

Sleepwalking disorder
Patients with sleepwalking disorder show complex automatic behaviors, such as wandering aimlessly, carrying objects without any purpose, going outdoors, and performing other activities of varying complexity and duration (even driving). Persons affected with the disorder usually have their eyes wide open in a stare. They may mumble; however, communication with a person who is sleepwalking is usually poor or impossible. This disorder occurs in the slow-wave stages of NREM sleep.

REM sleep behavior disorder
Patients with REM sleep behavior disorder act out distinctly altered dreams that are vivid, intense, action-packed, and violent. Dream-enacting behaviors include talking, yelling, punching, kicking, sitting, jumping out of bed, arm flailing, and grabbing. An acute form may occur during withdrawal from ethanol or sedative-hypnotic drugs. See REM Sleep Behavior Disorder.

Restless legs syndrome and periodic limb movement disorder
Restless legs syndrome and periodic limb movement disorder are common disorders that often may coexist. The primary symptom of restless legs syndrome is insomnia (inability to sleep), whereas periodic leg movement disorder is a well-recognized cause of excessive daytime sleepiness. Nearly all persons with restless legs syndrome have periodic limb movements, and only few persons with periodic limb movement disorder also have restless legs syndrome.

Sleep Disorder Symptoms

The symptoms associated with each subtype of the parasomnias are as follows:

Nightmare disorder
Person complains of a frightening dream.
Arousal during the dream is common.
The presence of a dream is the essential feature that differentiates nightmare disorder from sleep terror disorder.

Sleep terror disorder
A sleep terror is characterized by a sudden arousal.
Commonly, the person cries out or screams as he or she is aroused.
The person has an increased heart rate, an increase in the respiratory rate, flushing, sweating, and increased muscle tone.
The person is routinely unresponsive to external stimuli and, when awakened, is confused, disoriented, and does not remember the event.
Incoherent speech or passing of urine has been reported to accompany the event.

Sleepwalking disorder
Episodes of sleepwalking are associated with behaviors that range from simply sitting up in bed to walking, possibly with associated complex behaviors such as eating. Talking behavior has also been noted during episodes of sleepwalking.
Upon awakening, the person most often is confused and does not remember the event.
The event may spontaneously terminate, or the person may return to bed or lie down somewhere else and go off to sleep without waking up from sleep.

REM sleep behavior disorder
The main feature of this disorder is the acting out of dreams. The behavior can include punching, kicking, leaping, and running from the bed. The most common reason for medical consultation is injury to the bed partner, although the effects of sleep disruption can also precipitate such consultation. The event occurs during REM sleep.
In persons with REM sleep behavior disorder, arousals from sleep to alertness and orientation occur rapidly, and they usually vividly recall their dreams.
After awakening, the person's behavior and interactions are normal.
Acute (short-term) and chronic (long-term) forms exist. The acute form can emerge during withdrawal from ethanol or sedative-hypnotic abuse and with anticholinergic and other drug intoxication states. The chronic form presents for evaluation following observations of bed partners.
Despite nighttime behavior, few persons develop excessive daytime sleepiness or fatigue.

Restless legs syndrome and periodic limb movement disorder
Persons with restless legs syndrome describe discomfort in the legs, using terms, such as "pulling, searing, crawling, creeping, and boring" to describe these sensations. The symptoms usually occur at bedtime or during other periods of inactivity. These distressing symptoms are relieved by moving the legs, walking about, rubbing

