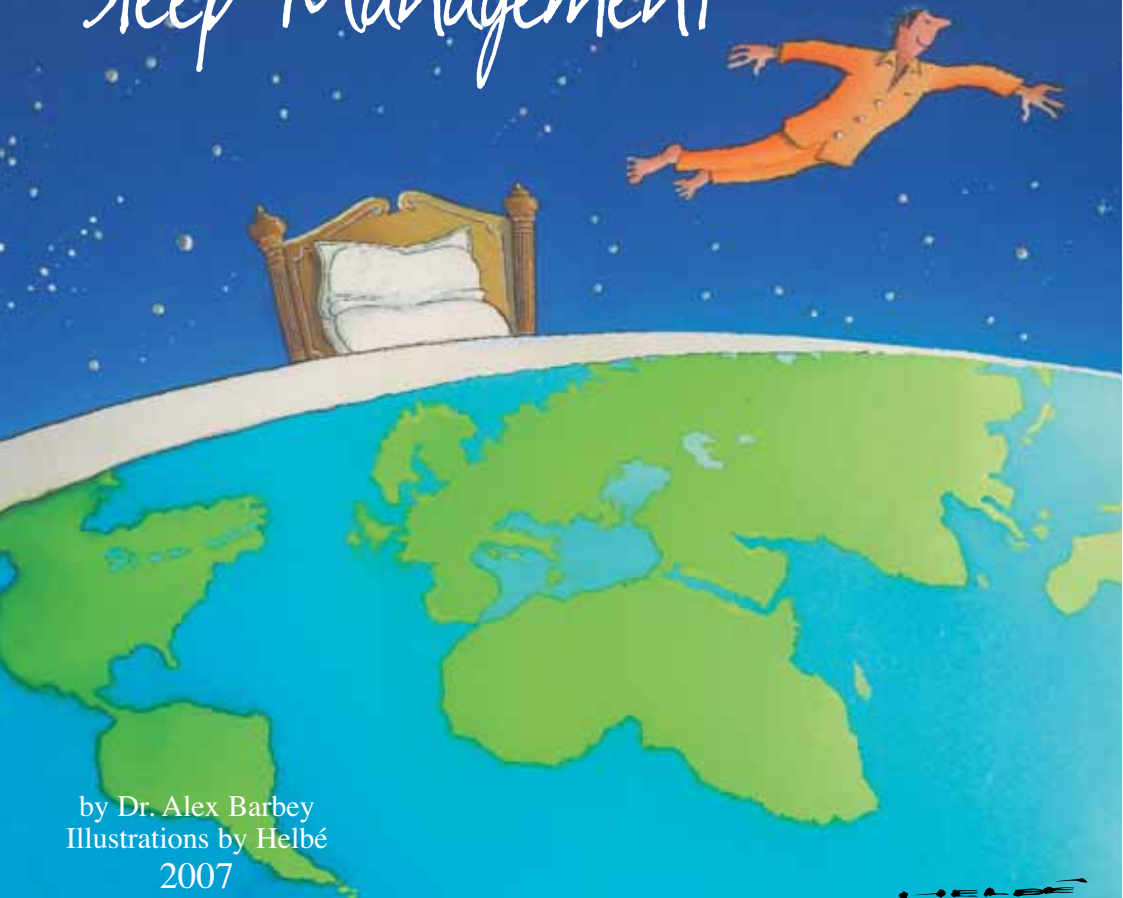


Sleep Disorders and Sleep Management



by Dr. Alex Barbey
Illustrations by Helbé
2007



A message from the author

Over the past few years company health campaigns have looked at many issues that concern the daily life of company employees —stress, lower back problems, smoking, ergonomics, just to mention a few. But all these health campaigns focused on the waking hours, while at home or abroad, at work or during leisure.

A 2007 health campaign addressed a concern of every person on the face of this earth and yet it is one that most businesses, governments, international organizations, and health programs completely ignore—sleep! We sleep over one-third of our lives, or roughly 25 years, and dream for approximately five years worth.

Of course, you are not paid to sleep and probably will not get a direct bonus from your manager if you increase your sleep quantity or quality. However, enough and better-quality sleep will improve your health, your performance at work, as well as your mood and relationships with your family, your colleagues, and your supervisor. And with improved performance at work, you may well earn that bonus.

Since the invention of the light bulb, humans have been sleeping less and less. Within the last 20 years especially, the time devoted to using personal computers and watching television has meant the loss of millions of hours of sleep around the world.

In the USA, sleep problems affect as many as 70 million people and cost billions of dollars each year in accidents, injuries and medical expenses, and lost productivity. Within many overseas companies, irregular working hours, shift work, international travel, stress, and domestic worries can result in sleepless nights, exposing people to fatigue,

sleep deprivation and drowsiness and their resulting consequences.

There are more than 80 medically defined sleep-related disorders. Some have more severe effects than others and can even lead to serious health problems and death.

It therefore seemed essential that we devote a health campaign to sleep management and discuss how to recognize and treat some of the major sleep disorders that may affect a small percentage of company employees.

Waking up in the morning after a good night's sleep and feeling rested and refreshed should be natural for everyone and not something that we need to fight, discipline, or drug ourselves to achieve. It is my hope that this brochure will help you to better meet your personal sleep requirements and in the long run promote greater enjoyment of the future waking hours in your life.

Dr. Alex Barbey

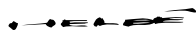


*LET THERE
BE LIGHT!*



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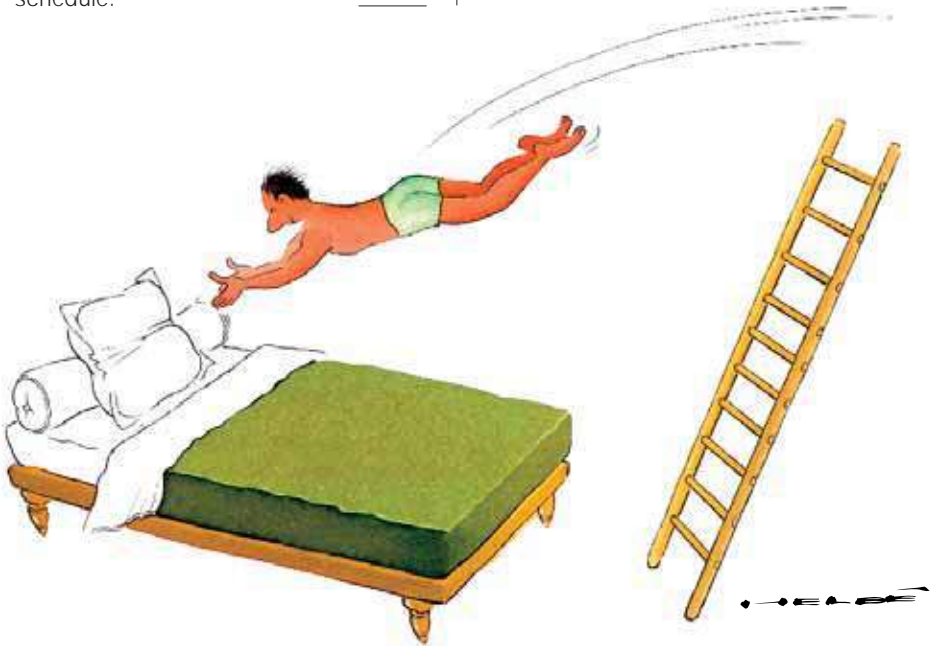


1 The sleep quiz

Before starting, let's assess what you know about sleep. Take the Sleep Quiz below.

Answer «true» or «false» to the following statements and then check the answers on page 4. You may learn something new!

- | | |
|--|---|
| 1. During sleep your brain rests. _____ | 7. A strong cup of coffee will keep a tired driver from falling asleep at the wheel. _____ |
| 2. Snoring is harmful only if it wakes up your bed partner. _____ | 8. Insomnia is characterized only by difficulty falling asleep. _____ |
| 3. People can sleep at night without dreaming. _____ | 9. There is no correlation between sleep and a person's health. _____ |
| 4. Older people need less sleep. _____ | 10. Daytime sleepiness means one thing: that a person is not getting enough sleep at night. _____ |
| 5. Listening to the radio, opening the car window, or turning on the air conditioner is sufficient to prevent you from falling asleep while you are driving. _____ | |
| 6. There is no need to have a regular «go to bed» and «wake up» time schedule. _____ | |



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The sleep quiz – Answers

1. False - Although the body may rest, your brain does not. During sleep the brain continues to control breathing, heart rate, hormonal secretions, and body temperature among other things. During the stage of sleep when the brain dreams, breathing and heart rate accelerate, and the eyes, arms, and legs may move around, just like during the daytime.

2. False - Snoring can be an important indicator of one of the major sleep disorders known as obstructive sleep apnea. This condition affects the quality of your sleep and can lead to high blood pressure, serious cardiac problems, and death. Most people who snore are unaware that they may have a potentially serious health problem.

3. False - Everyone dreams every night. Even though people do not always remember the content of their dreams, all people have a sleep stage called REM (rapid eye movement) that corresponds to when most dreams occur in the brain. This is confirmed by monitoring the brain activity of sleepers during a sleep study.

4. False - Older people need just as much sleep as when they were young adults. Although they may tend to wake up more often and sleep less at night, they sleep more during the daytime. Although frequent, having difficulty sleeping is not a natural part of aging.

5. False - The radio, air conditioner, fresh air, or even talking to someone in the vehicle will not prevent a drowsy driver from falling asleep and potentially having a sleepiness-related accident. If you feel tired or sleepy while driving, the only solution is to pull over to a safe parking area and take a short 20- to 30-minute nap.

6. False - The brain's master biological clock regulates the sleep-wake cycle by what is known as the circadian rhythm. Going to sleep and waking up at approximately the same times each day, including weekends, reinforces the circadian rhythm. This facilitates sleep onset at night. Changing your sleep schedule on weekends or during travel to different time zones disrupts your circadian rhythm, resulting in difficulty going to and awaking from sleep and a groggy, tired feeling.

7. False - Nothing replaces a good night's sleep before a long trip or pulling over and taking a short nap if feeling drowsy. It takes at least 30 minutes for the caffeine in a cup of coffee to kick in and become effective. However, caffeine decreases drowsiness only for a short period of time, and the driver will get sleepy again and be at risk for a sleepiness-related accident.

8. False - Insomnia is not just difficulty in falling asleep. Insomnia is also accompanied by the following symptoms:

- frequent awakenings during the night
- early awakening in the morning with the inability to fall back asleep
- waking up in the morning and feeling unrefreshed.

9. False - Insufficient sleep has been found to play a role in obesity, diabetes, high blood pressure, cardiac problems, and other conditions related to mental and physical health.

10. False - In some people excessive daytime sleepiness, even after a good night's sleep, is a sign of an underlying medical condition or medically defined sleep disorder such as obstructive sleep apnea or narcolepsy.

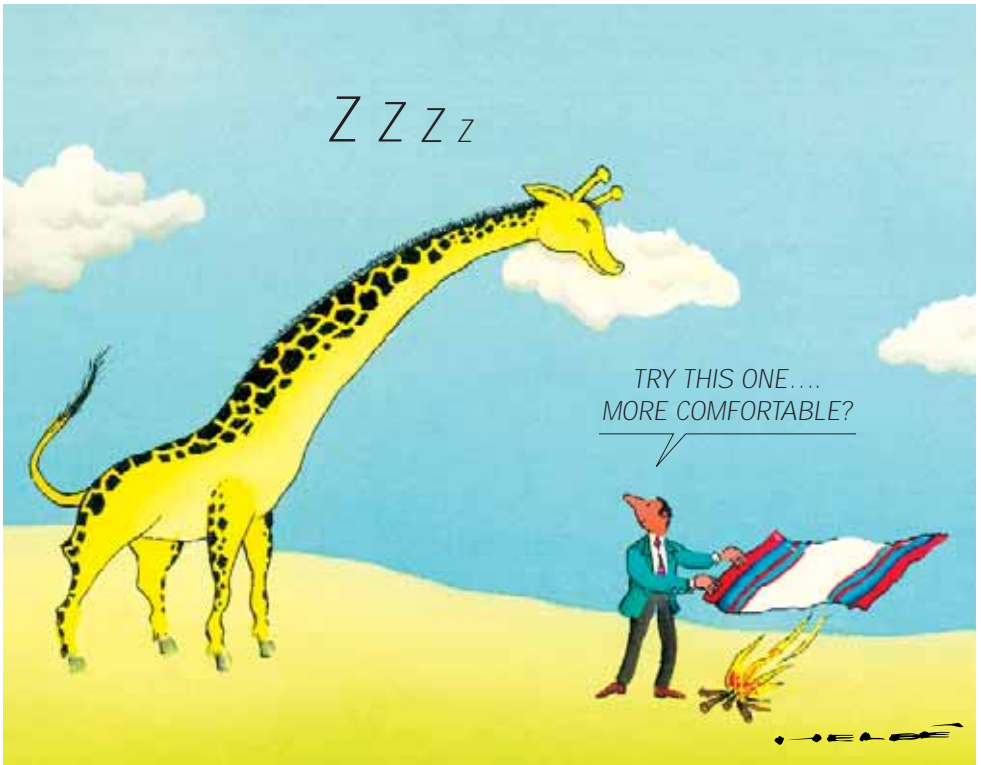
2 How and why we sleep



Sleep in Animals

A quiet, resting period of sleep occurs in all birds, reptiles, and mammals but varies greatly from one species to another.

