



INSOMNIA IN ADULTS AND CHILDREN

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Dedication

We would like to dedicate this book to all the patients we see who struggle to sleep. We recognize that for those who do not have the problem of insomnia it is difficult to appreciate the many ways in which this condition impacts one's life.

We also dedicate this book to our colleagues who work in our respective sleep clinics and help us to improve the situation for people with disrupted sleep.

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Introduction

The impact of insomnia is far reaching and may affect both physical and emotional health as well as intellectual capacity. The field of sleep medicine is relatively young but there have been significant strides in the field. Understanding the potential causes of sleep disruption and the range of possible solutions will allow many to overcome the difficulty of disrupted sleep. This booklet is meant to provide a broad but simple understanding of the problem and possible treatments of insomnia. Too often the problem is tackled from the perspective of the symptom rather than dealing with the cause. Furthermore insomnia is too often seen as merely a facet of another condition rather than a problem in its own right that may require long term treatment (as is the case for many other chronic problems). We hope this booklet gives useful options and an understanding of insomnia.

1. What is Insomnia?

Slumber, snooze, somnolent, sleep - these are all words that describe a state that we spend about one-third of our lives in. Sleep is one of those soothing pleasures that is easy to take for granted. Once you experience difficulty sleeping, the battle to get a good night's sleep can become all consuming.

Sleep is a basic need. Like breathing and eating, we need sleep in order to survive. The drive to recover lost sleep is as strong as our drive for food. Sometimes the need for sleep can be so overwhelming that it could result in death, such as falling asleep while driving. Despite all that we know about sleep, science does not have answers to the basic question of why we sleep. (See chapter 2).

We do know that poor sleep has an adverse impact on daily life. These negative changes can be through effects such as reduced intellectual and physical performance, low mood and changes in appetite (usually increased). In the long term, poor sleep can cause havoc to, or with, your emotional, physical and social health.

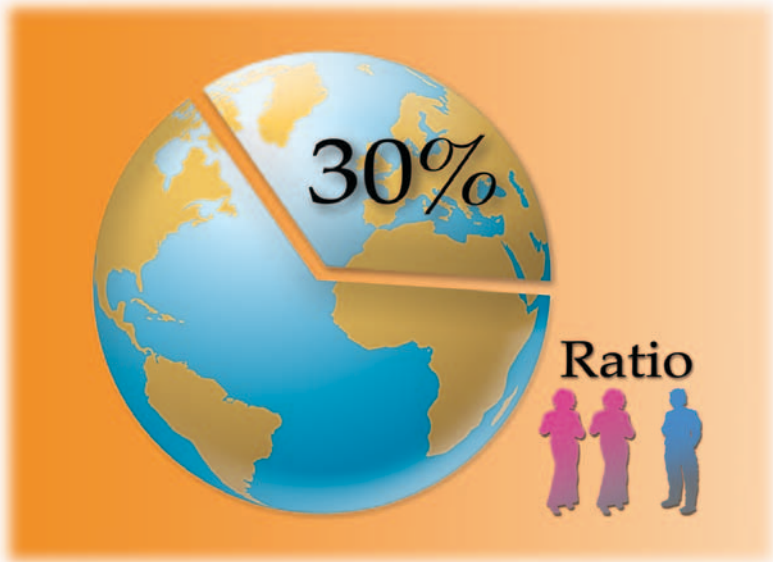
THE CYCLE OF INSOMNIA: WHEN YOU CANNOT SLEEP, EVERYTHING MATTERS.

Problems such as **difficulty falling or staying asleep, and waking up too early, all describe insomnia**. Along with difficulty sleeping, **some people don't feel refreshed on waking and feel that their sleep was not restorative**. This is also a form of insomnia. Other consequences may be fatigue, emotional distress, impaired mental ability, poor concentration and memory, and emotionality. For some people insomnia may be situational (such as sleeping in a different place) or it may be intermittent (such as at exam time). The reason for the difficulty sleeping may be apparent and insomnia transient. When insomnia lasts for weeks/months/years, it is important to treat. Usually insomnia that persists does not resolve on its own and can lead to a reduced quality of life.

WHO GETS INSOMNIA?

The most common causes of insomnia are stress, anxiety, and depression. Women are about twice as likely as men are to report insomnia. It is also more common in older adults, shift workers, and people with medical or psychological disorders. There also seems to be a genetic component to insomnia, especially in cases where insomnia starts early in life. Depending on the definition of insomnia used, up to a third of the population suffers from insomnia. (See figure on next page).

WHAT PROPORTION OF PEOPLE HAVE INSOMNIA?



Almost one third of the world has insomnia at some point in their lives, and the ratio is 2 females to every male

HOW IS INSOMNIA DEFINED?

Insomnia may simply be a complaint of sleep that is “unsatisfactory”. More strict definitions use three insomnia symptoms: (1) trouble falling asleep, (2) waking up during the night, and (3) waking up too early in the morning and being unable to fall back to sleep. About one-third of the general population report one or more of these symptoms. Stricter definitions of insomnia consider how often it occurs, how long it has lasted and the effect it has on daily functioning. For example, “difficulty sleeping at least three nights a week for at least one month and that is associated with impaired functioning or distress.” Using this definition, a recent study in Quebec found that 11% of women experienced insomnia. A study by Stats Canada in 2002 asked: “How often do you have trouble going to sleep or staying asleep?” Based on a positive response and answering either “most of the time” or “all of the time”, about 3.3 million Canadians (13.4% of the household population aged 15 or older) have insomnia.

INSOMNIA ALONE OR WITH ANOTHER MEDICAL CONDITION?

Insomnia may be a result of another medical or psychiatric condition. Half the people who report insomnia symptoms also have multiple health problems. Insomnia sufferers are more likely to have a physical illness, especially arthritis, heart diseases, pain, or respiratory disorders. There is some evidence that people with chronic sleep problems have shorter lives.

A 34-year-old healthy woman presented with insomnia as defined by her family doctor as she slept only 4 hours a night. She was referred to a sleep clinic. She did not drink tea or coffee, exercised regularly, was of normal weight and did not take any medications. She was worried because her doctor told her she had insomnia. Her examination was normal and she was told to keep a sleep record for a month.

Because she had no symptoms of concern such as daytime sleepiness or fatigue and her function at work and home was normal, she was told that she was one of the rare people who are short sleepers. She came back a month later, very happy as she had read up about this and was delighted that she did not have a disorder that needed treating. "Short sleepers are people who sleep less than 5 hrs, with no daytime impairment, where the typical sleep time for young and middle aged adults is 7 to 9 hours."