the legs, squeezing or stroking the legs, and by taking hot showers or baths. The symptoms may wax and wane over the person's lifetime.
Persons with restless legs syndrome commonly present with complaints of insomnia (inability to sleep), and, in severe cases, the disorder may cause depression and suicidal thoughts.
Periodic limb movement disorder primarily occurs during sleep. This disorder is described as rhythmic extension of the great toe, associated with dorsiflexion (upward movement) of the ankle and light flexion (bending) of the knee and hip. Because periodic limb movement disorder occurs during sleep, the symptoms are often not noticed by the person. Affected persons often complain of excessive daytime sleepiness, initially during passive activities, such as watching TV, being a passenger in a car, or reading. In later stages, one may have excessive daytime sleepiness during activities requiring alertness, such as driving, operating machinery, or talking with people.
Restless legs syndrome and periodic limb movement disorder may occur even during childhood and present as attention deficit disorder with hyperactivity or as growing pains.
Restless legs syndrome and periodic limb movement disorder are present in a significant percentage of pregnant women, and exacerbations are observed during menstruation and menopause.
These disorders are associated with numerous neurological conditions, such as peripheral neuropathy, postpolio syndrome, and spinal cord pathology (disease).
Restless legs syndrome and periodic limb movement disorder affect 20-40% of persons with chronic renal (kidney) failure who are on dialysis.
A history of iron-deficiency anemia is also common in persons with restless legs syndrome and periodic limb movement disorder.

Medical Treatment

The treatment of parasomnias is aimed at lessening the frequency and/or intensity of the events.

Sleepwalking and sleep terror disorder
In children, sleepwalking and sleep terrors usually do not need to be treated. However, risk factors should be identified and minimized.
In adults, especially in cases involving sleep-related injury, drugs may be required and can be lifesaving. Benzodiazepines, which are used for insomnia situations where an individual awakens after falling asleep, such as estazolam (ProSom), have been found to be safe and remarkably effective in adults with sleepwalking and sleep terrors.

REM sleep behavior disorder
Treatment for REM sleep behavior disorder is initiated with clonazepam (Klonopin) taken at bedtime. Clonazepam is remarkably effective in controlling both the behavioral and the dream-disordered components of REM sleep behavior disorder. This drug has been shown to be beneficial in the long term. Drug discontinuation often results in prompt relapse.
Tricyclic antidepressants are occasionally used in the treatment of REM sleep behavior disorder. Imipramine has been used, but the effects are unpredictable.
Several reports of levodopa/carbidopa, gabapentin, pramipexole, and clonidine have been published, but the benefit of these drugs has not been systemically evaluated.

Restless legs syndrome and periodic limb movement disorder
Restless legs syndrome and periodic limb movement disorder are treated with 3 classes of medications. Treatment guidelines are as follows:
Anti-parkinsonian drugs, such as levodopa/carbidopa, bromocriptine, ropinirole (Requip), pergolide (Permax), and pramipexole (Mirapex), have been used.
Benzodiazepines, especially clonazepam have been effective. Other benzodiazepines used have included diazepam, temazepam, and lorazepam.

Opiates, such as codeine, oxycodone, methadone, and propoxyphene, are other drugs that have been used.
Dopamine agonists, such as levodopa or pergolide, may be effective, but the effectiveness may not last, and some individuals are unable to tolerate side effects.
Other drugs that have shown effectiveness include clonidine or anticonvulsants, such as carbamazepine, valproate, and gabapentin.

Several studies have reported efficacy of different medications belonging to the aforementioned groups, but comparative studies between various classes of drugs or even individual drugs do not exist. Therefore, persons should receive one drug, and, if no response is noted, they should be placed on another drug of the same class or a different class.
A combination of drugs may be required in more severe cases. Some persons who do not respond to benzodiazepines alone, levodopa alone, or a combination of both may be treated with opiates.

One should receive the smallest possible dose and should be closely observed for the development of dependency. Experience reveals that the incidence of abuse, tolerance, or addiction to opiates or benzodiazepines in persons with severe restless legs syndrome appears to be insignificant. The disabling condition of severe restless legs syndrome must be treated aggressively.
Restless legs syndrome and periodic limb movement disorder are chronic conditions that require long-term drug therapy. Some persons may develop symptoms of restless legs during the daytime, and this may be treated with controlled release of levodopa/carbidopa administered in the evening and morning.
Avoidance of certain drugs, such as tricyclic antidepressants, fluoxetine, or lithium, may be helpful because these drugs generally worsen the symptoms of restless legs syndrome and periodic limb movement disorder.
A decrease in body iron stores, as indicated by serum ferritin (an iron-protein complex) levels less than 50 mcg/L, should be corrected with iron supplementation. Oral iron is preferred but takes a long time to provide improvement, because gastrointestinal absorption is low. However, replenishment is an effective treatment strategy for iron-deficiency anemia and may also relieve symptoms of restless legs syndrome and periodic limb movement disorder (if present).