- Smaller animals require more sleep than larger ones; predators sleep more than prey animals.
- Giraffes usually sleep less than 2 hours a day and can go for weeks without sleep.
- Dolphins continue to swim and surface to breathe with only one-half of their brain sleeping while the other half is awake.
- Horses and cows can sleep while standing.
- Some birds sleep with one eye closed while the other eye stays open and on the alert for enemies.



We humans are creatures of habit, normally falling asleep each day at approximately the same time. Each person has a typical body posture and a preferential place and conditions for sleeping.

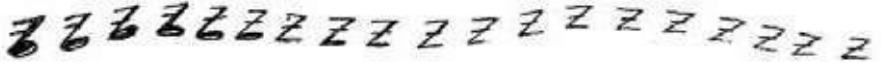
1 Sleep Requirements

Sleep requirements vary from one individual to another. Whereas some adults can function normally on as little as 3 hours of sleep per night, others require up to 12 hours. With 7 to 8 hours of sleep per night the average adult feels well rested upon waking in the morning.

Sleep requirements vary with age. As children grow, they spend less time sleeping:

- Newborns sleep as much as 20 hours per day.
- Infants need about 16 hours per day.
- Teenagers require about 9 hours per day.

Most adults need between 7 and 9 hours each night. Older adults do not need less sleep, but they tend to go to sleep earlier at night and get up earlier in the morning than they did when they were younger and they often nap more during the day.



2 A Normal Night's Sleep

As a normal night's sleep begins, the eyes close and sensory awareness of surroundings decreases. Body temperature falls and muscles relax. The heart rate and respiration become slower and more regular during the first stages of sleep, then more rapid during a dream stage, and slowing again when the dream stage ends.

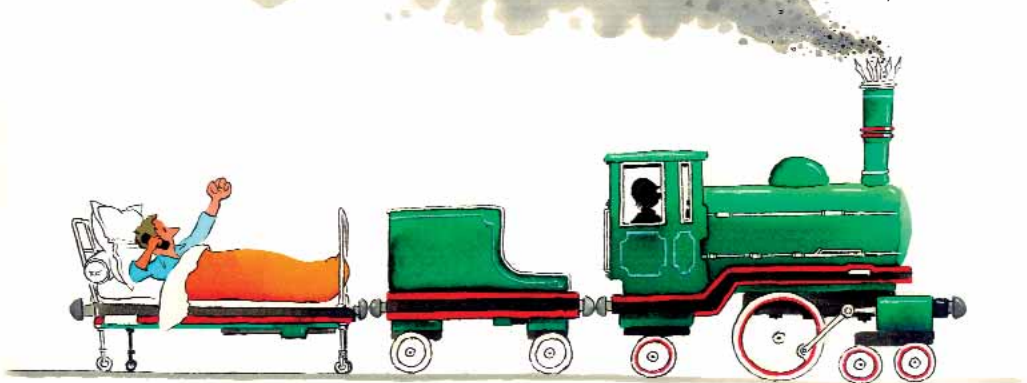
The brain's activity during sleep can be recorded by attaching electrodes to the scalp that are connected to an electroencephalograph. The machine produces an electroencephalogram (EEG) of the electrical waves produced by the brain. The brain waves follow a regular cycle through the different stages of sleep, each with a characteristic pattern of brain waves on the EEG. A normal 8-hour night of sleep has 4 or 5 sleep cycles, with each cycle lasting between 80 and 100 minutes.

At bedtime, the oncoming initial sleep cycle is easy to recognize, announced by drooping eyelids, blurred vision, repeated yawning, trouble keeping the head up, and feeling tired. Successfully falling asleep at the beginning of a sleep cycle has often been compared to catching a train arriving at the station. You can hop on the train only when it is stopped at the platform. Once the train has left the station, it is too late to

catch it, and the next one will not enter the station for another 80 to 100 minutes. If a person "misses the train" by not going to bed at the beginning of a sleep cycle, he or she might as well get out of bed and read a book for the next hour and a half because they will typically only toss and turn in bed while waiting for the next sleep cycle to begin.

Each sleep cycle begins with a series of several stages, which progress from light sleep to deep, recuperative sleep and then back to a light sleep stage. No eye movement occurs behind the sleeper's closed eyelids during these stages of the sleep cycle, which are known collectively as NREM or non-REM for non-rapid eye movement.

The NREM stage of the sleep cycle is followed by the rapid eye movement (REM) stage of sleep, so called because the eyes move back and forth rapidly during this stage. Most dreams occur during REM sleep, which is also marked by a dramatic increase in the brain's electrical activity that resembles wakeful activity patterns. However, the brain prevents corresponding muscle movement by not releasing muscle-activating signals (the eyes continue to move because this neurotransmitter mechanism does not control them).



HOP ON THE SLEEP TRAIN...

3 The Circadian Rhythm of the Sleep-Wake Cycle

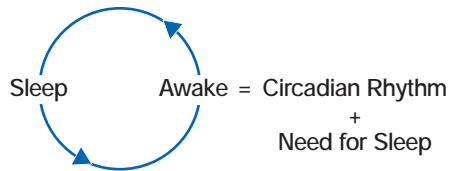
The sleep-wake cycle is the alternating balance of sleep and wakefulness during a 24-hour day. Each person's sleep-wake cycle is influenced by numerous environmental stimuli or cues called zeitgebers (from the German for «time givers»). These cues include interactions with other people, one's daily routine and habits, mealtimes, noise levels, and exercise. But the sleep-wake cycle is regulated primarily by the circadian rhythm of the body's biological clock, which in turn is influenced by exposure to light.

The word «circadian» comes from the Latin circa for «around» and dies for «day.» The term refers to the regular physiological changes that occur in the body on an approximately 24-hour cycle.

The master biological clock that coordinates the body's circadian rhythm is the pinhead-sized suprachiasmatic nucleus (SCN) cells, which are located in hypothalamus region of the brain, behind the crossing of the two optic nerves. The SCN uses the information about exposure

to light that is sent along the optic nerves from the eyes to regulate more than 100 circadian rhythm cycles by telling the body's hormone glands when to make hormones. Hormones act as chemical messengers sent through the bloodstream to control body functions, including temperature, heart rate and blood pressure, the pain threshold, and the one that we are interested in—the sleep-wake cycle. For example, the hormone melatonin is secreted at night by the pineal gland to promote sleepiness within the sleep-wake cycle.

It is the interaction of the circadian rhythm and the body's need for sleep, which is increased by any accumulated sleep debt, that determines the levels of sleepiness and alertness during daytime. The longer a person is awake, the stronger is the need for sleep.



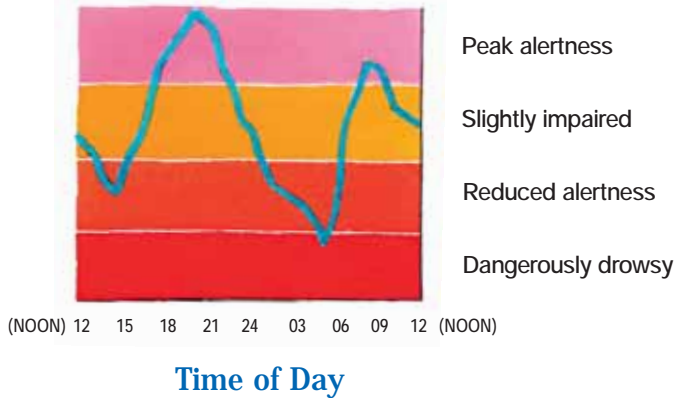
WHERE ARE
YOUR ZEITGEBERS ?



Independent of other factors influencing the need for sleep, there are two periods of maximum sleepiness within the 24-hour cycle of the body's circadian rhythm: in the morning between 2 and 6 am and in the afternoon between 2 and 4 p.m.—the well-known

afternoon lull. It is around these two periods of natural sleepiness within the circadian rhythm that most major accidents occur as a result of decreased alertness (for example, *Exxon Valdez* oil spill, Chernobyl radiation release, and space shuttle *Challenger* explosion).

Alertness over a 24-hour period



Periods of lowest alertness and highest risk of dozing off are between 2 and 6 a.m. in the morning and between 2 and 4 p.m. in the afternoon.



Why Do We Sleep?

Sleep is not optional—it is as much a basic biological need as eating. But why do we sleep? There are two schools of thought:

- Sleep is restorative. During sleep, the body repairs and renews itself from the activities of the day. Dreaming may assist in consolidating and organizing memories in the brain.
- Sleep is a protective adaptation, similar to how some animals hide at night from predators and also conserve energy by being relatively inactive.



4 Sleep Deprivation

Before the invention of the electric light bulb by Thomas Edison, people slept an average of 10 hours per night. In today's busy world, where people go to bed late because of television, computers, and other electronic diversions, the average night's sleep is a little less than 7 hours on weekdays (6.9 hours) and 7.5 hours on weekends.

Stress, anxiety, depression, family or professional problems, pain, and illnesses can all result in sleepless nights. Certain sleep disorders can also reduce sleep quantity and quality. People whose personal sleep requirements are not met become sleep deprived, and the resulting «sleep debt» results in short-term and long-term consequences.

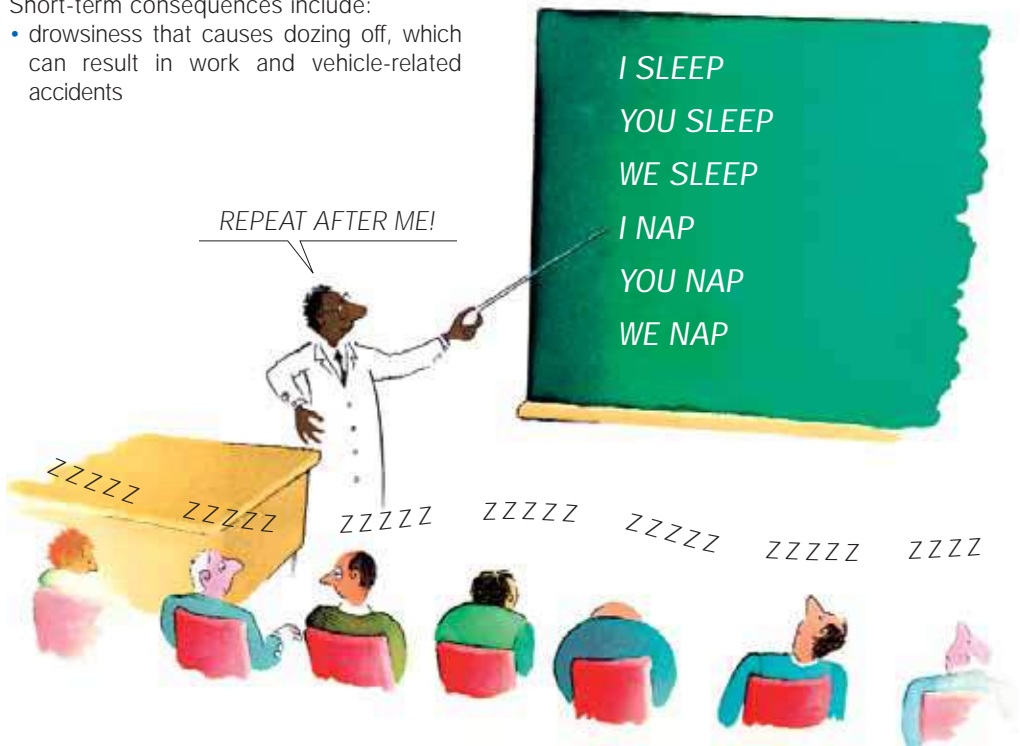
Short-term consequences include:

- drowsiness that causes dozing off, which can result in work and vehicle-related accidents

- poorer performance and reduced attention span
- memory problems and lack of concentration
- irritability, aggressiveness, increased stress and depression
- strained relationships with friends, family members, coworkers, and managers.

Long-term consequences of sleep deprivation include numerous health problems in addition to the short-term consequences:

- obesity—lack of sleep stimulates overeating
- diabetes—sleep deprivation impairs glucose tolerance by reducing the body's ability to use insulin
- cardiovascular diseases including high blood pressure and heart attacks
- repeated infections related to reduced immunity levels.