2. What is Non-Restorative Sleep?

Non-restorative sleep is the subjective experience of feeling unrefreshed or not at full energy a short while after one wakes up. One of the more widely held theories about the function of sleep is that sleep serves a restorative purpose. The figure opposite provides evidence that sleep is restorative. For example, in teenagers there is evidence that their long bones grow during the night; there is evidence that new memories are laid down in different parts of sleep (dreaming and non-dreaming sleep) and one's ability to function if one is deprived of sleep is significantly impaired. For example, people who drive after being awake for 17 - 19 hours performed worse than those with a blood alcohol level of .05 percent

There are probably many factors that come together to give one the subjective experience of whether one has had a "restorative" sleep, or not. These would include both physical and psychological factors. People who are highly athletic might describe themselves as feeling very refreshed after a day when they have had a good workout and would probably feel that they have had good sleep as a consequence of the physical activity they did the previous day. Conversely a person who is worried or stressed, from, for example, difficulty in the work environment or a recent bereavement, might feel that his or her sleep is interrupted and not very refreshing. There are some medical conditions where sleep is commonly described as being non-refreshing leaving the person feeling fatigued and unrested. This would include conditions such as fibromyalgia, certain infections such as hepatitis-C and certain neurological conditions such as multiple sclerosis. In all of these, people might feel that their quality of sleep is impaired and they have an overwhelming sense of fatigue during the day. Until recently, doctors would mostly ask a patient a simple, single question as to whether they feel refreshed or not with a simple "yes" or "no" as the answer. In chapter 7, a newly developed scale to measure restorative feeling is provided and you can do a self-test to see how you score on this questionnaire.

Some of the factors that might go into making sleep more or less refreshing are described above. Other factors would include the actual composition of sleep. At each age there is an appropriate amount of different types of sleep a person has. For example a new born baby will have half of their sleep (which could be 16 hours a day in total) filled with dream or REM (rapid eye movement) sleep. In a 20-year old who only sleeps eight hours a day, only a quarter might be filled with dream or REM sleep. One of the bigger changes in sleep through adult life is the dramatic decrease in the amount of deep sleep where the rule of thumb of 20% at 20 years, 10% at 40 years and 5% at 60 years. (See figure on page 10). This emphasizes that one loses three quarters of one's deep sleep as one goes through adulthood which may explain why many older people often complain of their sleep being unrefreshing compared to people in their twenties. People with certain sleep dis-

The Wall of Evidence for The Restorative Theory of Sleep

Catabolism/anabolism*

The balance tips towards more build-up during sleep

Increased deep sleep

Protects against feeling pain

Growth hormone

Mostly released at night and mostly in deep sleep

ATP concentrations

Increase while oxygen consumption drops during sleep

Oxygen

Use decreases in deep sleep

Pregnancy

Some studies show is associated with increased deep sleep

Sleep loss

Worse performance e.g., driving

Illness

People with illnesses that lead to low energy output (e.g. paraplegics or those with hypothyroidism) have low levels of deep sleep

Exercise

People who exercise have more deep sleep indicating that sleep is restorative

Immunology

Infected animals who are prevented from sleeping are more likely to die

Height

Teenagers get taller during the sleeping period

Core sleep

When sleep is lost, deep sleep is replaced first

Cell mitosis

Most cell division is during sleep

Recovery

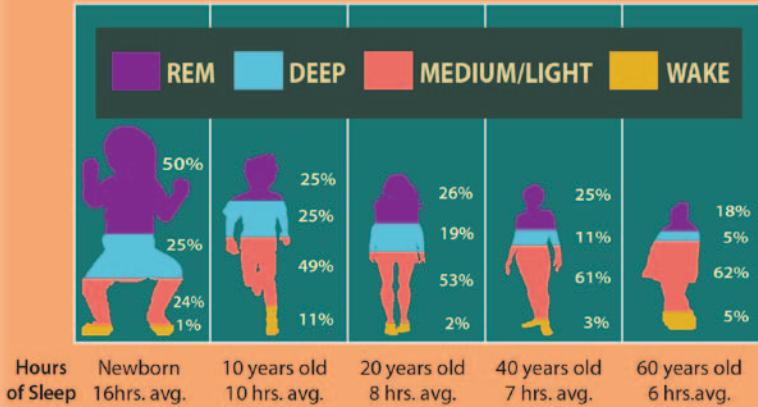
There is more deep sleep after deprivation

Memory

Growing evidence that certain types of memory need deep sleep

This figure emphasizes the points made on the previous page. There are many bricks in the wall of evidence that link sleep to a restorative process.

COMPOSITION OF SLEEP ACROSS THE LIFE CYCLE



The size of the figure reflects the hours of sleep

orders in which their sleep is very fragmented, for example because of repeated awakenings from breathing pauses during the night, might also complain that their sleep is unrefreshing.

In addition to the quality of sleep there is the timing of sleep which is controlled by the body clock. People who do shift work or who are jetlagged will also often complain that their sleep is unrefreshing. In teenagers, this can be a particular issue when they have a body clock that seems to be on British Columbia time when they are living in Ontario, i.e. they go to bed and wake up three hours later than would be appropriate in terms of what else is happening during the day, for example at school or at a job. (See chapter 6). A disruption of the body clock can lead to a feeling that one's sleep is not restorative and can also lead to depression. Depression, in turn, can also give one the feeling that sleep is unrefreshing.

It is common to observe that it is not just one thing that makes one feel that one's sleep is unrefreshing. Often there is a little change in several aspects of sleep. For example sleep may be a little shorter than usual *and* there is a lower percentage of deep sleep *and* there is an intrusion of a different brain wave pattern (alpha EEG – which is usually only seen in relaxed wakefulness). The net result is that the person feels unrefreshed. We sometimes refer to this as the “three strikes and you are out rule.”

One of these features alone, for example, the shorter sleep of an athlete who is exercising intensely and has a great deal of deep sleep, does not have the same effect i.e. a short sleep can be normal especially if it is of good quality.