Outlook for these disorders

Nightmare disorder
Most children outgrow this disorder.
A small number of children report this disorder persisting into adulthood and becoming a lifelong problem.
Some persons may experience a reduction of the symptoms later in life.

Sleep terror disorder
If the onset is in childhood, the outlook is excellent.
If the onset is in adulthood, the outlook is poor because the disorder tends to be chronic (lasting a long time), with a waxing and waning course.

Sleepwalking disorder
If the onset is in childhood, the outlook is excellent.
If the onset is in adulthood and no evidence of an underlying neurological or substance abuse problem is present, the outlook is poor because the disorder tends to be chronic, following a waxing and waning course.

Restless legs syndrome and periodic limb movement disorder
The outlook of these disorders is variable.
Many persons develop long-term remissions, whereas others continue to experience the symptoms throughout life.
Generally, the severity increases as one becomes older.

Problem Sleepiness

Everyone feels sleepy at times. However, when sleepiness interferes with daily routines and activities, or reduces the ability to function, it is called "problem sleepiness." A person can be sleepy without realizing it. For example, a person may not feel sleepy during activities such as talking and listening to music at a party, but the same person can fall asleep while driving home afterward. You may have problem sleepiness if you: consistently do not get enough sleep, or get poor quality sleep; fall asleep while driving; struggle to stay awake when inactive, such as when watching television or reading; have difficulty paying attention or concentrating at work, school, or home; have performance problems at work or school; are often told by others that you are sleepy; have difficulty remembering; have slowed responses; have difficulty controlling your emotions; or must take naps on most days.

Causes of Problem Sleepiness

Sleepiness can be due to the body's natural daily sleep-wake cycles, inadequate sleep, sleep disorders, or certain drugs.

Sleep-Wake Cycle

Each day there are two periods when the body experiences a natural tendency toward sleepiness: during the late night hours (generally between midnight and 7 a.m.) and again during the midafternoon (generally between 1 p.m. and 4 p.m.). If people are awake during these times, they have a higher risk of falling asleep unintentionally, especially if they haven't been getting enough sleep.

Inadequate Sleep

The amount of sleep needed each night varies among people. Each person needs a particular amount of sleep in order to be fully alert throughout the day. Research has shown that when healthy adults are allowed to sleep unrestricted, the average time slept is 8 to 8.5 hours. Some people need more than that to avoid problem sleepiness; others need less. If a person does not get enough sleep, even on one night, a "sleep debt" begins to build and increases until enough sleep is obtained. Problem sleepiness occurs as the debt accumulates. Many people do not get enough sleep during the work week and then sleep longer on the weekends or days off to reduce their sleep debt. If too much sleep has been lost, sleeping in on the weekend may not completely reverse the effects of not getting enough sleep during the week.

Sleep Disorders

Sleep disorders such as sleep apnea, narcolepsy, restless legs syndrome, and insomnia can cause problem sleepiness. Sleep apnea is a serious disorder in which a person's breathing is interrupted during sleep, causing the individual to awaken many times during the night and experience problem sleepiness during the day. People with narcolepsy have excessive sleepiness during the day, even after sleeping enough at night. They may fall asleep at inappropriate times and places. Restless legs syndrome (RLS) causes a person to experience unpleasant sensations in the legs, often described as creeping, crawling, pulling, or painful. These sensations frequently occur in the evening, making it difficult for people with RLS to fall asleep, leading to problem sleepiness during the day. Insomnia is the perception of poor-quality sleep due to difficulty falling asleep, waking up during the night with difficulty returning to sleep, waking up too early in the morning, or unrefreshing sleep. Any of these sleep disorders can cause problem sleepiness.