5 Analyzing Sleep Disorders

People sometimes complain that they do not get a normal night's sleep. While some may have trouble falling asleep or staying asleep during the night, others seem to sleep well but feel groggy and tired upon waking in the morning. Some complain of excessive daytime sleepiness and fall asleep often during normal daytime activities.

A person may not be aware of a sleep problem or disorder. Often, it is his or her bed partner who reports behaviors or movements that occur during sleep but which the person is not aware of. Examples include snoring, cessation of breathing, twitching or kicking of the legs or arms, chewing movements, sleepwalking, sleep talking, screams, and violent behavior.

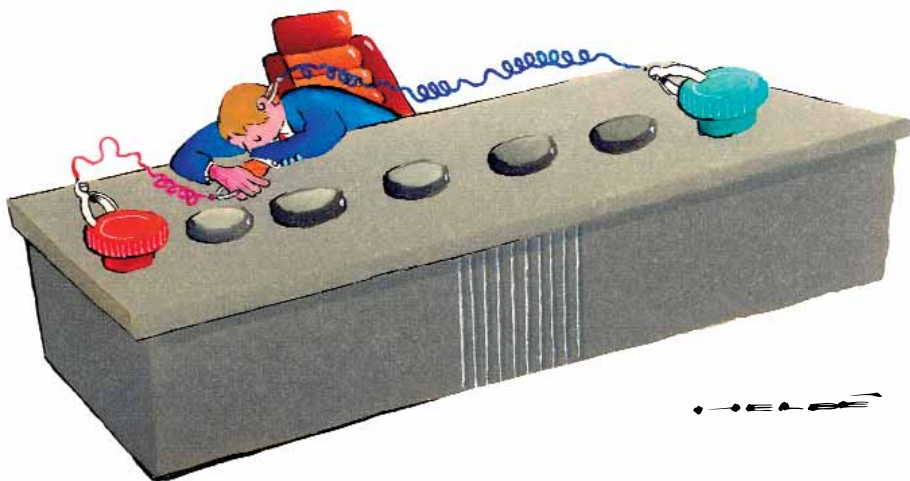
If the sleep problem cannot be resolved or its adverse effects become a major issue for a person and his or her bed partner, medical help can be sought to progressively analyze the problem with a clinical examination, sleep log or sleep diary, and finally a sleep study.

a – Clinical examination

The clinical examination conducted by a medical professional begins with collecting the patient's personal medical history as well as that of the sleep problem. When did the sleep problem start? What are its consequences on daily life? Is the patient stressed, anxious, or depressed? Does the patient snore, have breathing problems, abnormal movements, etc., during sleep? Discussion with the patient's bed partner is vital in getting the full picture of the sleep problem.

Other important information for the medical professional to learn are the patient's daily schedule, work and domestic problems, and prescription and nonprescription medications taken as well as use of tobacco products, drugs, or alcohol.

The examination continues with a physical examination, with a focus on the patient's weight and cardiovascular condition, including blood pressure. Diagnostic tests may be ordered to determine physical problems that may cause the sleep problem.



I'M NOT SLEEPING... I'M RECHARGING MY BATTERIES!

b – Sleep diary

The medical professional may ask the patient to maintain a sleep log or sleep diary for a few weeks. This is a record the patient makes of his or her perceived sleep pattern and includes such details as:

- time patient went to bed
- time the light was turned off
- time he or she fell asleep
- if there was a night awakening, when was it and for how long
- time of awakening in the morning
- time the patient got out of bed
- naps taken during the daytime (when, where, how long)
- daytime schedule of medications, tobacco use, and consumption of alcohol, coffee and other caffeine-containing substances, and meals.

It is important to remember that the sleep log is only an approximation of the patient's 24-hour schedule. It does not need to be an exact minute by minute account of the day and the patient does not need to turn on the light in the middle of the night to see what time it is to record in the sleep diary. That would only disturb sleep even more!



IT'S JUST A

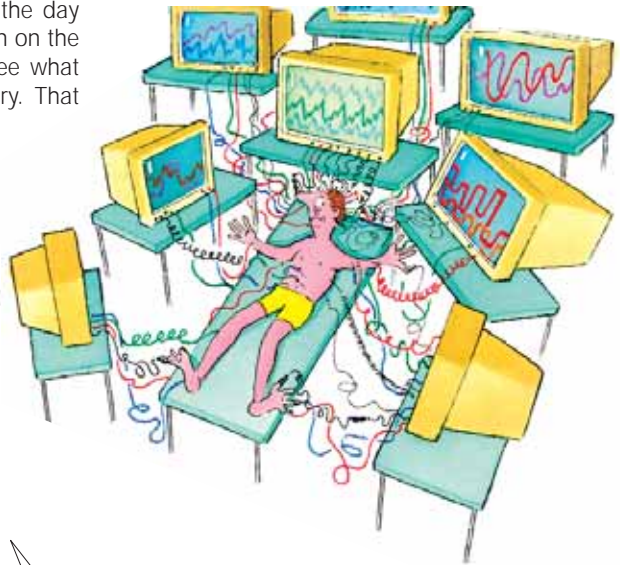
POLYSOMNOGRAPHYELECTROENCEPHALOGRAM ELECTROMYOGRAM ELECTROOCULOGRAM!!!!

c – Sleep study

Some patients may be observed during a sleep study, also known as polysomnography (PSG).

The sleep study is noninvasive—the patient sleeps overnight in a clinic with continuous monitoring of body position by a video camera, brain waves by an electroencephalogram (EEG), muscle tension by an electromyogram (EMG), eye movement by an electrooculogram (EOG), respiratory airflow and effort, pulse and heart rate, oxygen levels in the blood, and snoring and gasping by audio recording.

In most cases, conducting a PSG enables the diagnosis of one of the 80-some medically defined sleep disorders. And once the cause of the sleep problem is known, treatment can be proposed to improve the patient's condition.



3 Sleep disorders



Millions of people toss and turn each night in their beds. For them, sleep is synonymous with anxiety, watching the hours go by on the alarm clock and worrying about how they will feel and perform the next day.

There are more than 80 medically defined sleep disorders. They can all contribute to impaired performance, accidents at work or while driving, as well as disturbances of mood and social adjustment. Marriages and relationships may be adversely affected by certain sleep disorders. Some can also exacerbate serious medical, neurological, and psychiatric problems.

For the sake of simplicity we will look at the most common sleep disorders:

- insomnia
- sleep-related breathing disorders
- hypersomnias (excessive sleepiness) not related to breathing disorders
- circadian rhythm sleep disorders
- parasomnias (abnormal events occurring during sleep)
- sleep-related movement disorders.

Treatments and lifestyle strategies for managing these sleep disorders are presented in a later section in this brochure.

I CAN'T SLEEP ! I KEEP HEARING THE SEA! TOO NOISY!



1 Insomnia—Not Enough Sleep

Insomnia means «no sleep» or «inability to sleep.» Humans are the only animals who suffer from insomnia. Instead of the 10 to 30 minutes most people take to fall asleep, the more than one-quarter of the world's population who are insomniacs have problems falling asleep or staying asleep each night.

In addition to difficulty in falling asleep, insomnia is associated with:

- difficulty maintaining sleep, with frequent awakenings during the night
- waking up too early in the morning and not being able to get back to sleep
- waking up in the morning feeling tired and unrefreshed.

Short-term, or acute, insomnia can last up to one month and is often caused by stress, job worries, acute illnesses (fever, coughing, nasal obstruction, etc.), or relationship problems as well as poor daytime and

bedtime habits. Insomnia that lasts for more than 4 weeks is called chronic or long term.

Long-term insomnia is responsible for sleep deprivation that accumulates as a sleep debt. Just like a financial debt, the hours lost to sleepless nights must be repaid. Obviously, a significant sleep debt may be difficult to pay back!

Long-term insomnia may be due to a preexisting medical, physical, or psychological (for example, depression) condition or it may just be a symptom of a specific sleep disorder. Certain medications as well as other substances (alcohol, drugs, etc.) can cause chronic insomnia.

Insomnia is more common in women (due to hormonal modifications related to the menstrual cycle, pregnancy, and menopause) than men. Insomnia is also more common in shift workers and in the elderly.



2 Sleep-Related Breathing Disorders—Obstructive Sleep Apnea

a – What is obstructive sleep apnea?

Apnea means pauses in breathing. Obstructive refers to an obstacle in the upper airway, which comprises the mouth, nose, and throat.

Obstructive sleep apnea (OSA) is the cessation of breathing, lasting from 30 seconds to 3 minutes, during sleep. OSA events can have a frequency from 5 times per hour to hundreds of times each night. Breathing resumes with a jerk of the body or a gasp.

The frequent and repetitive cessation of breathing during the night reduces the oxygen level in the brain. This can increase the risk of serious health problems such as high blood pressure, heart attacks, strokes, and irregular heartbeat that can lead to cardiac arrest and death.

The bed partner of a person with OSA typically complains of the loud snoring associated with the respiratory pauses as well as the person's agitation, frequent awakenings, body jerking, and gasping.

Because people with OSA awaken each time the airway is reopened to resume breathing, the continuity of their sleep is disrupted,

particularly in reaching the deep stages of NREM and REM sleep. During the day, they easily fall asleep while performing monotonous or repetitive tasks such as watching TV, reading a book, driving a vehicle, or attending a meeting. They often complain of reduced memory and attention span, reduced libido, as well as irritability and depression.

OSA is more common in men than women and mainly affects overweight adults over 40 years of age. The stereotypical depiction of a person with OSA is the character Fat Joe from Charles Dickens's 1837 serial novel *The Pickwick Papers*. Obese, red-faced Fat Joe constantly fell asleep during meetings and when doing simple things such as waiting for someone to answer the door. His loud snoring was very disruptive. Fat Joe suffered from an advanced form of OSA characterized by obesity, also called today the «Pickwick syndrome.»

Because alcohol relaxes the muscles in the upper airway, it increases the likelihood of OSA. Certain medications and drugs, such as sedatives, have a similar effect.

In the USA alone, an estimated 18 million adults have OSA, of which nearly 50,000 die each year (National Institutes of Health). But 95% people with OSA are unaware that they are not just snoring loudly but have a serious sleep disorder.



b – The causes of obstructive sleep apnea

The upper airway obstruction that causes OSA can have numerous origins:

- Obesity is one of the major risk factors for having OSA. The tissues in the upper airway (nose, mouth, and throat) of obese

people are infiltrated with fat, which reduces the diameter of the airway. Many people with OSA have a body mass index (BMI) that is more than 20% over the BMI that represents a normal weight for their height.

Are You Obese? Measure Your Body Mass Index (BMI)

The BMI is calculated as a ratio of your weight to your height squared:

or:

$$\text{BMI} = \frac{\text{weight in kilograms}}{(\text{height in meters}) \times (\text{height in meters})}$$

$$\text{BMI} = 704.5 \frac{\text{weight in pounds}}{(\text{height in inches}) \times (\text{height in inches})}$$

Examples

Weight of 70 kilograms and height of 1.75 meters = $(70)/(1.75^2) = 22.9$

Weight of 225 pounds and height of 5 feet 9 inches = $(704.5)/[(225)/69^2] = 33.3$

BMI < 18 = You are underweight.

BMI between 20 and 25 = You are in the normal weight range for your height.

BMI between 25 and 30 = You are overweight.

BMI > 30 = You are obese.

BMI > 40 = You have what is called «morbid» obesity.

BMI > 50 = You are in the category of «super or malignant» obesity.

- OSA can occur in nonobese people because of anatomical conditions that can obstruct the upper airway:
 - enlarged tonsils or adenoids
 - deformed or enlarged uvula (the little piece of flesh that hangs down at the back of the throat)
 - enlarged or thick tongue

– enlarged or thick neck (collar size of 17 inches [43 centimeters] or greater in men, 16 inches [40 centimeters] in women).

- Gastroesophageal reflux disease, for which heartburn is a symptom, is another cause of OSA.

c – Do you have obstructive sleep apnea?

OSA is a serious problem that can have severe effects on your health and cause excessive daytime sleepiness and sleep-related vehicle accidents while driving.

Do you have OSA? Take the simple quiz below by answering «yes» or «no» to each

- 1. Are you overweight? (Calculate your BMI as shown on the previous page. If your BMI is over 30, answer «yes» to this question.) _____
- 2. Do you snore loudly when sleeping? _____
- 3. Do you choke or gasp at night? _____
- 4. Have you been told that you hold your breath or stop breathing when you sleep? _____
- 5. Do you feel excessively tired and sleepy during the daytime? _____
- 6. Do you routinely fall asleep when sitting quietly, such as during a meeting, at the movies, while driving, or while watching TV? _____
- 7. Do you feel restless in your sleep, frequently tossing and turning? _____
- 8. Do you feel depressed, aggressive, or irritable? Do you have severe mood swings? _____
- 9. Have you lost interest in sex? Has your sex drive or your ability to perform decreased? _____

question. Your bed partner can probably help you with many of the answers!