FACTORS LEADING TO POOR SLEEP

*NOT MEASURED	*USUALLY MEASURED
No drop in oxygen consumption during sleep	Low sleep efficiency
No drop in temperature	Fragmented sleep
Body clock disruption	Low amounts of deep sleep
Reduced growth hormone released	High alpha EEG

* In laboratory

A 53-year-old executive of a large company complained of waking every morning at about 3:00 a.m. and could not get back to sleep. He would get up and go and eat something to help induce sleepiness and sometimes he would get back to sleep. His history included highly stressful work with late meal times. He would share a bottle of wine with his wife on a nightly basis. When reviewing his alcohol consumption, it was clear that she had a very small glass and he would finish the bottle. We reviewed the effect that alcohol has on sleep; that it allows people to fall asleep quickly but that once it was out of the system, it has a wakening effect. He stopped drinking late at night and would have the odd drink at lunch with the result that his insomnia resolved. Alcohol helps induce sleep but it disrupts sleep later in the night. For many, alcohol is used to get to sleep but there is lower quality of sleep. For example, suppression of growth hormone and fragmentation in the sleep later in the night, leaves the person feeling unrefreshed and unrestored.

3. Normal Sleep Physiology

HOW MUCH SLEEP DO WE NEED?

Adults have one major episode of sleep at night typically lasting about 7½ to 8 hours (but ranging from 6 to 9 hours). The amount of sleep that one needs is individual with some people being short sleepers, and others long sleepers. The amount of sleep that one needs is that which is sufficient for a person to awaken feeling refreshed and to be able to function optimally during the day. The amount changes more over childhood (see chapter 16 and the figures on pages 10 and 70).

SLEEP IS A TIME OF REDUCED AWARENESS ABOUT ONE'S ENVIRONMENT

The five senses of sight, hearing, taste, smell, and touch provide input about one's environment. People receive less stimulation from these senses when they sleep. Hearing is a key sense that remains vigilant during sleep. Other senses, like those for pain, temperature or an urge to urinate are perceived during sleep and these may be the cause of sleep disturbance.

CYCLES OF SLEEP

Sleep varies in depth across the sleep period. When sleep is deeper, it is more difficult to wake a person up than when it is lighter. Much of deep sleep comes early in the night and if woken in this stage of sleep, one may feel confused or drunk. There is a cyclic alteration between rapid eye movement (REM) and non-REM (NREM) sleep. If a person is woken from REM sleep they are about four times more likely to recall dreaming. The pattern and type of sleep is influenced by the time of day. These sleep cycles last about 90 minutes. The cycle of sleep starts with NREM sleep going from light sleep (NREM sleep stage N1), to more consolidated sleep (NREM sleep stage N2) and deep sleep (N3), and then to an episode of REM sleep. N3 is referred to as deep sleep because it requires a more meaningful or intense stimulus to cause one to awaken (for example, for parents it might be their baby crying, or it might be someone saying one's name). In adults, the first episode of REM sleep starts about 70-100 minutes after falling asleep. Depending on how long one sleeps for, one usually has 4 to 6 cycles of sleep a night. Even with these cycles of NREM and REM sleep, most of a person's deep sleep is in the first two cycles of the night. The episodes of REM sleep start out being fairly brief (about 10 minutes) and get longer towards the morning.



Sleep is portrayed as being restful

PERCHANCE TO DREAM

REM sleep is also sometimes referred to as “dream” sleep because this is when most dreams and more vivid dreams or nightmares occur. In order to remember a dream or nightmare, one usually needs to wake up during the REM episode or shortly after it. Everyone dreams but many don’t remember their dreams. Another important feature of REM sleep is that one has brief muscle twitches during REM sleep but one’s skeletal muscles are paralyzed – this is likely a protective feature so that people don’t get up and act out their dreams.

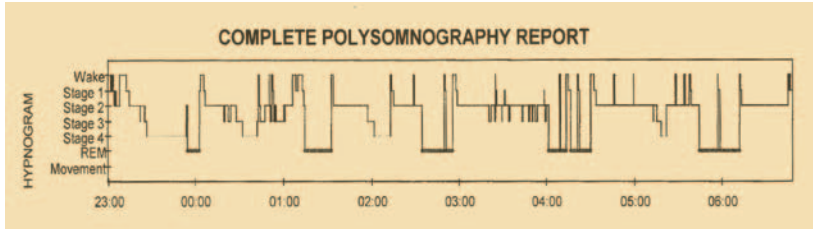
DID YOU KNOW THAT ONE’S EYE MOVEMENTS CHANGE IN DIFFERENT PHASES OF SLEEP?

Not only does a person have the rapid-eye-movements that are a hallmark of REM sleep, but in addition, as one falls asleep a person has slow-rolling eye movements. These changes in eye movements are helpful to a sleep technician to distinguish the different phases of sleep.

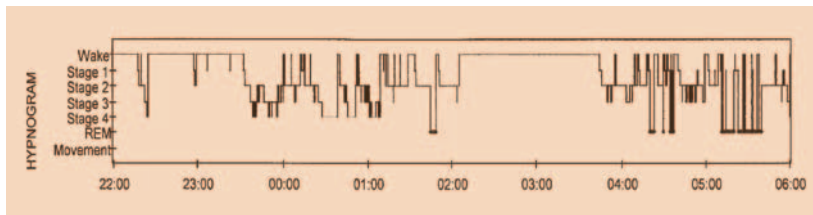
SLEEP RECORDINGS: POLYSOMNOGRAPHY (POLY-SOM-NO-GRAPHY)

Sleep recordings take advantage of minute electrical fields that can be recorded and amplified from three main sources: (1) the eyes, called the EOG or electro-oculogram; (2) the brain (recorded on the skull), called the EEG or electroencephalogram; (3) the muscles (usually recorded under the chin), called the EMG or electro-myogram. Recordings from these sources are used to distinguish the different stages of sleep. When awake, brain activity shows EEG waves are fast and

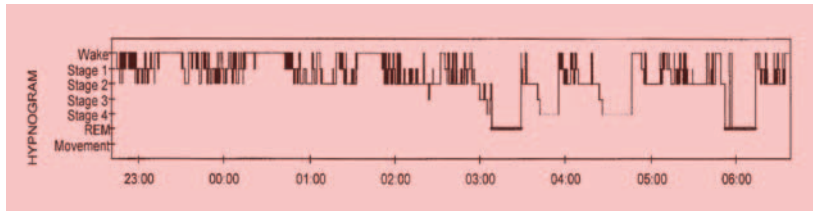
low in amplitude. The waves change in NREM sleep to slower frequencies with regular bursts of activity called sleep spindles. Interestingly, in REM sleep the EEG looks similar to how it would look when one is awake – showing fast activity.