Medical Conditions/Drugs

Certain medical conditions and drugs, including prescription medications, can also disrupt sleep and cause problem sleepiness.

Examples include:
Chronic illnesses such as asthma, congestive heart failure, rheumatoid arthritis, or any other chronically painful disorder;
Some medications to treat high blood pressure, some heart medications, and asthma medications such as theophylline;
Alcohol—Although some people use alcohol to help themselves fall asleep, it causes sleep disruption during the night, which can lead to problem sleepiness during the day. Alcohol is also a sedating drug that can, even in small amounts, make a sleepy person much more sleepy and at greater risk for car crashes and performance problems;
Caffeine—Whether consumed in coffee, tea, soft drinks, or medications, caffeine makes it harder for many people to fall asleep and stay asleep. Caffeine stays in the body for about 3 to 7 hours, so even when taken earlier in the day it can cause problems with sleep at night; and
Nicotine from cigarettes or a skin patch is a stimulant and makes it harder to fall asleep and stay asleep.

Problem Sleepiness And Adolescents
Many U.S. high school and college students have signs of problem sleepiness, such as:
difficulty getting up for school; falling asleep at school; and/or struggling to stay awake while doing homework. The need for sleep may be 9 hours or more per night as a person goes through adolescence. At the same time, many teens begin to show a preference for a later bed time, which may be due to a biological change. Teens tend to stay up later but have to get up early for school, resulting in their getting much less sleep than they need. Many factors contribute to problem sleepiness in teens and young adults, but the main causes are not getting enough sleep and irregular sleep schedules. Some of the factors that influence adolescent sleep include: social activities with peers that lead to later bedtimes; homework to be done in the evenings; early wake-up times due to early school start times; parents being less involved in setting and enforcing bedtimes; and employment, sports, or other extracurricular activities that decrease the time available for sleep. Teens and young adults who do not get enough sleep are at risk for problems such as: automobile crashes; poor performance in school and poor grades; depressed moods; and problems with peer and adult relationships. Many adolescents have part-time jobs in addition to their classes and other activities. High school students who work more than 20 hours per week have more problem sleepiness and may use more caffeine, nicotine, and alcohol than those who work less than 20 hours per week or not at all.

Shift Work and Problem Sleepiness
About 20 million Americans (20 to 25 percent of workers) perform shift work. Most shift workers get less sleep over 24 hours than day workers. Sleep loss is greatest for night shift workers, those who work early morning shifts, and female shift workers with children at home. About 60 to 70 percent of shift workers have difficulty sleeping and/or problem sleepiness. The human sleep-wake system is designed to prepare the body and mind for sleep at night and wakefulness during the day. These natural rhythms make it difficult to sleep during daylight hours and to stay awake during the night hours, even in people who are well rested. It is possible that the human body never completely adjusts to nighttime activity and daytime sleep, even in those who work permanent night shifts.
In addition to the sleep-wake system, environmental factors can influence sleepiness in shift workers. Because our society is strongly day-oriented, shift workers who try to sleep during the day are often interrupted by noise, light, telephones, family members, and other distractions. In contrast, the nighttime sleep of day workers is largely protected by social customs that keep noises and interruptions to a minimum. Problem sleepiness in shift workers may result in: increased risk for automobile crashes, especially while driving home after the night shift; decreased quality of life; decreased productivity (night work performance may be slower and less accurate than day performance); and/or increased risk of accidents and injuries at work.

<u>What Can Help</u>
Sleep—There Is No Substitute!

Many people simply do not allow enough time for sleep on a regular basis. A first step may be to evaluate daily activities and sleep-wake patterns to determine how much sleep is obtained. If you are consistently getting less than 8 hours of sleep per night, more sleep may be needed. A good approach is to gradually move to an earlier bedtime. For example, if an extra hour of sleep is needed, try going to bed 15 minutes earlier each night for four nights and then keep the last bedtime. This method will increase the amount of time in bed without causing a sudden change in schedule. However, if work or family schedules do not permit the earlier bedtime, a 30- to 60-minute daily nap may help.