If you answer «yes» to five or more questions you may have OSA. You should see a medical professional as soon as possible to schedule screening for a sleep study.

- 10. When you wake up in the morning, do your mouth and throat feel dry? _____
- 11. Do you have trouble concentrating? _____
- 12. Are you forgetful and have memory problems? _____
- 13. Do you feel confused upon awakening or sometimes have trouble awakening from a nightmare? _____
- 14. Do you have morning headaches? _____
- 15. Do you suffer from high blood pressure? _____
- 16. Do you wake up at night feeling your heart pounding, sometimes with an irregular beat? _____
- 17. Do you frequently get up at night to go to the bathroom? _____
- 18. Do you wake up perspiring heavily? _____
- 19. Do you wake up during the night with heartburn? _____
- 20. Do you wish that you had more energy and less fatigue? _____



3 Hypersomnia (Excessive Sleepiness) Not Related To Breathing Disorders

Hypersomnia is characterized by repeated episodes of excessive daytime sleepiness or prolonged nighttime sleep. Hypersomnia can result from the frequent awakenings caused by obstructive sleep apnea, but this discussion concerns hypersomnia that occurs unrelated to a breathing disorder.

A hypersomniac may sleep up to 12 hours a night and still need frequent daytime naps. These repeated naps, often at inappropriate times such as at work, during a meal, or in the middle of a conversation, do not reduce the feeling of drowsiness. The constant need for sleep can interfere with all areas of life, from work to home, and can have serious consequences, such as an increased risk of accidents while driving.

Hypersomniacs complain of often feeling disoriented, anxious, irritable, and restless when they wake up. They have low energy and concentration levels, loss of memory, and sometimes hallucinations.

Hypersomnia usually affects adolescents and young adults. A cause is rarely found, but there seems to be a genetic predisposition. Certain medications, or on the contrary their abrupt cessation without tapering off, can cause hypersomnia.

Hypersomnia also occurs in people with the following conditions:

- obesity
- depression or other psychiatric disorders
- drug or alcohol abuse
- certain neurological conditions (epilepsy, multiple sclerosis, and encephalitis)
- certain brain tumors or injuries.

JOHN! JOHN! PLEASE WAKE UP NOW!



a – Narcolepsy

Narcolepsy is a very rare but exaggerated form of hypersomnia (excessive daytime sleepiness) without a related breathing disorder. People with this chronic neurological sleep disorder have frequent, sudden daytime «sleep attacks» even if they have normal nighttime sleep. About three-quarters of narcoleptics also have episodes of cataplexy.

Cataplexy is the sudden temporary loss of muscle tone. Attacks may be mild and partial, causing weakness in a particular muscle, such as a drooping eyelid. Or they may be so severe to cause knee buckling and a complete collapse. The person falls to the ground but remains conscious. Cataplexy is often caused by an outburst of emotion—such as strong laughter, excitement, anger—and can last from a few seconds to a few minutes.

In addition to excessive daytime sleepiness and cataplexy, other symptoms of narcolepsy include the following:

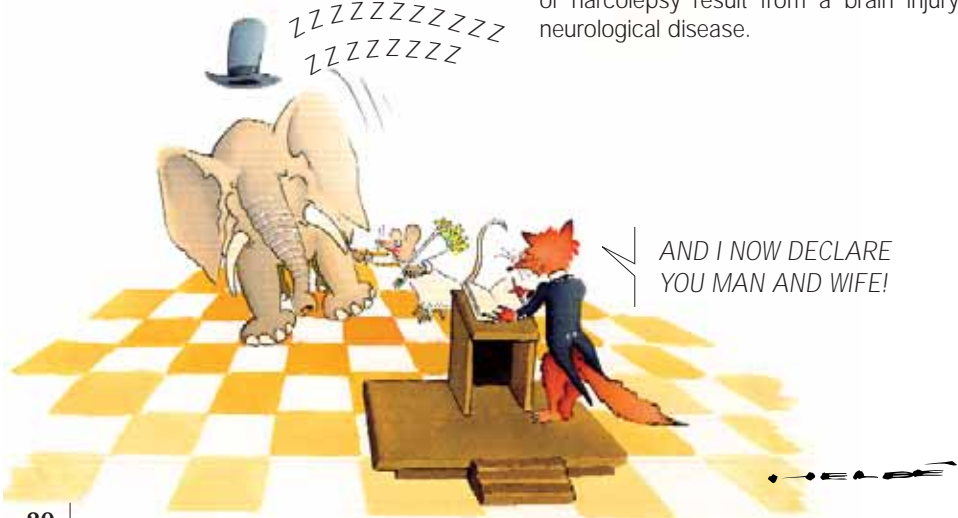
- Sleep paralysis is the terrifying inability to move the limbs, speak, or even breathe deeply while falling asleep or upon awakening. It may last for a few minutes and is frequently accompanied by hallucinations.

- Hypnagogic hallucinations or presleep dreams are vivid dreamlike images that the narcoleptic experiences while partially awake, while falling asleep, or at the beginning of sleep paralysis. The visions are often frightening, particularly because the person, although awake, is unable to control them.

Sleep attacks can occur with varying frequency, from once a day in some narcoleptics to once a week in others. The attacks interrupt normal daytime activities such as talking, eating, and driving.

Narcolepsy is easily diagnosed during a sleep study. Narcoleptics go from a state of being fully awake directly into deep REM sleep without passing through any of the normal preceding phases of sleep, and then they directly return to being fully awake.

Narcolepsy commonly begins between ages 15 and 30. Once it appears, narcolepsy is present for life. Almost 300,000 people in the USA are affected. Although there is no known cause, there seems to be a genetic predisposition. Researchers have recently identified a gene that causes narcolepsy in dogs and mice and are searching for defective versions of this same gene that occurs in humans. Some cases of narcolepsy result from a brain injury or neurological disease.



4 Circadian Rhythm Sleep Disorders

For most people daytime equals activity and nighttime equals sleep. Changes to this day-night schedule can desynchronize the body's biological clock and lead to circadian rhythm sleep disorders. These disorders that affect the timing of sleep commonly occur in shift workers but also as «jet lag» in international travelers who cross many time zones.

a – Shift work

A recent survey of approximately 1,000 train conductors in the USA revealed that almost 60% of the conductors who worked night shifts reported nodding off at least once during their shift within the previous week.

Shift workers are people who work outside of the typical «9 to 5» business-day schedule and particularly those who work nights or irregular schedules. It is challenging not only to stay awake and work when the body's natural clock says that it is time to go to bed but also to go to sleep when the sun is shining and everyone else is awake and making noise.

The distortion of the day-night signals to the brain produces disrupted sleep schedules with difficulty falling or staying asleep, difficulty waking up and being alert, and involuntary bouts during the waking hours of «microsleep» that last from a few seconds up to a minute.

Shift workers sleep an average of 1 to 2 hours less per night than their non-shift-working counterparts. This means that over time they are more and more sleep deprived and have accumulated a bigger sleep debt. The sleep deprivation is compounded by the fact that many shift workers revert to a normal sleep-wake schedule on weekends so they can participate in family and social events.

In comparison with day workers, shift workers seem to have the same average lifespan. However, shift work seems to be responsible for certain lifestyle variations, personal complaints, work-related issues, and health problems.

Lifestyle variations in shift workers include an increase in:

- cigarette consumption
- alcohol consumption
- weight gain due to loss of regular mealtime and exercise schedules.

Personal complaints include greater:

- irritability and frequency of depression
- time pressure and the burden of family obligation
- social marginalization (mismatch between working hours and social activities)
- marital disruption and spouse loneliness and night-time insecurity, leading to a higher divorce rate
- parental problems with the perception of failing as a parent.

Work-related issues include:

- poor concentration and mental fatigue
- errors leading to poor performance
- reduced productivity
- more near misses, injuries, accidents, and fatalities.

Health problems include higher rates of :

- gastrointestinal disorders—abdominal pain, alterations in bowel habits, peptic ulcers
- coronary heart disease and heart attacks
- metabolic variations and an increased risk of diabetes
- spontaneous abortion, miscarriage, and premature birth in pregnant women.

Although young adults seem to cope better with shift work than older workers, and men cope better than women (who are more likely to have additional domestic and childcare obligations), over the years the body never completely adapts. Staying awake all night and sleeping during the day remain difficult because they counter the circadian rhythm.

b – Jet lag

At any one time of the day, at least 500,000 people are flying in airplanes someplace in the world and many of them are crossing multiple time zones. Traveling rapidly across time zones disrupts the synchronization of

the biological clock and accompanying circadian rhythms with the local time, producing some awkward sensations.

Symptoms of jet lag may last for a few days:

- irritability
- physical and mental daytime tiredness, with impaired alertness and lower performance
- inability to get to sleep at night after an eastward flight
- early awakening after a westward flight
- disturbed nighttime sleep
- disorientation
- gastrointestinal problems and loss of appetite.

People adjust to new time zones at the rate of approximately one hour per day, but not all body functions adjust at the same speed. Body temperature, digestion, and sleep adjust at different speeds.

Most travelers report worse jet lag when flying from west to east than from east to west. This is because the body finds it easier to extend the natural day than to shorten the natural night.

Although jet lag may not be a big problem for someone on vacation, it can seriously impair the business traveler's ability to function effectively.

5 Parasomnias (Abnormal Events Occurring During Sleep)

Of the numerous parasomnias, or abnormal events that can occur during sleep, here are a few of the most common ones.

a – Nightmares

Nightmares are frightening dreams that awaken the sleeper with a feeling of intense anxiety, fear, or feeling of impending danger. There is an immediate recall of the frightening dream and the person is fully alert, not confused or disoriented. The person finds it difficult to return to sleep.

b – Sleepwalking

Sleepwalking, or somnambulism, is a disorder that can occur at any age, but is more common in children. Walking and other movements occur during deep sleep and last from a few seconds to as long as 30 minutes.

Sleepwalking activities include sitting up in bed, getting up and walking around, moving furniture, making one's bed, dressing or undressing, cooking and eating, or even driving a car while actually still asleep. The

sleepwalker may appear to be awake because the eyes may be wide open.

Sleepwalkers have no recollection of their nighttime activity the next morning. Although sleepwalking is usually portrayed humorously on television and in the movies, it can put the sleepwalker in dangerous situations and result in injuries. Contrary to popular belief, there is no danger in waking a sleepwalker.

A cause is rarely found to explain this sleep disorder, although in children it may be triggered by anxiety or a sleep debt. In adults it is often linked to medical conditions (such as mental health disorders or seizures) or to the use of drugs or alcohol.

c – Sleep talking

Sleep talking, or somniloquy, is the utterance of speech or sounds during sleep without the sleeper's awareness of speaking.

It can occur at any stage of sleep and is fairly common and usually harmless. What causes sleep talking is not known, but it sometimes results from circumstances related to other sleep disorders, such as medical conditions (for example, mental health disorders, anxiety, fever).



6 Sleep-Related Movement Disorders

Some sleepers may have repetitive and abnormal movements during the night. Although the movements may not awaken the sleeper, they usually disturb the bed partner's sleep. Below are some of the most common sleep-related movement disorders.

a – Periodic limb movement disorder

Periodic limb movement disorder causes people to jerk and kick their legs and sometimes their arms every 20 to 40 seconds during sleep in a repetitive movement of tightening and flexing the muscles. The limb movements are often associated with partial or complete awakening, although the sleeper is unaware of either the movements or the arousals.

Some people have hundreds of these movements each night. This disorder is more common with age: up to one-third of people 60 and older experience periodic limb movement disorder.

ALL NIGHT LONG I KEEP GETTING
KICKED BY THESE FINS!



b – Restless legs syndrome

Restless legs syndrome (RLS) produces sensations of creeping, crawling, aches and pains, pulling, or tingling in one or both legs and feet along with an irresistible urge to move them by stretching or getting up and walking around to obtain short-term relief.

RLS symptoms that occur prior to sleep onset make it difficult to fall asleep. People with RLS often also experience periodic limb movement, especially of the legs.

Diagnosis of RLS is based on the patient's history because there is no specific laboratory test for it. Restless leg syndrome tends to run in families.

c – Bruxism

Sleep bruxism is grinding or clenching of the teeth during sleep that may cause abnormal wear of the teeth, unpleasant sounds, and discomfort in the muscles of the jaw.

The frequency of bruxism and impact on the teeth vary from one person to another. Intense nightly episodes can cause dental injury, disorders of the jaw, and painful chewing when eating.

Bruxism tends to occur in people who are highly motivated and competitive; similarly, it can be caused by stress and anxiety or exacerbated by smoking or caffeine consumption close to bedtime.



4 Sleepiness and driving — sleep-related motor vehicle accidents



According to the National Transportation Safety Board, of the approximately 4,800 fatal crashes involving large trucks each year in the USA, 57% are probably due to the driver's sleepiness.