Normal night's sleep



Insomnia with 2 long awakenings



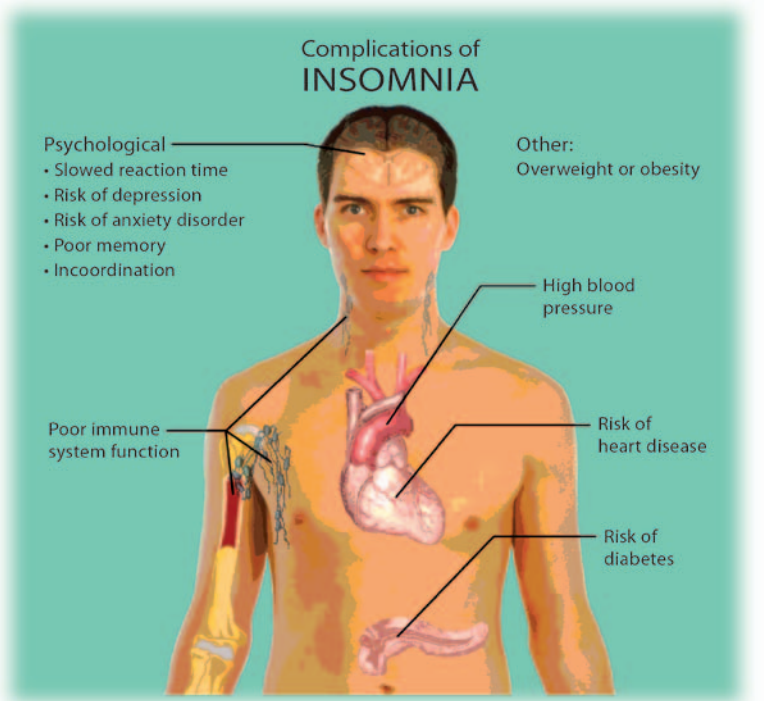
Insomnia with multiple arousals

THE 24-HOUR CLOCK – MORE THAN OWLS AND LARKS

There is an interaction between sleep and the 24-hour clock. Our 24-hour biological clock is also called the circadian process meaning “about a day”. The main time-cue for our circadian clock is sunlight. Other inputs to our biological clock include social cues (for example meal times) and genetics. Our circadian clock also determines whether we fall into the owl (stay up late) or lark (go to bed early and get up early) category. The need for sleep increases the longer you stay awake. The two processes of time spent awake and the circadian time, influence how long you sleep for, how quickly you fall asleep, and your sleep quality.

4. What are the Consequences of Poor and Insufficient Sleep in Adults?

The complications of insomnia and poor sleep are varied and can be seen as affecting the proper function of the brain. The brain uses sleep which is an active process whereby it exercises all the nerve cells by passing signals of electrical activity through all the circuits (like running a defragmentation process of a computer which detects defects and speeds up the processing capability). When the brain circuitry does not get the suitable amount of sleep, it cannot store or retrieve information and the ability to tolerate situations of stress and functioning at a higher level, are impaired. The major result of poor sleep is therefore a brain drain with the brain functioning at a lower level.



When the body is not restored by "good sleep" many problems may occur

Sleep is needed for memory formation and different types of sleep are needed for different types of memory consolidation. For this reason it is important that one not only has the right amount of sleep but also the correct composition of sleep i.e., the right balance of deep and dreaming sleep. In some sleep disorders, for example the breathing disorder, sleep apnea, patients may seem to not have too much of a problem overall but if all the “damage” is in one part of sleep, e.g. the REM sleep, then that may cause significant problems and a treatment intervention to fix this seemingly limited problem may have a big impact. The same applies to insomnia.

The physical effects of insomnia were less obvious until recently. It is now known that the immune system is affected by insomnia. Lack of sleep has been shown to cause weight gain. Obesity has become an epidemic in many societies, resulting in diabetes, heart disease and arthritis and in both adults and children. There is evidence that in countries where the average sleep time is shorter, there is a higher percentage of people with obesity. Although insomnia is not the only cause, fatigue results in lack of energy which leads to people doing less exercise. Body clock problems are linked to cancer, i.e., the timing of sleep is important.

Treating the insomnia can have a positive effect on many of these medical concerns.

5. Medical and Psychological Consequences of Poor Sleep in Children and Adolescents

Sleep disorders are not uncommon in children and adolescents. A questionnaire study of 1,700 12 to 19 year olds asked about those who had any sleep disturbance three or more times per week for the past 3 months. Six percent of the youths said they had difficulty falling asleep at night, 7% stated that they experienced frequent awakenings in the middle of the night and 10% complained of awakening too early in the morning. Overall, almost one in five (19%) of the youths reported having one or more of the above sleep difficulties on a regular basis.

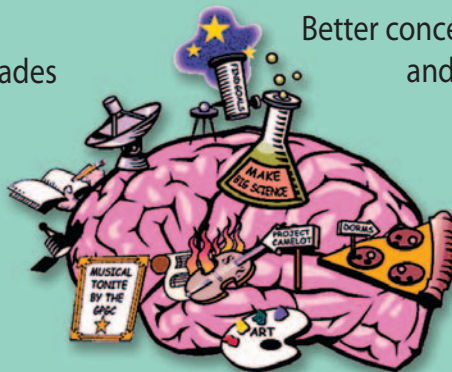
A number of pediatric medical and psychological problems have been shown to stem from an underlying sleep disorder. Medical conditions such as gastroesophageal reflux, obesity, failure to thrive, musculoskeletal pains and bed wetting in children and adolescents are also commonly linked to an undiagnosed sleep disorder. Behavioural consequences of disturbed sleep include hyperactivity and at-

ACADEMIC PERFORMANCE WITH REQUIRED AMOUNT OF SLEEP

Higher
math grades

Better concentration
and memory

Higher
GPA
and IQ



Less behavioural
and/or conduct problems

Improved ability
to learn

tention deficits, learning difficulties, poor school performance, aggression and irritability, difficulties with memory and concentration, substance abuse, depression and anxiety.

Poor sleep has a major impact on school performance. (See page 17). Students in Grade 1 who failed the year were shown to take longer to fall asleep, had more arousals from sleep, had reduced sleep efficiency and exhibited poorer cognitive and emotional maturity. Among 13 year olds, snoring or witnessed apneas are a strong predictor of poor academic performance and school failure even after age, gender, body mass index, type of school attended and sleep habits are taken into account. Similarly, sleep disorders were found to be much more common among college students on academic probation due to low grades than in students who were academically sound. Apart from sleep duration, an irregular sleep schedule has also been linked with poorer academic grades.