Medications/Drugs
In general, medications do not help problem sleepiness, and some make it worse. Caffeine can reduce sleepiness and increase alertness, but only temporarily. It can also cause problem sleepiness to become worse by interrupting sleep. While alcohol may shorten the time it takes to fall asleep, it can disrupt sleep later in the night, and therefore add to the problem sleepiness. Medications may be prescribed for patients in certain situations. For example, the short-term use of sleeping pills has been shown to be helpful in patients diagnosed with acute insomnia. Long-term use of sleep medication is recommended only for the treatment of specific sleep disorders.

If You're Sleepy—Don't Drive!

A person who is sleepy and drives is at high risk for an automobile crash. Planning ahead may help reduce that risk. For example, the following tips may help when planning a long distance car trip: Get a good night's sleep before leaving. Avoid driving between midnight and 7 a.m. Change drivers often to allow for rest periods. Schedule frequent breaks. If you are a shift worker, the following may help: decreasing the amount of night work; increasing the total amount of sleep by adding naps and lengthening the amount of time allotted for sleep; increasing the intensity of light at work; having a predictable schedule of night shifts; eliminating sound and light in the bedroom during daytime sleep; using caffeine (only during the first part of the shift) to promote alertness at night; or possibly using prescription sleeping pills to help daytime sleep on an occasional basis (check with your doctor).

Sleep apnea

Sleep apnea is a sleep disorder characterized by pauses in breathing during sleep. Each episode, called an apnea lasts long enough so that one or more breaths are missed, and such episodes occur repeatedly throughout sleep. Clinically significant levels of sleep apnea are defined as five or more episodes per hour of any type of apnea. There are three distinct forms of sleep apnea: central, obstructive, and complex (i.e., a combination of central and obstructive. Breathing is interrupted by the *lack of respiratory effort* in central sleep apnea; in obstructive sleep apnea, breathing is interrupted by a physical block to airflow *despite respiratory effort*. In complex (or "mixed") sleep apnea, there is a transition from central to obstructive features during the events themselves. Regardless of type, the individual with sleep apnea is rarely aware of having difficulty breathing, even upon awakening. Sleep apnea is recognized as a problem by others witnessing the individual during episodes or is suspected because of its effects on the body (*sequelae*). Symptoms may be present for years (or even decades) without identification, during which time the sufferer may become conditioned to the daytime sleepiness and fatigue associated with significant levels of sleep disturbance.

Obstructive sleep apnea (OSA) is the most common category of sleep-disordered breathing. The muscle tone of the body ordinarily relaxes during sleep and at the level of the throat the human airway is composed of collapsible walls of soft tissue which can obstruct breathing during sleep. Mild, occasional sleep apnea, such as many people experience during an upper respiratory infection may not be important, but chronic, severe obstructive sleep apnea requires treatment to prevent sleep deprivation and other complications. The most serious complication is a severe form of congestive heart failure called cor pulmonale.
Individuals with low muscle tone and soft tissue around the airway (e.g., due to obesity) and structural features that give rise to a narrowed airway are at high risk for obstructive sleep apnea. The elderly are more likely to have OSA than young people. Men are more typical sleep apnea sufferers than women and children, although it

is not uncommon in the latter two.
Common symptoms include loud snoring, restless sleep, and sleepiness during the daytime. Diagnostic tests include home oximetry or polysomnography in a sleep clinic. Some treatments involve lifestyle changes, such as avoiding alcohol or muscle relaxants, losing weight, and quitting smoking. Many people benefit from sleeping at a 30 degree elevation of the upper body or higher, as if in a recliner. Doing so helps prevent the gravitational collapse of the airway. Lateral positions (sleeping on a side), as opposed to supine positions (sleeping on the back), are also recommended as a treatment for sleep apnea, largely because the gravitational component is smaller in the lateral position. Some people benefit from various kinds of oral appliances to keep the airway open during sleep. "Breathing machines" like the continuous positive airway pressure (CPAP) may help. There are also surgical procedures to remove and tighten tissue and widen the airway.