A similar study found that the 27% of drivers in the UK who fell asleep at the steering wheel of their vehicle caused 83% of all vehicle-related deaths.

Sleepiness (used here synonymously with tiredness and drowsiness) is the need for sleep or the likelihood of falling asleep. Sleepiness results from insufficient sleep, prolonged wakefulness, or staying awake at a time when the body's biological clock is set for sleep, such as the middle of the night. Sleepiness can be counteracted only by sleep.

Sleepiness increases reaction time, decreases awareness, and impairs judgment. Only quite recently has sleepiness been identified as a major cause of motor vehicle accidents, estimated to be responsible for 20% of serious road accidents and 40% to 50% of all single-vehicle crashes.

Falling asleep at the wheel is the result of microsleep episodes, which last from a few seconds to as long as a minute. Nothing can prevent microsleep except sleep. Opening

the window for some fresh air, turning on the air conditioner, or increasing the volume of the radio are of very limited value and are sufficient only to get you to a safe place to pull over and take a nap.

Every driver should know the signs of drowsiness and stop driving when they appear:

- eyelids starting to droop and vision blurring
- repeated yawning
- no memory of the last few miles or kilometers that have been driven
- trouble keeping the head up
- drifting between lanes, missing traffic signs and signals, and tailgating
- drifting off the road and jerking the vehicle back into the lane
- experiencing near misses.

Although not yet completely commercialized, Dozy Driver Detection Systems (DDDS) have been developed and in the near future will be widely available to warn a driver when he is starting to experience sleepiness. The systems work by scanning the upper body using a dash-mounted transceiver which monitors and quantitatively measures several indices, such as the general activity level, the speed, frequency and duration of eyelid closure, and the rate of heartbeat and respiration, by analyzing the reflected signal.

1 Factors Involved in Sleep-Related Vehicle Accidents

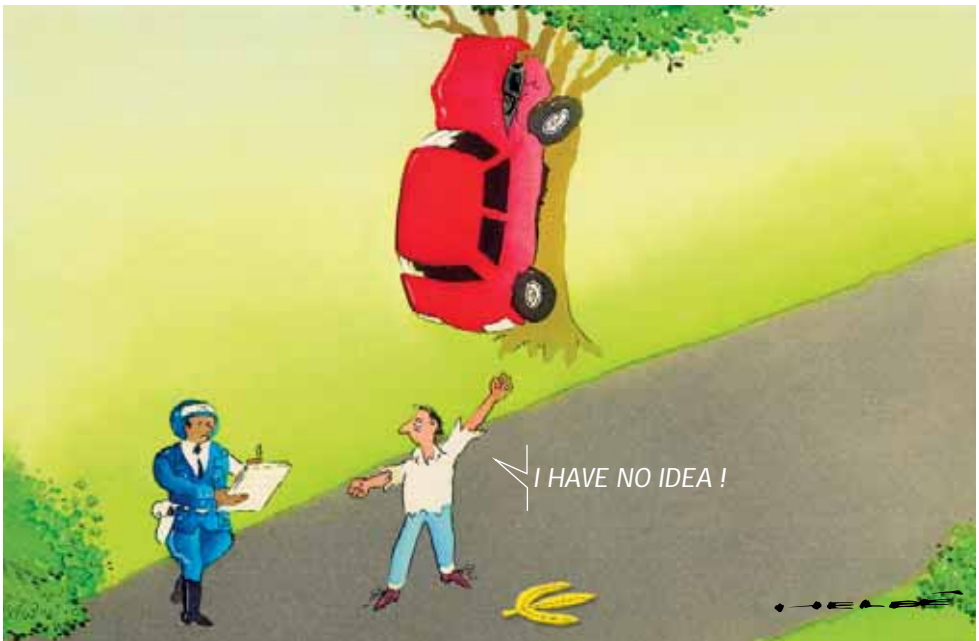
A sleepy driver should not get behind the wheel. Ignoring the need for sleep can be fatal.

People with known sleep disorders (such as obstructive sleep apnea or narcolepsy) have 7 times the risk of having a sleep-related vehicle accident. Driving with untreated obstructive sleep apnea is comparable to driving drunk. Some states in the USA restrict the driving privileges of people with certain sleep disorders.

Sleepiness is increased by long working hours, an active nighttime social life, or family or work problems that reduce the amount of sleep obtained the previous night. Sleepiness is also increased by certain health conditions (fever, the common cold, and other illnesses) and some medications (see the chapter on «Substances that Influence Sleepiness and Total Sleep Time»).

Accumulating a sleep debt from chronic sleep deprivation increases the tendency to fall asleep, especially while performing monotonous tasks such as driving.

The Epworth Sleepiness Scale on the next page is used in many countries and organizations to measure daytime sleepiness and predict the degree of sleep deprivation and /or disturbance, and one's ability to drive a company vehicle or perform other safety critical tasks without falling asleep. It is closely correlated to the polysomnography or sleep tests and should be considered when hiring drivers in order to screen for potential sleep disorders such as sleep apnea as required by the International Association of Oil & Gas Producers *Land Transportation Safety Recommended Practice* (Report No. 365, April 2005). Employees should be referred to a physician in the event there appears to be a connection to sleep disorders.



2 How Sleepy or Drowsy Are You? Can You Safely Drive a Vehicle?

How likely are you to doze off or fall asleep in the following situations, in contrast to just feeling fatigued? The Epworth Sleepiness Scale is widely used to measure daytime sleepiness and predict its affect on the ability to drive a vehicle or perform other tasks without falling asleep. It is closely correlated to sleep tests.

Epworth Sleepiness Scale

The questions in this quiz refer to a your recent, usual way of life. Even if you have not done some of these things recently, imagine how they would have affected you.

Use the following scale to rate each situation:

0 = no chance of dozing

1 = slight chance of dozing

2 = moderate chance of dozing

3 = high chance of dozing

In the following situations:

What is your chance of dozing?

Sitting and reading _____

Watching TV _____

Sitting inactive in a public place (for example, a theater or meeting) _____

Passenger in a car for an hour without a break _____

Lying down to rest in the afternoon when circumstances permit _____

Sitting and talking to someone _____

Sitting quietly after a lunch without alcohol _____

In a car, while stopped for a few minutes in traffic _____

TOTAL SCORE

Interpreting your score

Total Score **How important is your sleep debt and sleep problem?**

0–5 Slight or none—you are getting enough sleep

6–10 You have a moderate sleep problem

11–20 You have a heavy sleep debt and an important sleep problem

21–24 You have an extreme sleep debt and very important sleep problem

A score above 15 should lead to a medical consultation before being authorized to drive a company vehicle or operate heavy machinery in the workplace.

¹ Johns, M.W., 1991. «A New Method for Measuring Daytime Sleepiness: The Epworth Sleepiness Scale,» *SLEEP*, 14(6):540-545.

3 When to Suspect a Sleep-Related Vehicle Accident

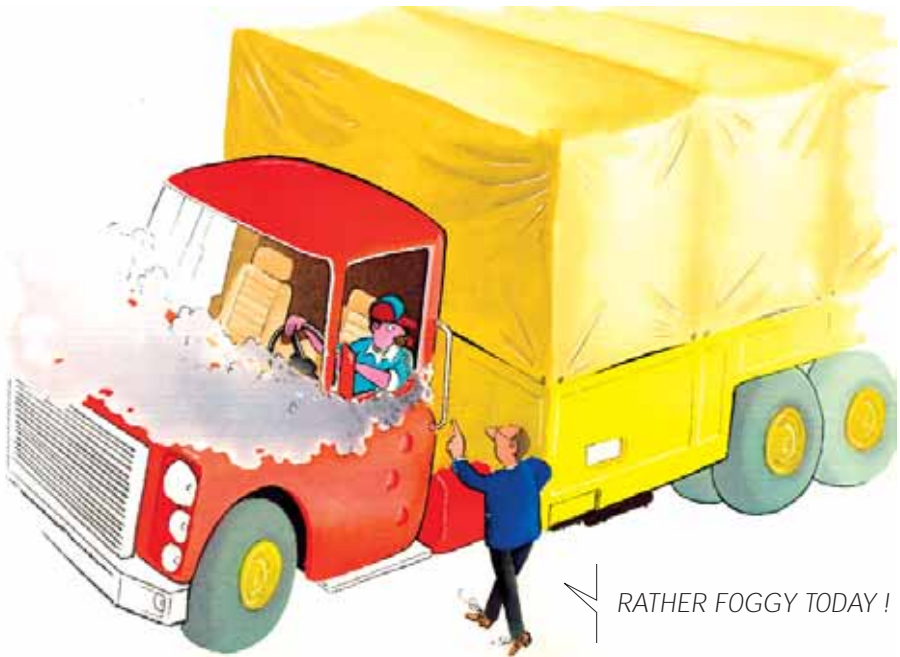
There may be no direct evidence that sleepiness was involved in a driving accident. The driver may be unaware that he or she fell asleep at the wheel or may deny having fallen asleep.

A sleep-related vehicle accident should be suspected when other possible causes of an accident have been eliminated and most or all of the following conditions apply:

- Weather conditions were good.
- Postaccident testing found no drugs or alcohol in the driver.

- No mechanical problems occurred with the vehicle.
- No speeding was indicated by the vehicle's monitor.
- The driver has no known medical disorders that could be a causative factor.
- No skid marks or signs of swerving or braking before impact were present.
- No other vehicles were involved.

A sleep-related vehicle accident should also be suspected when the accident occurred during the periods of low alertness in the circadian rhythm: between 2 and 6 a.m. in the morning or between 2 and 4 p.m. in the afternoon.



5 Substances that influence sleepiness and total sleep time



Numerous substances can influence sleepiness and total sleep time. Caffeine, alcohol, and tobacco products can play a major role in increasing daytime sleepiness by disrupting nighttime sleep. Over-the-counter and prescription medications can also have this effect.

1 Caffeine

Caffeine is in coffee, tea, chocolate, some colas and other soft drinks, energy drinks, and even in some medications. It has probably been used to combat sleepiness since the Stone Age, when our ancestors found it in certain plants. Caffeine is an addictive psychostimulant that requires about 30 minutes after ingesting before it becomes effective, with its effects lasting about 5 hours.

Caffeine increases intellectual and physical performance, reduces the feeling of drowsiness, and produces a mild sensation of euphoria. Conversely, it also reduces sleep quality and total sleep time by masking natural sleeping needs and thus destabilizing normal sleeping habits.

When caffeine intake exceeds 250 mg/day (over 5 cups of coffee) side effects of overstimulation can occur: nervousness, irritability, palpitations, flushing, hyperventilation, arrhythmias, rapid respiration and heart rate (tachycardia), muscle twitching, and gastrointestinal disturbances, among other things. Chronic consumption of caffeine can lead to insomnia, persistent anxiety, paranoia, and depression.

2 Alcohol

Alcohol is a depressant and has a sedative effect, which is magnified in sleepy or anxious people. It is probably the most frequently used self-medicated sleeping aid in the world.

Consuming alcoholic beverages initially produces a short period of euphoria, followed by impairment of the drinker's judgment, concentration, visual perception, and memory. Its effects are directly related to the quantity consumed.

Although alcohol reduces the time it takes to fall asleep because it relaxes the brain, after 3 or 4 hours of sleep it increases sleep disruption during the deep NREM and REM stages. Alcohol increases the likelihood of snoring, sleep-related breathing disorders, and parasomnias and sleep-related movement disorders, followed by excessive daytime sleepiness. People with obstructive sleep apnea are particularly effected, with an increased risk of heart attack, stroke, and sudden death because their throat muscles are relaxed by alcohol.

The risk of having a fatigue-related vehicle accident is increased by alcohol consumption.

3 Nicotine

Nicotine is a highly addictive stimulant that disrupts sleep and reduces total sleep time. Users of tobacco products wake up more often during the night, have more difficulty staying asleep, and experience more daytime sleepiness than nonusers.

Nicotine, along with the many irritants in cigarette smoke, increases snoring as well as the intensity of obstructive sleep apnea and other sleep disorders. Some heavy smokers crave nicotine so much that they wake up during the night to have another cigarette.

4 Medications that Increase Sleepiness

Over-the-counter and prescription medications also influence sleep:

- Nonhypnotic benzodiazepines, known as tranquilizers, are used to treat anxiety. Tranquilizers with long half-lives in the body have residual sedative effects that contribute to daytime sleepiness. They can also be addictive.
- Hypnotic benzodiazepines have replaced barbiturates for use as sleeping pills. They can be effective in treating acute insomnia when prescribed for short periods of time under a physician's supervision, but they are potentially addictive and can paradoxically cause insomnia as a withdrawal symptom if a person abruptly stops taking them.
- Melatonin, considered a «darkness hormone» because it is produced by the brain at the onset of sleep and during the night, is available as a dietary supplement. It is reputed to improve sleep quality and assist with managing jet lag, although this is not formally proven.