Common pediatric sleep disorders such as nightmares, bruxism or tooth-grinding and bed wetting have been shown to lead to hyperactivity, temper outbursts, mood disturbances and poor academic performance, including greater learning difficulties, problems with maintaining attention, and difficulty with reading. Interestingly, about 5% of children with nightmares also had insomnia, and this quadrupled the likelihood of these children having hyperactivity and more than doubled the incidence of temper outbursts and mood disturbances.

Excessive daytime sleepiness is of great concern, especially in teenagers. Sleepiness is a daily problem in about 1 in 7 youths and over one-third of students admit to falling asleep in class. This teenager sleepiness epidemic is probably the result of insufficient sleep, irregular or late bedtime, too many caffeinated beverages and poor sleep quality. It is a primary cause of falling grades, being late for school and reduced participation in extra-curricular activities. Youths whose sleep duration is appropriate for their age have been shown to do much better in school.

The distinction between ADHD and an undiagnosed and untreated sleep disorder is not always clear. Inadequate amount of sleep or poor sleep quality, which may be indicative of untreated sleep apnea, can lead to hyperactivity, impulsivity, inattention, cognitive and behavioural deficits, impaired memory acquisition, irritability, distractibility and lack of motivation. The aforementioned symptoms are typical of ADHD and it is not surprising that children presenting with these issues are often misdiagnosed with ADHD. Even reducing sleep for one hour per night for six nights can result in poor focus and alertness and an increase of errors in otherwise healthy children. Treatment of sleep apnea in children with CPAP (continuous positive airway pressure) has been demonstrated to lead to remarkable improvements in behaviour and cognition. Of note, cognitive function in children with ADHD deteriorates even further with sleep restriction or with a sleep disorder such as sleep apnea, and an underlying sleep disorder can make it more difficult to treat ADHD.

TEENS ARE TOO SLEEPY



I Want You To Stay Awake!

*When President George Bush Senior visited a high school
half the students fell asleep during his address*

Difficulties with sleep in children and adolescents can be a precursor or early symptom of anxiety and/or depression. Bedtime difficulties, sleep anxiety, short sleep duration, increased time to fall asleep and fragmented sleep occurs in about 5% of healthy children and adolescents but the incidence increases to 82% in those who are depressed. Similarly, 42% of youths with depression have insomnia symptoms compared to about 29% of healthy youths who have difficulty sleeping. Stories of bullying and other aggressive behaviours in children and teens are often reported in newspapers and other media. Sleep disturbances may also play a role in this problem; children who bully or exhibit aggressive and disruptive behaviour at school are more likely to have a sleep disorder and/or excessive daytime sleepiness.

A research study of over 300 children in grades 2 to 5 reported that children with untreated sleep disordered breathing had an almost 9 times greater incidence of conduct (behaviour) disorder and a 10-fold greater likelihood of being a bully. Among children with excessive daytime sleepiness, conduct problems and bullying were about one and a half times more common. Any number of sleep disorders in children can result in and mimic a behavioural or psychological disorder.

In summary, there is a strong bi-directional association between undiagnosed and untreated sleep disorders in children and adolescents and medical and psychological problems. Consequently, a comprehensive sleep assessment, including polysomnography and/or actigraphy (which measures motor activity), can

constitute an integral part of a pediatric medical or psychiatric assessment. This is especially the case for children who have any problems with their sleep or day-time function. (See figure below).

SLEEP DISORDERS AND SOME CONSEQUENCES

All of the sleep disorders listed below can cause poor sleep



Large tonsils in a child with Sleep Apnea



Insomnia



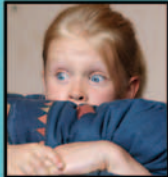
Excessive daytime sleepiness



Bruxism



Periodic Limb Movement Disorder/ Restless Leg Syndrome



Nightmares



Parasomnia



Nocturnal Enuresis

Consequences of poor sleep



Hyperactivity



Temper outburst



Conduct disorder



Depression and/or Anxiety

6. How do we measure Insomnia, Sleepiness, Fatigue and Non Restorative Sleep?

There are a number of different ways to measure the phenomenon of insomnia. One can simply ask a person what their subjective feeling is as to whether they had a good night's sleep or if they were awake much of the time. (See figure below). A second way would be to use questionnaires that have been carefully created to reflect different aspects of insomnia. (See pages 22 to 26). A third way might be to wear a device called an actigraph which measures movement, with the deduction being made that when a person is completely still, he or she is probably asleep. (See figure on page 25).



The following pages provide questionnaires to measure insomnia, sleepiness, fatigue and non-restorative sleep. We would like you to complete these questionnaires and on the last page of this chapter you will see the normal scores for these four scales. You might be interested to compare your own scores with the normal scores and see how yours compares.



By Professor John Murray

EPWORTH SLEEPINESS SCALE

HOW LIKELY ARE YOU TO DOZE OFF OR FALL ASLEEP IN THE FOLLOWING SITUATIONS, IN CONTRAST TO FEELING JUST TIRED?

This refers to your usual way of life in recent times. Even if you have not done some of these things recently, try to work out how they would have affected you.

Use the following scale to choose the **most appropriate** number for each situation.

- 0 = would **never** doze 2 = **moderate** chance of dozing
 1 = **slight** chance of dozing 3 = **high** chance of dozing

Situation	Chance of Dozing			
Sitting and reading	0	1	2	3
Watching TV	0	1	2	3
Sitting, inactive in a public place (e.g. theatre or a meeting)	0	1	2	3
As a passenger in a car for an hour without a break	0	1	2	3
Lying down to rest in the afternoon when circumstances permit	0	1	2	3
Sitting and talking to someone	0	1	2	3
Sitting quietly after a lunch without alcohol	0	1	2	3
In a car, while stopped for a few minutes in the traffic	0	1	2	3

Total score

ATHENS INSOMNIA SCALE

This scale is intended to record your own assessment of any sleep difficulty you might have experienced. Please, check (by circling the appropriate number) the items below to indicate your estimate of any difficulty, provided that it occurred at least three times per week during the last month.