OSA symptoms, signs and sequelae
As already mentioned, snoring is almost a uniform finding in an individual with this syndrome, but many people snore without having apnea. Snoring is the turbulent sound of air moving through the back of the mouth, nose and throat. The loudness of the snoring is not indicative of the severity of obstruction, however. If the upper airways are tremendously obstructed, there may not be enough air movement to make much sound. Even the loudest snoring does not mean that an individual has sleep apnea syndrome. The sign that is most suggestive of sleep apneas occurs if snoring stops. If it does, along with breath, while the persons' chest and body tries to breathe - that is literally a description of an event in obstructive sleep apnea syndrome. When breathing starts again, there is typically a deep gasp, and then the resumption of snoring.
Sometimes, elevated arterial pressure (commonly called high blood pressure) is a sequela of obstructive sleep apnea syndrome. When high blood pressure is caused by OSA, it is distinctive in that, unlike most cases of high blood pressure (so-called essential hypertension), the readings do not drop significantly when the individual is sleeping. Stroke is associated with obstructive sleep apnea. Sleep apnea sufferers also have a 30% higher risk of heart attack or premature death than those unaffected.

Central sleep apnea
In pure central sleep apnea or Cheyne-Stokes respiration, the brain's respiratory control centers are imbalanced during sleep. Blood levels of carbon dioxide, and the neurological feedback mechanism that monitors it does not react quickly enough to maintain an even respiratory rate, with the entire system cycling between apnea and hyperpnea, even during wakefulness. The sleeper stops breathing, and then starts again. There is no effort made to breathe during the pause in breathing: there are no chest movements and no struggling. After the episode of apnea, breathing may be faster (hyperpnea) for a period of time, a compensatory mechanism to blow off retained waste gases and absorb more oxygen.
While sleeping, a normal individual is "at rest", as far as cardiovascular workload is concerned. Breathing is regular in a healthy person during sleep, and oxygen levels and carbon dioxide levels in the bloodstream stay fairly constant. The respiratory drive is so strong that even conscious efforts to hold one's breath do not overcome it. Any sudden drop in oxygen or excess of carbon dioxide (even if tiny) strongly stimulates the brain's respiratory centers to breathe.
In central sleep apnea, the basic neurological controls for breathing rate malfunctions and fails to give the signal to inhale, causing the individual to miss one or more cycles of breathing. If the pause in breathing is long enough, the percentage of oxygen in the circulation will drop to a lower than normal level (hypoxia) and the concentration of carbon dioxide will build to a higher than normal level (hypercapnia). In turn, these conditions of hypoxia and hypercapnia will trigger additional effects on the body. Brain cells need constant oxygen to live, and, if the level of blood oxygen goes low enough for long enough, the consequences of brain damage and even death will occur. Fortunately, central sleep apnea is more often a chronic condition that causes much milder effects than sudden death. The exact effects of the condition will depend on how severe the apnea is, and the individual characteristics of the person having the apnea. In any person, hypoxia and hypercapnia have certain common effects on the body. The heart rate will increase, unless there are such severe co-existing problems with the heart muscle itself or the autonomic nervous system that makes this compensatory increase impossible.

The more translucent areas of the body will show a bluish or dusky cast from cyanosis, which is the change in hue that occurs due to lack of oxygen in the blood ("turning blue"). Overdoses of drugs that are respiratory depressants (such as heroin, and other opiates) kill by damping the activity of the brain's respiratory control centers. In central sleep apnea, the effects of sleep alone can remove the brains' mandate for the body to breathe. Even in severe cases of central sleep apnea, the effects almost always result in pauses that make breathing irregular, rather than cause the total cessation of breathing.

Any individual, no matter how healthy, who is given enough of a central respiratory depressant drug will develop apnea on a central basis. Generally, drugs that are central respiratory depressants also have sedative effects, and so the individual taking a toxic dose of such a drug is likely to be asleep, or at least in an altered state of consciousness, when breathing becomes irregular. Alcohol is such a central respiratory depressant in large doses, so are opiates, barbiturates, benzodiazepines, and many other tranquilizers. Some individuals have abnormalities that predispose them to central sleep apnea. The treatment for the condition depends on its specific cause.