- All medications have side effects. Many over-the-counter and prescription medications have side effects that increase sleepiness during normal waking hours. Always read the label of any medication for warnings. You should avoid driving or operating machinery when taking these medications, which include :

- cough syrups and pain killers derived from morphine or codeine
- nasal decongestants
- antihistamines used to combat allergies and travel sickness
- muscle relaxants
- certain medications used to treat epilepsy
- neuroleptics (tranquilizers) used to treat psychotic behavior
- sedative antidepressants
- appetite suppressants
- certain medications used to treat high blood pressure

Sedative properties are also common to many illegal drugs (such as marijuana and opiates), although the effects can be unpredictable because their purity is not consistent. The side effects of using illegal drugs also typically include addiction, abuse, and overdose.

BOB! YOU NEED
TWO HANDS WHEN
YOU YAWN !



5 Medications that Increase Alertness and Reduce Sleepiness

Stimulant medications act on the central nervous system to increase alertness and reduce sleepiness. Prescription stimulant medications include :

- amphetamines and amphetamine-like (Ritalin®)
- modafinil, a non-amphetamine stimulant that produces alertness and vigilance with very few side effects and has been used to keep soldiers and pilots awake for days in combat zones

- beta blockers used to treat high blood pressure and cardiac conditions
- theophylline, a respiratory stimulant used to treat asthma
- cortisone
- thyroid hormones
- some non-sedative antidepressants.

Common over-the-counter stimulants are caffeine, ephedrine (or herbal ephedra), pseudoephedrine, and phenylpropanolamine. They are used mainly as antihistamines and cold medications, but are also marketed as diet aids and «energy pills.»



6 Sleep management



No law states that everyone must sleep 8 hours each night. Some people feel rested with only a few hours of sleep while others feel groggy and tired even after a full 10 or 11 hours of sleep.

For the majority of people who do not have a sleep disorder, going to sleep is best accomplished by reclining and relaxing. Forget everything and let nature take its course. Sleep is natural. Your brain is in control, managing your body's chemistry to make you fall asleep within 20 to 30 minutes or so and cycle through the various phases of sleep.

An occasional sleepless night is not dangerous or debilitating. It is common to everyone and simply reflects our worries, anxieties, and ambitions. Paradoxically, it is most often the fear of not being able to fall asleep that causes insomnia! People are afraid that if they do not get their 8 hours of sleep every single night they will be seriously ill or not able to perform the next day. Typically, the more someone wants to sleep, the less he or she actually sleeps.

In the next pages let's look at some advice for better managing sleep. There is also specific advice for coping with various sleep disorders.

THE BUSINESS NAP



1 Sleep Advice for Everyone

For those of you who sleep well and wake up in the morning feeling relaxed, refreshed, and ready to go, the next few pages are not necessarily of interest. But for those of you who feel that you do not get enough good-quality sleep, there are three elements on which you can work to improve sleep quantity and quality: your sleep schedule, your bedroom, and yourself.

a – Your sleep schedule

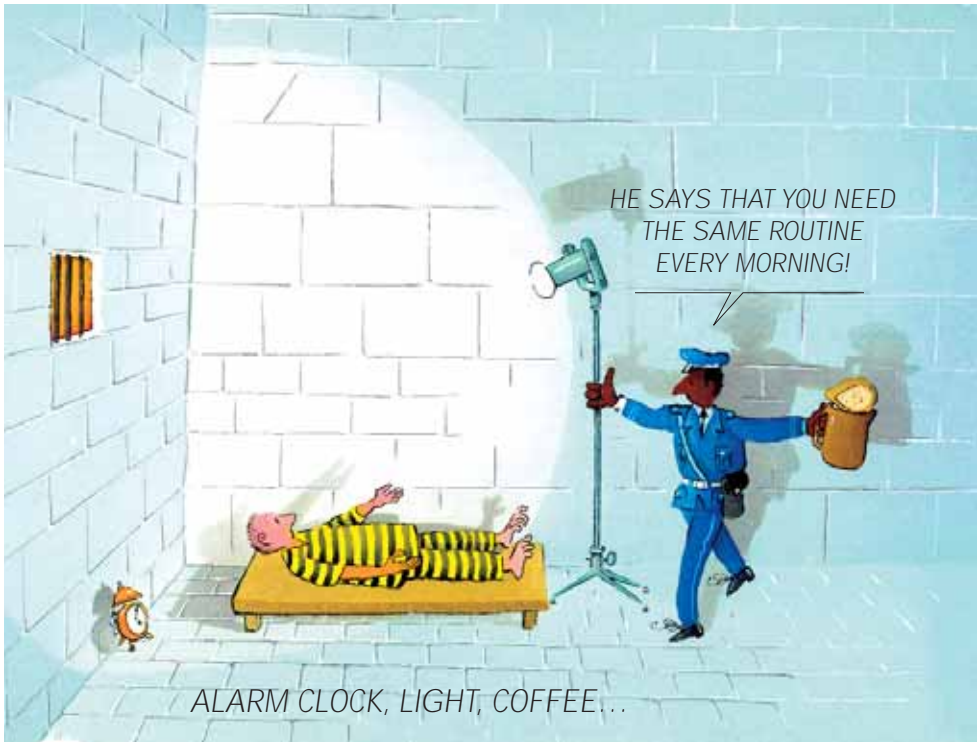
Try to follow a regular daily schedule, ritual, or routine for going to bed and getting up at the same time each day. It is important to maintain this schedule on weekends.

Doing the same activities about 30 to 45 minutes before bedtime cues your body that it is time to sleep. Some people watch

television, read a book, listen to soothing music, or soak in a warm bath. The point is to do something relaxing. Do not watch a horror movie, answer your emails or start working on your unpaid bills or income taxes.

Similarly, follow a routine each morning when you wake up so that your body knows that it is time to start the day. Start by opening the curtains to take in natural light. If there is no natural light, use a halogen lamp, which is 100 times brighter than a fluorescent light, to cue the brain's biological clock. Exercise, take a shower, have breakfast, get dressed for work, and get on with the day's activities.

Above all, avoid napping in the later part of the afternoon or early part of the evening. This practice does not match your circadian rhythm and may keep you awake later on during the night.



ALARM CLOCK, LIGHT, COFFEE...

b – Your bedroom

Your bedroom is the most important place when it comes to sleep. Ideally, it is reserved only for sleep and intimate moments. Do not do anything else in the bedroom—do not work or use a computer, eat, or watch television in the bedroom.

- **Temperature and humidity** — Keep the bedroom at a comfortable temperature (65 to 68 degF [18 to 20 degC]). It should not be too dry, which can induce a dry throat and nose and breathing discomfort. Have enough blankets for the season. Wear a pair of socks to prevent cold feet, which may prevent you from falling sleep at bedtime or wake you in the wee hours of the morning.
- **Light**—Darken the room and adjoining bathroom, using blackout window treatments (draperies and shades) if

necessary. Eye blinders, shades, or a sleeping mask can also be worn to prevent light or the rising sun from waking the brain. Hide devices with LEDs (light emitting diodes) such as cell phones, computers and other electronic equipment.

- **Bed**— Ensure that your mattress and pillow are comfortable for you, providing both comfort and enough space because sleepers typically move between 40 to 60 times during a normal night. If you allow pets in your bedroom, they should sleep in their own bed.
- **Noise** — Keep the bedroom as quiet as possible. Turn off cell and land-line telephones, radio, TV, and computer. Use ear plugs if necessary. The steady, low-pitched hum of a fan, air conditioner, white-noise machine, or soft music may help block out unwanted outside noise.



c – Yourself

• Bedtime

- Go to bed only when you are sleepy and you feel the «sleep train» coming into the station. This is usually announced by drooping eyelids, blurred vision, repeated yawning, trouble keeping the head up, and a tired feeling that calls you to bed.
- If after 20 to 30 minutes in bed you have not fallen asleep, do not stay in bed. Get up and go to another room and do something nonstimulating, such as reading a book or listening to calm music, with the lights down low while you wait for the sleep train to reenter the station. This should not take more than 60 to 90 minutes.

• Clothing — Good sleep requires loose, comfortable bedclothes.

• Stress reduction

- Before going to sleep, jot down on a piece of paper the thoughts and problems you are turning over in your mind and your «to do» list for the next day. This will relieve your mind of the pressure of being responsible for remembering these items.
- Although a warm bath or shower can relax and prepare you for bed, it can also prevent sleep by increasing your body temperature.

• Exercise — Avoid intense exercise in the hours just before bedtime. A short walk is

fine for relaxing and reducing stress, but strong exertion such as at the gym, jogging, or playing squash interferes with your ability to fall asleep.

• Food — Avoid heavy meals and foods rich in sugar and high in fat in the few hours before bedtime. A light snack is fine.

• Fluids

- Reduce fluids in the evening. By drinking less in the hours before bedtime, you reduce bathroom calls, which can disrupt your sleep.
- Avoid alcoholic drinks before going to bed. Alcohol in moderation reduces stress, inhibitions, and tension. However, it relaxes you in the short term, while in the long term it disrupts the normal sleep pattern and only increases insomnia.
- Avoid caffeine-containing beverages and foods (such as tea, chocolate, soft drinks) in the hours preceding bedtime.

• Smoking — Avoid smoking just before going to bed because the nicotine in tobacco products is a stimulant.

• Medication — Avoid medications that can make it difficult to fall asleep or stay asleep (see «Substances that Influence Sleepiness and Total Sleep Time»). However, do not abruptly discontinue taking a prescription medication without first checking with your physician or pharmacist.



I NEED COMFORTABLE CLOTHING TO SLEEP WELL

d – A few words on sleep safety

- Do not smoke in bed. If you are tired or have been drinking you can easily fall asleep while smoking. Tobacco is processed to stay lit, and can quietly smolder to start a deadly fire during the night.
- Do not fall asleep with a heating pad on— even at low settings a heating pad can burn your skin or it may short circuit and cause a fire. Try a microwave-heated bag, but use one with a solid filler instead of a liquid or gel, because skin burns when exposed to liquid at 125 deg F [83 degC].

If you use an electric blanket, follow the manufacturer's directions and avoid the use of extension cords.

- Keep a glass of water next to the bed. If you get thirsty in the middle of the night, you will not have to get up and risk tripping or falling in the dark.
- Keep a flashlight within easy reach near the bed or use motion-detection nightlights in the bathroom and hall so you do not have to turn on the lights, which can fool your brain into thinking that it is time to wake up, not fall asleep again.

BATHROOM.
NO LIGHT.
FELL IN STAIRS!



2 Treating Insomnia

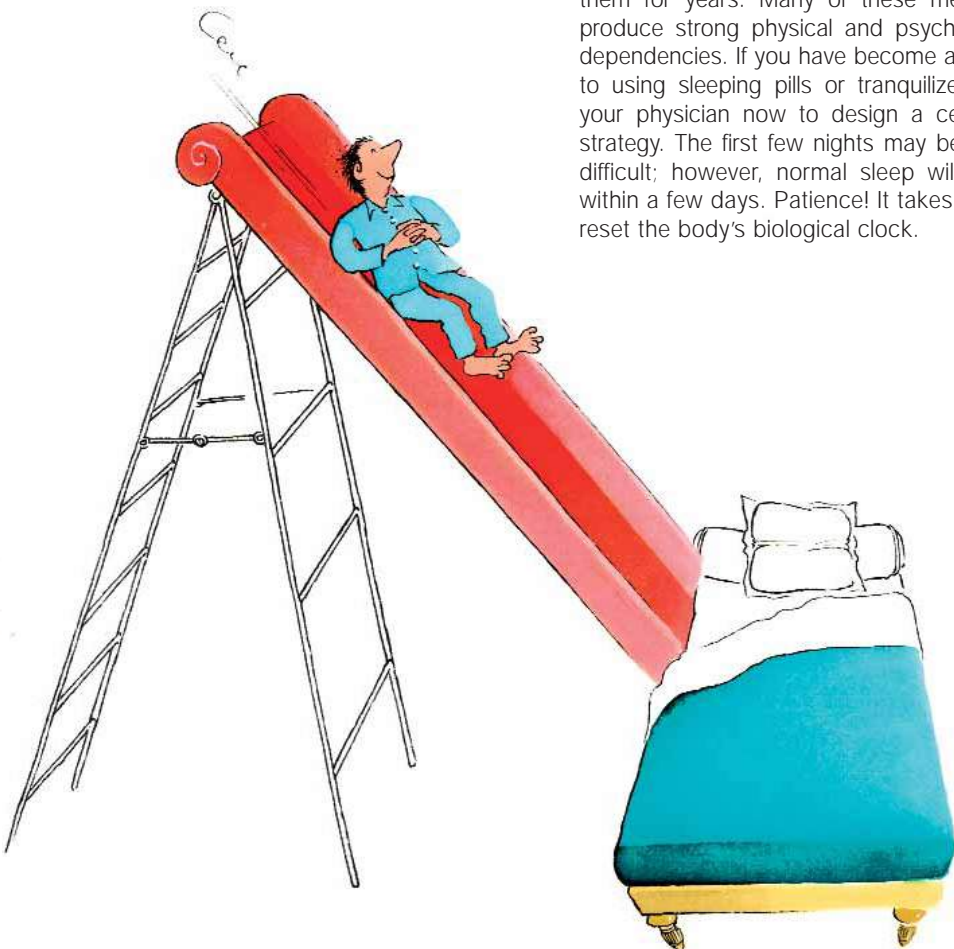
Do not despair if you have sleepless nights: Insomnia is a treatable condition.