By Dr. Constantin Soldatos and Dr. Dimitris G. Dikeos

1. SLEEP INDUCTION (<i>time it takes you to fall asleep after turning off the lights</i>)			
0 No problem	1 Slightly delayed	2 Markedly delayed	3 Very delayed or did not sleep at all
2. AWAKENINGS DURING THE NIGHT			
0 No problem	1 Minor problem	2 Considerable problem	3 Serious problem or did not sleep at all
3. FINAL AWAKENING EARLIER THAN DESIRED			
0 Not earlier	1 A little earlier	2 Markedly earlier	3 Much earlier or did not sleep at all
4. TOTAL SLEEP DURATION			
0 Sufficient	1 Slightly insufficient	2 Markedly insufficient	3 Very insufficient or did not sleep at all
5. OVERALL QUALITY OF SLEEP (<i>no matter how long you slept</i>)			
0 Satisfactory	1 Slightly unsatisfactory	2 Markedly unsatisfactory	3 Very unsatisfactory or did not sleep at all
6. SENSE OF WELL-BEING DURING THE DAY			
0 Normal	1 Slightly decreased	2 Markedly decreased	3 Very decreased
7. FUNCTIONING (PHYSICAL AND MENTAL) DURING THE DAY			
0 Normal	1 Slightly decreased	2 Markedly decreased	3 Very decreased
8. SLEEPINESS DURING THE DAY			
0 None	1 Mild	2 Considerable	3 Intense

Total score



By Kate Wilkinson and Dr. Colin Shapiro

NON RESTORATIVE SLEEP SCALE QUESTIONNAIRE

Please circle the response that best represents your usual experiences over the past month										
How often have you felt really refreshed upon awakening in the morning?										
Never	1 day/week	2-3 days/week	4-5 days/week	6-7 days/week						
1. How would you rate the quality of your sleep?										
1	2	3	4	5	6	7	8	9	10	
Very poor									Very good	
2. Usually, do you think your sleep is restoring or refreshing?										
1	2	3	4	5	6	7	8	9	10	
Never									Always	
3. Have you felt rested if you've slept for your usual amount of time?										
1	2	3	4	5	6	7	8	9	10	
Not at all									Absolutely	
4. Have you had physical sensations or unusual feelings in your body that you couldn't identify?										
1	2	3	4	5	6	7	8	9	10	
Never									Yes, all the time	
5. In the past month, how often have you had one or more of the following: headaches, body pain, numbness or tingling in parts of your body, nausea, racing heart/palpitations, sore throat, frequent cough?										
Never	1 day/week	2-3 days/week	4-5 days/week	6-7 days/week						
6. Do you feel that physical or medical problems are dragging you down?										
1	2	3	4	5	6	7	8	9	10	
Never									Yes, all the time	
7. Do you ever have a sense of panic, or physical symptoms of panic such as heart racing, for no apparent reason?										
1	2	3	4	5	6	7	8	9	10	
Never									Yes, all the time	
8. How is your memory and concentration during the daytime?										
1	2	3	4	5	6	7	8	9	10	
Very poor									Very good	
9. What is your usual level of daytime energy?										
1	2	3	4	5	6	7	8	9	10	
Very low									Very high	
10. Do you usually feel alert during the daytime?										
1	2	3	4	5	6	7	8	9	10	
Not at all									Very alert	
11. Do you feel depressed or down if you didn't sleep well the night before?										
1	2	3	4	5	6	7	8	9	10	
Not at all									Very depressed	
12. How often have you felt irritable or gotten the "blahs" if you didn't sleep well the night before?										
Never	1 day/week	2-3 days/week	4-5 days/week	6-7 days/week						

Scoring: The scale employs ten Likert-type items with choices ranging from one to ten and two Likert-type items with scales from one to five (item 5 and 12). Items 1-3 and 8-10 are worded positively (with ten indicating very good sleep or very high alertness), while items 4-7 and 11-12 are worded negatively (where ten refers to very poor sleep or refreshment). When scoring, each item is given a weighted value from one to five. For those questions with Likert scales ranging from one to ten, responses of one or two are given a score of one, responses of three or four are given a score of two, etc. Negatively worded items are reversed before scoring, meaning that higher scores on the scale are indicative of less NRS.

The normal scores for these questionnaires are:

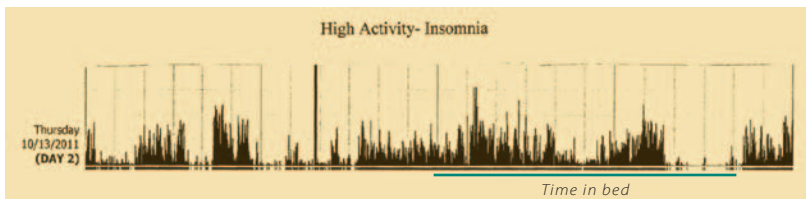
The Epworth sleepiness scale: Less than 10

Athens insomnia scale: Less than 10

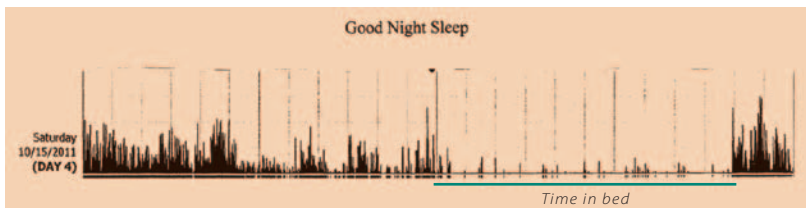
The Non-restorative sleep scale: Less than 43

Fatigue severity scale: 3.0 or less (27 total or less)

THE FIGURE BELOW SHOWS 2 ACTIGRAPHY RECORDINGS INDICATING PERIODS OF SLEEP AND WAKEFULNESS ON A PATIENT WEARING AN ACTIGRAPH



Day 2 - High activity during the time in bed indicating wakefulness i.e., insomnia



Day 4 - Good night's sleep



By Dr. Lauren Krupp

FATIGUE SEVERITY SCALE

During the past week, I have found that:	Completely Disagree		Neither Agree Nor Disagree			Completely Agree	
1. My motivation is lower when I am fatigued	1	2	3	4	5	6	7
2. Exercise brings on my fatigue	1	2	3	4	5	6	7
3. I am easily fatigued	1	2	3	4	5	6	7
4. Fatigue interferes with my physical functioning	1	2	3	4	5	6	7
5. Fatigue causes frequent problems for me	1	2	3	4	5	6	7
6. My fatigue prevents sustained physical functioning	1	2	3	4	5	6	7
7. Fatigue interferes with carrying out certain duties and responsibilities	1	2	3	4	5	6	7
8. Fatigue is among my three most disabling symptoms	1	2	3	4	5	6	7
9. Fatigue interferes with my work, family, or social life	1	2	3	4	5	6	7

Total:	Average i.e. divided by 9 =
--------	--------------------------------

7. Medical Causes of Insomnia

Medical causes of insomnia are health disorders that prevent or interrupt restorative sleep. Any medical condition can cause sleep problems. An almost obvious example may be a child who breaks his arm and the pain causes him to wake up repeatedly during the night.