Similarly, in any person who has some form of sleep apnea (including obstructive sleep apnea), breathing irregularities during sleep can be dangerously aggravated by taking one of these drugs. Quantities that are normally considered safe may cause the person with chronic sleep apnea to stop breathing altogether. Should these individuals have general anesthesia, for example, they require prolonged monitoring after initial recovery, as compared to a person with no history of sleep apnea, because apnea is likely to occur with even low levels of the drugs in their system.

Premature infants with immature brains and reflex systems are at high risk for central sleep apnea syndrome, even if these babies are otherwise healthy. Fortunately, those premature babies who have the syndrome will generally outgrow it as they mature, providing they receive careful enough monitoring and supportive care during infancy to survive. Because of the propensity toward apnea, medications that can cause respiratory drive depression are either not given to premature infants, or given under careful monitoring, with equipment for resuscitation immediately available. Such precautions are routinely taken for premature infants after general anesthesia. Caffeine has been found to help reduce apnea in preterm infants and to aid in care after general anesthesia. Sudden infant death syndrome is sometimes theorized to be attributable to sleep apnea.

Congenital Central Hypoventilation Syndrome: This rare, inborn condition involves a specific gene, PHOX2B. This homeobox gene guides maturation of the autonomic nervous system, and loss-of-function mutations lead to the failure of the brain to effectively control breathing during sleep in patients with the syndrome. There may be a pattern of recognizable facial features among individuals affected with this syndrome.

Once almost uniformly fatal, congenital hypoventilation ("abnormally low ventilation") syndrome is now treatable. The children who have it must have tracheotomies and access to mechanical ventilation on respirators while sleeping, but most do not need to use a respirator while awake. The use of a diaphragmatic pacemaker may offer an alternative for some patients. When pacemakers have enabled some children to sleep without the use of a mechanical respirator, reported cases still required the tracheotomy to remain in place, because the vocal cords did not move apart with inhalation. This form of central sleep apnea has been called Ondine's curse. Now that some children with the syndrome have grown up, there is particular need for their avoidance of adolescent behaviors, such as alcohol use, which can easily be lethal.

Adults suffering from congestive heart failure are at risk for a form of central sleep apnea called Cheyne-Stokes respiration. This is periodic breathing with recurrent episodes of apnea alternating with episodes of rapid breathing. In those who have it, Cheyne-Stokes respirations occur while both awake and asleep. There is good evidence that replacement of the failed heart (heart transplant) cures central apnea in these patients. The use of some medications that are respiratory stimulants decrease the severity of apnea in some patients.

Issue #0109 Class A CEU

CEU QUESTIONNAIRE

Complete the questions below to receive 10.5 continuing education credits. All questions must be answered completely to receive credit.

1. What are parasomnias? _____
2. Name 3 categories of parasomnias. _____
3. Which disorder shows complex automatic behaviors? _____
4. What is the main feature of REM sleep behavior? _____
5. What disorder do most children outgrow? _____
6. What disorder generally increases in severity with age?_____
7. What causes problem sleepiness? _____
8. A natural tendency toward sleepiness is called _____
9. Name causes of problem sleepiness. _____
10. How many hours of sleep are necessary during adolescence? _____
11. What is percentage of shift workers with problem sleepiness? _____
12. What often makes problem sleepiness worse? _____
13. What hours should you avoid driving to prevent sleepiness? _____
14. What is a characteristic of sleep apnea? _____
15. What does the abbreviation OSA stand for? _____
16. Lateral position means what? _____
17. What is snoring? _____
18. What causes “turning blue”? _____

19. What depressant drug will cause apnea on a central basis? _____

20. What stimulant has been found to help reduce apnea in premature infants?
_____

21. What is hypoventilation? _____

22. What is Ondine's curse? _____

23. Who is at risk for Cheyne-Stokes? _____

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CEU Update #0109

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