As strange as it may seem, many insomniacs spend too much time in bed. They try to counter their circadian rhythm by remaining in bed even if they cannot fall asleep, taking naps during the daytime or early evening, going to bed early and before they feel sleepy, and staying in bed long after they have awoken in the morning. These tactics are a serious mistake.

The first thing to do is to closely follow the preceding «Sleep Advice for Everyone» on sleep management for at least one month. If these recommendations do not improve the situation, consider seeing a medical professional.

If you are prescribed a mild sedative or sleeping pill to use for a short period of time, remember that sleeping pills only increase the quantity of light sleep. They do not increase the amount of restful and recuperative deep sleep.

Unfortunately, too often people get hooked on their sleeping pills and keep taking them for years. Many of these medicines produce strong physical and psychological dependencies. If you have become addicted to using sleeping pills or tranquilizers, see your physician now to design a cessation strategy. The first few nights may be a little difficult; however, normal sleep will return within a few days. Patience! It takes time to reset the body's biological clock.



3 Treating Sleep-Related Breathing Disorders— Obstructive Sleep Apnea

Once the diagnosis of OSA has been confirmed, treatment should be implemented rapidly to avoid its numerous potential health risks. The aim of treatment is to reduce the upper airway obstruction and increase the amount of oxygen getting to the brain and heart.

a – Mild cases of obstructive sleep apnea

Mild cases of OSA and snoring can be improved through lifestyle changes:

- weight loss, which also improves overall health
- increased physical activity
- avoidance of medications that relax the central nervous system (tranquilizers, sleeping pills)
- avoidance of alcohol
- nostril enlargers
- sleeping on the side because sleeping on the back increases the symptoms.

In some cases, an oral appliance that keeps the airway open during sleep may be necessary. Some devices bring the jaw forward, elevate

the soft palate (roof of the mouth), or retain the tongue from falling back in the airway and blocking breathing when the patient is in bed.

b – Severe obstructive sleep apnea

Severe cases of sleep apnea require using a continuous positive airway pressure (CPAP) device while sleeping.

The CPAP device is a mask that fits over the nose (over the mouth in rare cases) and is connected to a mini compressor. It keeps the airway open with a stream of air for unobstructed breathing. The machine must be used and the mask worn every night.

In some cases the CPAP device is ineffective or the patient refuses to use it. Surgical techniques can be tried to remove and tighten tissue and widen the airway:

- fix a deviated nasal septum
- remove enlarged tonsils or polyps
- uvulopalatopharyngoplasty (UPPP) to remove the uvula and excess tissue in the palate and pharynx.

As with any surgery, effectiveness varies from person to person.



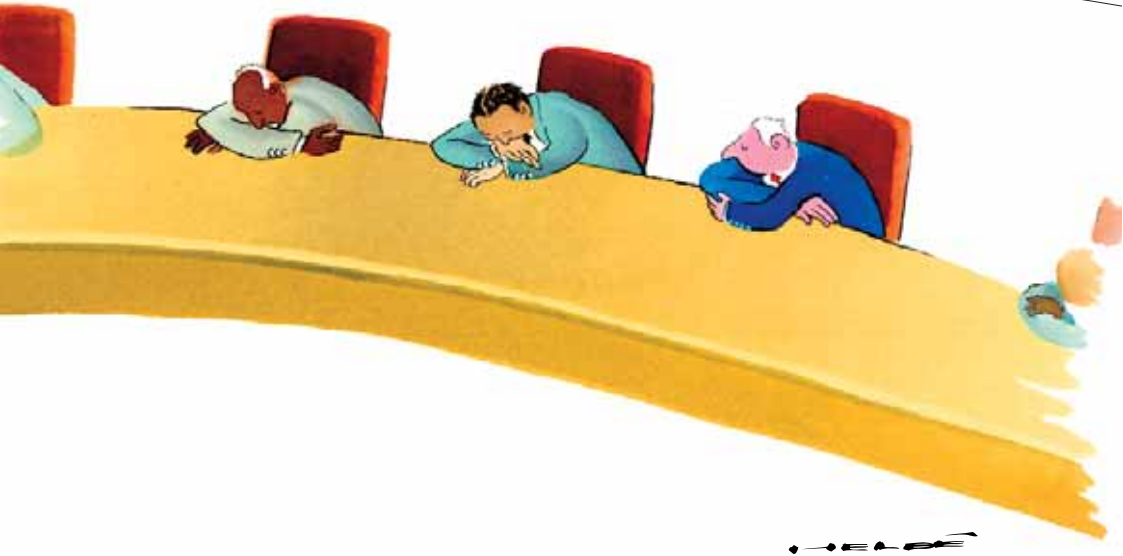
4 Treating Hypersomnia Not Caused by Breathing Disorders

If hypersomnia continues to occur after following the recommendations for sleep management at the beginning of this chapter, a physician should be seen to rule out underlying medical conditions, such as neurological illnesses or depression, that can

have excessive daytime sleepiness as a symptom.

Managing narcolepsy requires more than just management of the sleep-wake cycle. Although there is no cure for narcolepsy, daily treatment with stimulants or wake-promoting medications, such as amphetamines or modafinil, respectively, may be effective in maintaining wakefulness.

INTERNATIONAL CONFERENCE



5 Treating Circadian Rhythm Sleep Disorders

a – Shift workers

During work on night shifts, try the following recommendations to cope with the sleep tendencies of your circadian rhythm:

- Maintain the work area well lit, preferably with halogen lamps. The bright light helps keep the brain alert.
- Do the tedious and boring tasks at the beginning of the shift, when alertness is usually highest. Leave the stimulating and motivating tasks for later in the shift, when interest in your activity reduces sleepiness and increases alertness.
- Use a buddy system. Coworkers can help keep each other alert and recommend work stoppage if signs of drowsiness appear.
- Exercise, walk around, or do some physical activity during breaks.
- Develop a napping strategy. Napping is an effective way to fight sleepiness. A late afternoon nap before the night shift will increase alertness. During the night shift,

the best time to nap is between 4 and 6 a.m. There are two types of naps:

- A short nap, less than 20 to 30 minutes, maintains or improves alertness, performance, and mood.
- A long nap, approximately 90 minutes, allows a person to sleep through a full sleep cycle including recuperative deep sleep and dreaming.

Naps that last more than 20 to 30 minutes but less than 90 minutes cause the sleeper to wake up in the middle of the deeper sleep phases, feeling groggy, disoriented, and drowsy for quite some time afterward.

- If you must work consecutive shifts, a short nap taken every 3 to 4 hours can be just enough sleep to help you avoid falling asleep during a crucial task.
- Drink caffeinated beverages (coffee, tea, cola) during the shift to increase alertness and combat sleepiness. A cup of coffee just before a short nap is very effective. The caffeine starts working just as the nap ends.



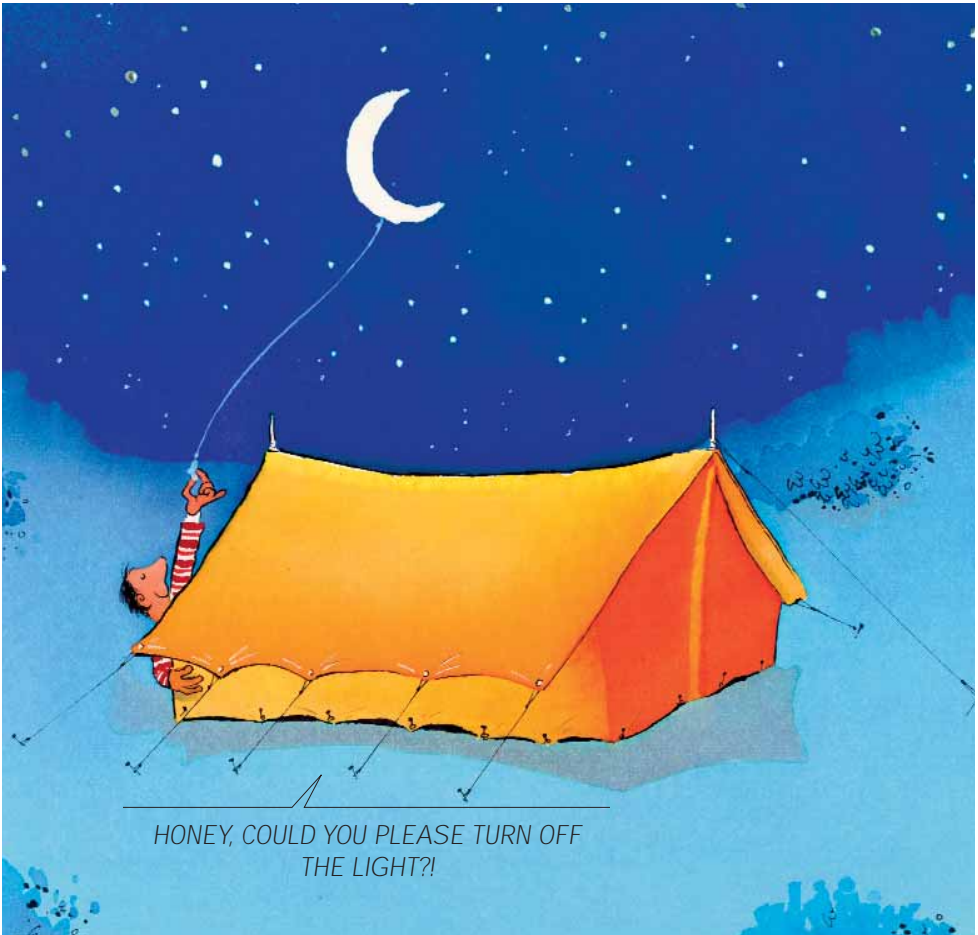
NAP TIME

At the end of the night shift, the following recommendations apply:

- Avoid driving yourself home or to sleeping quarters. Let a well-rested driver take the wheel. Drowsiness at the end of a night shift increases the risk of sleep-related vehicle accidents.
- Avoid sunlight, wear wraparound dark glasses when outdoors, and go straight to bed. If exposed to the sun's bright light, the brain thinks that a new day is starting and resists falling asleep.
- Reduce daytime noise. It is hard to go to sleep when everyone is waking up and noise levels are increasing. Try to maintain

an oasis of quiet and calm in your bedroom. Tell your neighbors about your sleep schedule so they can shift noisy activities such as vacuuming and mowing to other times. Hang a «Do not disturb» sign to prevent sleep interruptions by maintenance workers and salespeople.

Night shift workers in isolated situations, such as on oil rigs, adapt better to working odd hours because they have no immediate social demands or family life obligations. In addition, sleeping quarters are usually adapted to maintain quiet and dark conditions for night shift workers.



b - Jet lag

If possible, take daytime flights to minimize the loss of sleep and the resulting fatigue.

During the flight, avoid large, high-fat meals, caffeine, and alcoholic beverages. Drink a lot of water to remain well hydrated.

Upon arrival at your destination:

- Remember that light is the major factor in combating jet lag. Seeking out or avoiding light at the right times can greatly accelerate resetting your biological clock in a new time zone. The goal is to synchronize the brain's clock to the local time. If the sun is shining upon arrival, take advantage of it and go out for a short walk or jog. Then try to stay awake until your normal bedtime at your destination. To promote sleep at bedtime, avoid light by darkening the room or wearing an eye mask. Earplugs similarly reduce the distracting effects of noisy surroundings.
- Avoid critical meetings on the first day after arrival.

- Avoid driving, especially for long distances, on the first day after arrival.

Melatonin supplements are reputed to be effective in reducing jet lag, but this has not been formally confirmed by scientific studies.

6 Treating Parasomnias and Sleep-Related Movement Disorders

In addition to the previous general sleep recommendations, a warm bath before going to bed, leg massages, and exercise and relaxation techniques can provide temporary relief from the symptoms of periodic limb movement disorder and restless legs syndrome. Prescription options for more severe cases include a new medication that helps regulate movement and balance, sedatives, anticonvulsives, and pain relievers.

Sleep bruxism can typically be managed with a dental appliance, also called a night guard, fitted from impressions of your teeth.