In children, common nighttime sensations such as hunger, thirst, pain, fever, fear and anxiety may prevent or interrupt sleep. Medical triggers such as an earache, abdominal colic or an injury can equally disrupt sleep. Emotions either positive (like getting a new toy) or negative (such as a threat of harm, a loss or separation from a parent) often presents with sleeplessness.

In addition to the above physical and emotional situations, teenagers may compound their sleep problems with addiction behaviours often with the dangerous use of alcohol and illicit drugs which impact on sleep.

In adults, a number of system-related disorders (affecting the heart, lungs, kidney and brain, amongst others) can manifest as insomnia.

Neurological diseases that will fragment sleep include Parkinson's disease, Tourette's Syndrome, epileptic seizures, chronic pain, fibromyalgia, migraines and cluster headaches. Some of these are only likely to occur in adults, e.g., Parkinson's; others are more problematic in children, e.g., Tourette's while others can have an impact at any age, e.g., epilepsy and brain injury.

Cardiac conditions such as chest pain from angina and heart attacks (myocardial infarction), difficulty and shortness of breath from congestive heart failure, and abnormal heart rhythms (arrhythmia) causing palpitations result in sympathetic nervous system over-activity and sleep disruption.

A famous Canadian authoress complained that since being diagnosed with breast cancer, the quality of her life had deteriorated mostly because she could not get to sleep. She felt tired, had become tense and irritable, and this had affected her interaction with her grandchildren. Her oncologist (cancer specialist) had followed the rules and only allowed her to take a sleeping pill for two weeks. During this time, she felt a little better but all her problems returned when the treatment stopped and her misery increased. After discussing this in detail with a sleep specialist and after appropriate evaluation, she was given a long-term prescription for one of the newer 'Z' drugs (see page 50). Her symptoms subsided, her interaction with family and friends normalized and she started writing again. She felt the quality of her life dramatically improved.

Circulatory diseases such as peripheral vascular disease can disrupt sleep due to impaired circulation and oxygenation to the legs causing leg pain. In children the phenomena of painful legs at night is often misattributed to “growing pains” but it may be a treatable condition.

Respiratory conditions disrupt sleep by affecting the ability to breathe, causing abnormalities in gas exchange. The lack of body oxygenation and elimination of carbon dioxide result in a potent chemical trigger for awakenings. Some of these include asthma, bronchiolitis, pneumonia, pleurisy, COPD (emphysema and chronic bronchitis) and sleep-related breathing disorders (apnea). Multiple sclerosis, scoliosis of the spine and muscular dystrophy impair the actions of the respiratory muscles. Allergies and nasal congestion are particularly disruptive to sleep during the allergy seasons because of the impaired breathing that results from these respiratory problems.

Hormonal disorders can result in insomnia. These include thyroid abnormalities (hypothyroidism and hyperthyroidism which alter the body's metabolism); menopause associated vascular changes (hot flushes and sweats); and diabetes (hypoglycemia and hyperglycemia). Pregnancy presents unique physical and emotional challenges that fragments sleep while also increasing deep sleep.

Disorders of the gastrointestinal tract that fragment sleep include GERD (gastroesophageal reflux disorder) which causes heartburn and chest pain. Abdominal pain from inflammatory bowel disease, diverticulitis (an intestine disorder) and bowel obstruction will disrupt sleep.

Urinary tract disorders resulting in urinary frequency and sleep disruption may occur due to diuretic medications taken later in the day. Urinary bladder infections; kidney stones (often associated with pain); prostate diseases (benign prostatic hyperplasia, infections, and cancer); and chronic renal failure may all impact on sleep.

Most musculoskeletal conditions manifest in pain resulting in poor sleep. Arthritis, degenerative spinal discs, sciatica and nerve compression syndromes have a worsening of their symptoms at night for physiological reasons. Pain from gout can cause awakenings.

In thinking about insomnia it is important to consider medical conditions and the medications a person is taking for these.

Insomnia is very common in most psychiatric diseases, for example depression, but ironically most antidepressants can lead to sleep disruption. This creates a tricky balance. Sometimes the mood can improve with medication only to get worse again because of the increase in insomnia as the treatment course progresses.

EFFECT OF MEDICATIONS ON SLEEP

Medication Class	TST	WASO	SWS/N3	REM/Vivid dreaming
Cardiovasculars <ul style="list-style-type: none"> • Antiarrhythmic • Alpha-adrenergic blockers 	decrease decrease	increase decrease		increase vivid dreams decrease vivid dreams
Psychotherapeutics <ul style="list-style-type: none"> • Sedative hypnotics: <ul style="list-style-type: none"> • benzodiazepines • non-benzodiazepines • Sodium oxybate • Atypical anti-psychotic (e.g., olanzapine) • Antidepressants: <ul style="list-style-type: none"> • TCAs • MAOIs • SSRI • SNRI • SARI • NDRI • NaSSA • Stimulants: <ul style="list-style-type: none"> • Sympathomimetic • Analeptic (e.g., Modafinil) • Nicotine replacement 	increase minimal effect increase increase	decrease increase	decrease increase increase decrease	decrease decrease decrease decrease decrease decrease decrease decrease
Gastrointestinal <ul style="list-style-type: none"> • Histamine H-2 blocker • Anticholinergics 	minimal effect			minimal decrease minimal decrease
Cholesterol agents	minimal increase			
Hormones <ul style="list-style-type: none"> • Thyroid • Corticosteroids • Melatonin • Growth hormone 	decr. (at high dose) decrease may increase minimal effect	increase	incr/decr	decrease
Analgesics <ul style="list-style-type: none"> • Non-steroidal anti-inflammatory • Synthetic opioid receptor agonist • Opiates & opioids • Pregabalin 	decrease	increase increase decrease	decrease decrease decrease increase	decrease decrease
Anti-infective <ul style="list-style-type: none"> • Antibiotics • Anti-viral (e.g., Amantadine) 	decrease	increase	decrease	
Medications for neurological disorders <ul style="list-style-type: none"> • Anti-epileptic <ul style="list-style-type: none"> • Phentoin • Tiagabine • Anti-Parkinsonian (e.g., Sinemet) 	increase minimal increase	reduce	increase increase increase	reduce may incr. vivid dreams
Over-the-counter medications <ul style="list-style-type: none"> • Cold medicine, decongestants • Antihistamines • Herbal medications <ul style="list-style-type: none"> • Valerian root • St. John's wort • Ginseng 	minimal effect increase minimal increase reduce reduce slight	increase increase	decrease increase reduce	decrease increase decrease