7 Conclusion

Sleep is essential not just to maintain performance but also health. The 25 years of the average lifespan that are spent sleeping, of which we are dreaming for five years, are not wasted down time.

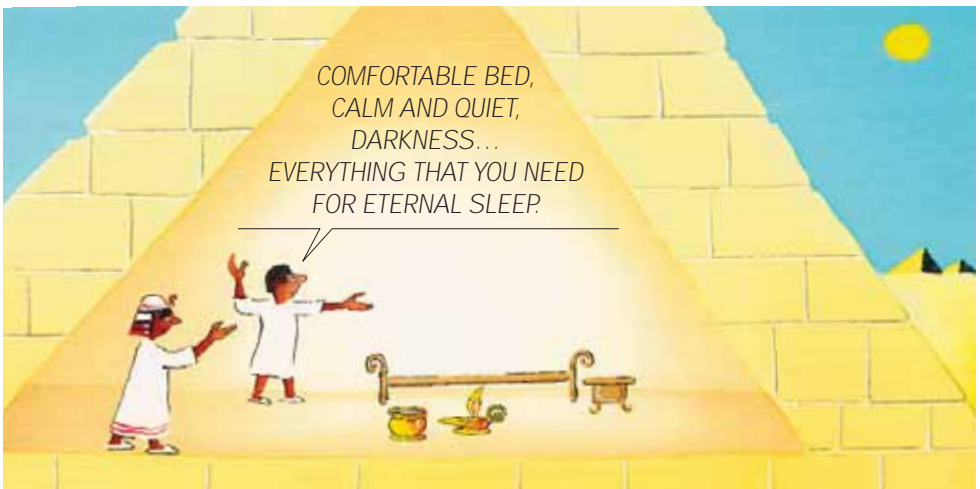
People who purposely do not take the time to get enough sleep end up sleep deprived. With the development of electricity and modern technology (especially television and computers), it is all too easy for people to sleep much less than their candle-burning ancestors. They are constantly tired and drowsy and at much greater risk for making mistakes, dozing off, and having accidents.

Similarly sleep deprived are the people who want to sleep but have difficulty falling asleep at night or keep waking up in the middle of the night. Some suffer from acute insomnia, lasting from one miserable night to a few weeks, typically the result of worry, problems, and stress. Others suffer from sleep disorders, often unaware but reported by their bed partner, lasting for years that can lead to serious health consequences and even death.

For most readers, the sleep management recommendations outlined in this brochure will suffice to get your biological clock and circadian rhythm better synchronized, which in turn will improve your sleep quantity and quality. If excessive daytime sleepiness and drowsiness continue, you should consult a medical professional. After an initial interview and clinical examination, you will probably be asked to keep a sleep diary for a few weeks, and you may be asked to participate in a noninvasive sleep study at a clinic or hospital.

Use the Epworth Sleepiness Scale to help prevent accidents resulting from excessive daytime sleepiness while driving or at work and at home.

Although you are not paid to sleep, your sleep influences your performance at work and during personal time. It is never too late to begin investing in good sleep management to meet your personal sleep requirement. If your performance improves, your salary may improve as well. But the most important result is that you will feel much better after each good night's sleep that reduces your sleep debt. Good night and sleep well!



THE MUSICIAN'S NAP



- **Benzodiazepine** – class of tranquilizers used for managing insomnia and some other sleep disorders (for example, restless legs syndrome, periodic limb movement disorder)
- **BMI** – body mass index, the relationship of height and weight that is used to indicate body fat content
- **Bruxism** – sleep disorder characterized by grinding or clenching of the teeth during sleep that may cause abnormal wear of the teeth, unpleasant sounds, and discomfort in the muscles of the jaw
- **Cataplexy** – sudden temporary loss of muscle tone that may occur at moments of strong emotion in people with narcolepsy
- **Chronic insomnia** – regular difficulty in falling or staying asleep that occurs for more than four weeks
- **Circadian rhythm** – the biological clock that controls numerous body functions, such as the sleep-wake cycle, body temperature, and blood pressure over an approximately 24-hour period
- **CPAP** – continuous positive airway pressure device used to treat obstructive sleep apnea
- **Dreams** – thoughts, emotions, and sensations that occur during sleep and usually can be remembered only if the sleeper wakes up during a dream
- **Drowsiness** – feeling abnormally sleepy during the day
- **Drowsy driver detection system** – machine that scans and monitors drivers for symptoms of sleepiness
- **EEG** – electroencephalogram, a record of the brain's electrical activity
- **EMG** – electromyogram, a record of muscle electrical activity
- **EOG** – electro-oculogram, a record of eye activity
- **Fatigue** – lack of energy resulting from prolonged, excessive mental or physical activity, illness or insufficient sleep, or the side effect of medication
- **Hypersomnia** – repeated episodes of excessive daytime sleepiness or prolonged nighttime sleep
- **Insomnia** – inability to fall or remain asleep, which may include waking up too early in the morning not being able to return to sleep
- **Jet lag** – sleep disorder caused by discordance of the body's circadian rhythm with the local time zone after a person has traveled across several time zones within a short period
- **Melatonin** – hormone, also available as a supplement, produced by the body to regulate the sleep-wake cycle
- **Microsleep** – short bout of sleep lasting from a few seconds to a minute during the waking hours and usually resulting from sleep deprivation
- **Narcolepsy** – chronic sleep disorder characterized by attacks of excessive daytime sleepiness and commonly by periods of muscle weakness called cataplexy and sleep paralysis and hallucinations
- **Night guard** – dental appliance for managing bruxism

- **Nightmare** – anxiety-filled, frightening dream.
- **NREM sleep** – for non-rapid eye movement (non-REM): the stages of sleep when there is no rapid eye movement.
- **Obstructive sleep apnea** – cessation of breathing during sleep due to an obstruction of the upper airway
- **Parasomnia** – sleep disorder characterized by an abnormal event that occurs during sleep (for example, sleepwalking, sleep talking, and nightmares)
- **Periodic limb movement disorder** – sleep disorder with jerking and kicking of the legs and sometimes arms during sleep
- **Pickwick syndrome** – severe form of obstructive sleep apnea named after the character Fat Joe, who was described as obese and constantly falling asleep in Charles Dickens' *Pickwick Papers* (1837)
- **Polysomnography** – sleep study or sleep test
- **REM sleep** – stage of sleep during which most dreaming takes place that is characterized by rapid eye movement, voluntary muscle paralysis, and more rapid, irregular breathing and heart rate
- **Restless legs syndrome** – nighttime sensation of burning, itching, or crawling in the legs with a need to move the limbs for relief
- **SCN** – suprachiasmatic nucleus cells in the brain that regulate the circadian rhythm of the body
- **Shift work** – work schedules outside of the typical «9 to 5» business day
- **Sleep** – periodic state of rest accompanied by varying degrees of unconsciousness and relative inactivity
- **Sleep debt** – deficiency of sleep that accumulates when personal sleep requirements are not met
- **Sleepiness or tiredness** – need for sleep or likelihood of falling asleep resulting from the circadian rhythm, insufficient sleep, or prolonged wakefulness that can be counteracted only by sleep
- **Sleep study** – noninvasive procedure that records brain, muscle, and eye activity and vital signs and observes a person during a night of sleep
- **Sleep talking or somniloquy** – utterance of speech or sounds during sleep
- **Sleep-wake cycle** – alternating balance of sleep and wakefulness during a 24-hour day
- **Sleepwalking or somnambulism** – sleep disorder in which a person walks or does certain activities while seemingly awake but during deep sleep
- **Snoring** – noisy or harsh-sounding breathing through the mouth during sleep caused by partial obstruction of the upper airway, this is a primary symptom of obstructive sleep apnea
- **Uvulopalatopharyngoplasty** – surgical removal of the piece of flesh (uvula) hanging in the back of the throat and other excess tissue to treat obstructive sleep apnea
- **White noise** – combination of all sound frequencies that has the effect of masking noise
- **Yawning** – involuntary opening of the mouth with a prolonged, deep inhalation of air, usually resulting from drowsiness, boredom, or fatigue
- **Zeitgebers** – time cues for the body's biological clock

For further information concerning sleep disorders:

Canadian Lung Association : « What is sleep apnoea? »
http://www.lung.ca/diseases-maladies/apnoea-apnee_e.php

The International Classification of Sleep Disorders
<http://web.uni-marburg.de/sleep/enn/database/asdadefswelcome.htm>

National Institute of Health, Bethesda, Maryland, USA: « Sleep Disorders »
<http://health.nih.gov/result.asp/601>

National Sleep Foundation
<http://www.sleepfoundation.Org/>

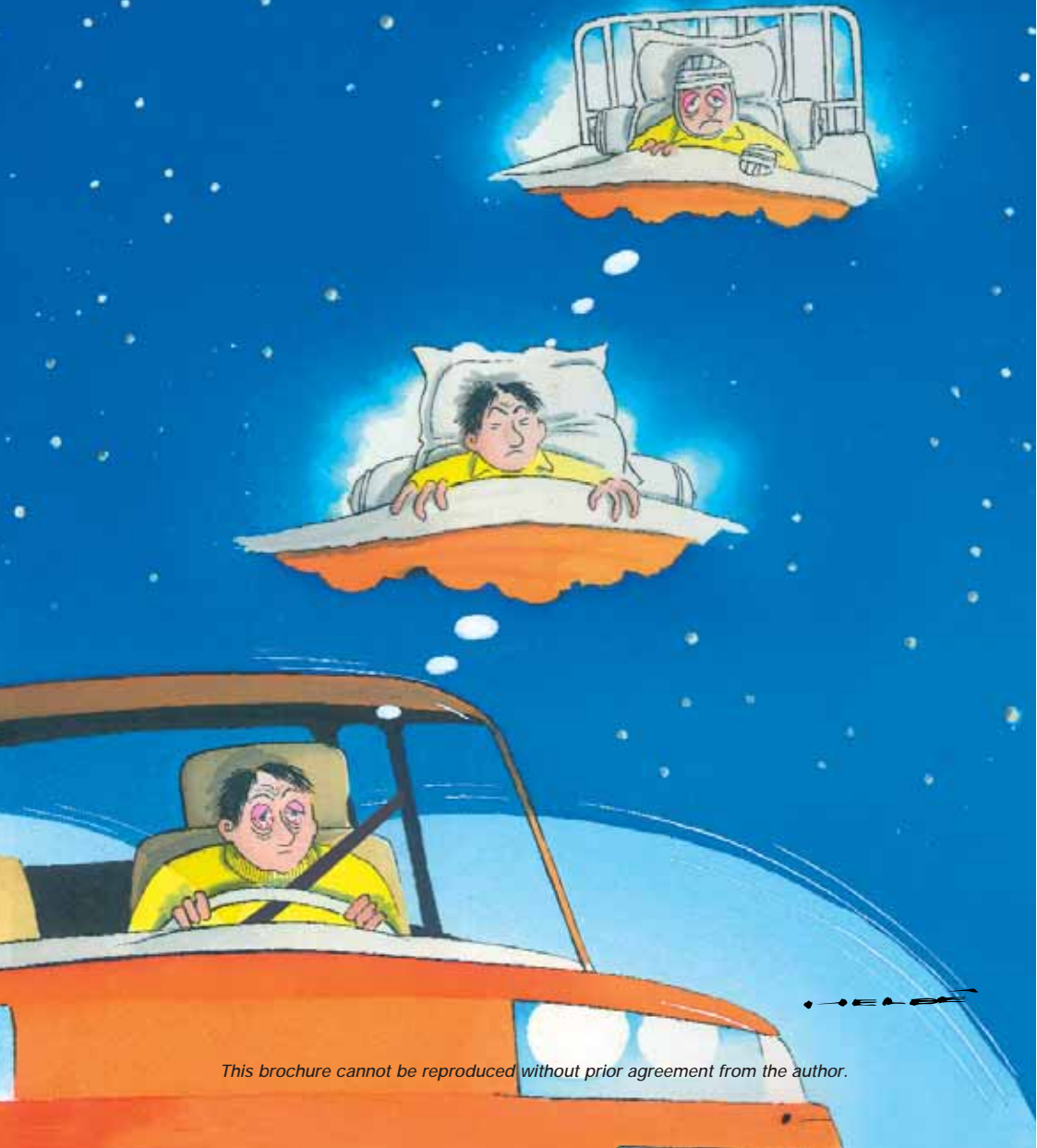
WebMD: « Sleep Disorders »
<http://www.webmd.com/content/article/104/107650.htm>

DIFFICULTY SLEEPING ?



The recommendations and practices described in this brochure should only be considered as valuable advice. They cannot replace a personalized and adapted consultation by a medical professional.

Therefore, the author disclaims all and any liabilities resulting from the implementation of the health prevention recommendations and practices described in this brochure, including but not limited to personal injury or illness.





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