TST= Total Sleep Time WASO= Wake After Sleep Onset SWS/N3= Slow Wave (Deep) Sleep

Until recently many doctors saw insomnia as a symptom of other medical (including psychiatric) disorders. Now it is more often seen as a “co-morbid condition” i.e., that it is a problem in its own right. The old approach led doctors to treat the underlying medical problem and to hope that when that problem was resolved the insomnia would go away. Now it is realized that insomnia is often a “co-morbid” condition. This means that it is a separate problem and needs to be treated in its “own right”. Often a medical condition can make insomnia worse but it is also the case that insomnia can make the medical condition worse. For example, a person who does not sleep well has more sensitivity to pain which in turn can lead to insomnia, creating a circuit. Also broken sleep can lead to depression and depression leads to more insomnia.

ETIOLOGY OF INSOMNIA

Category	Percentage
Primary Psychiatric	38%
Drugs and Alcohol	18%
Psychophysiological	12%
Restless Legs or Periodic Limb Movements in Sleep	13%
Sleep Apnea	8%
Medical Disorders	5%
Childhood Onset	2%
Circadian (sleep-wake) Rhythm	6%
Miscellaneous	9%

General Practitioner

Duration of Patient's complaint
 Short duration: a few weeks
 Long term: Insomnia

What area of life is causing sleep disruption:
 a) psychological
 b) social
 c) physiological
 d) medical

Patient

Social Worker

*Different people view insomnia in different ways.
 Measuring key factors can be helpful.*

8. Sleep Disorders that Cause Insomnia

Sleep disorders that cause insomnia are specific to the sleep period, unlike medical disorders which also affect the wake period.

“Psycho-Physiological Insomnia” is the type of insomnia that occurs in hyper-vigilant ‘type A’ personalities, who are generally perfectionists, constantly obsessed with time, and who are overly anxious and stress more easily about work and family issues. These individuals are generally anxious and often irritable and resort to unconstructive sleeping aids including alcohol, over-the-counter and street drugs. These maladaptive behaviours to improve sleep usually result in the psychological and physiological perpetuation of the insomnia. In some individuals the initial stress that triggers the insomnia may have ended but the habit of poor sleep established at that time of stress perpetuates. Many people with this type of insomnia do not remember the trigger.

Restless Leg Syndrome refers to intensely discomforting sensations experienced before going off to sleep or during the night and result in prolonged awakenings from sleep. These perceived sensations occur from altered sensory input to the nervous system (sharp or dull pain, touch, pressure, and temperature). The sensations are temporarily relieved by irresistible urges to move or rub the limb. The movements of the legs disrupt sleep and leads to daytime sleepiness and fatigue.

A 49-year-old male presented with a history of 2 years of insomnia and could not fall asleep at night. He was sleepy during the day, had high blood pressure and was overweight. He was seen by the physician who noted that he had a very small and narrow throat and that his tongue was large. He had a sleep study test and did not sleep at all. He came back for a repeat visit and the senior physician decided to treat him for sleep apnea as it looked as if his throat was very small and may be closing in the night.

He came back for a sleep study test with a CPAP (CPAP is a device that simply blows air and helps people to breathe at night if they have a problem of the airways collapsing during sleep) mask this time and as soon as the mask was put on him, he fell asleep and slept the entire night as the technician adjusted the pressure. He subsequently lost 20 kg (44 lbs) but remains on the CPAP. His insomnia was the result of him not breathing properly at night and once treated with the CPAP, he slept normally.

Periodic Leg Movement Disorder is a neurological motor nerve disorder (to do with movement) and results in muscular twitches or movements of the limb that frequently disrupt the sleep process. They are common in spinal disc diseases, disorders of the nerve endings, pregnancy and deficiencies of iron, vitamin B12 and Folic acid, and also in thyroid disorders. It is sometimes seen in disorders of the motor areas of the brain stem such as in Parkinson's disease. It is more common in patients taking certain antidepressants and a number of other medications.

A table of medications to treat this condition can be found in a companion book from this publisher (Joli Joco Publications) entitled *Fighting Fatigue and Sleepiness*.

Obstructive Sleep Apnea is a breathing disorder in which the upper airways obstruct air from flowing to and from the lungs. Oxygenation of the body and removal of carbon dioxide, a waste product of the body's metabolism, is therefore impaired. The resulting chemical imbalance stimulates the brain's distress signals (Sympathetic Nervous System over-activation) which profoundly stimulate the cardiovascular system to increase blood pressure and blood flow to the vital organs for its survival. This system also startles the waking mechanisms in the brain so that wakeful breathing resumes, thus averting critical consequences such as a heart attack, a stroke or death. The breathing stops repeatedly wakes the person, leading to tiredness, sleepiness and fatigue. This is a very common condition which can be easily screened with the questionnaire on the following page.

A 56-year-old banker complained of poor sleep and fatigue. The fatigue was especially bad on Mondays. After a detailed history failed to provide any clear clues, a sleep test was done which showed that he twitched his legs 38 times per hour in his sleep. He wanted to know why he felt worse on Mondays. He subsequently purchased, at considerable expense, a device that counted leg twitches. He kept meticulous records which showed that he had more twitches on Sunday nights. Although he was helped by prescribed medications, the thing that made the biggest difference was the doctor's suggestion that he have no appointments before noon on Mondays. Later the banker realized that he always got excited by the anticipation of going to work on Mondays "to make a killing". The restructuring of his work routine decreased the number of leg twitches on Sunday nights and as a result he was far less fatigued on Mondays.



By Dr. Frances Chung and Dr. Colin Shapiro

STOP



Do you **S**nore? Yes No

Do you feel **T**ired, fatigued or sleepy during the day? Yes No

Has anyone **O**bserved you stop breathing in your sleep? Yes No

Do you have high blood **P**ressure? Yes No

Please count the number of "Yes" responses and put the number in this box
 There is a good chance that you have Sleep Apnea if you have two 'yes' responses out of four.

My neck size is _____ cms _____ inches

My height is _____ cms _____ inches

My weight is _____ kgs _____ lbs

	B	A	N	G						
	BMI > 35	Age > 50	Neck Size > 40cm > 15.7"	Gender - Male						
If height is in ft	4'11"	5'0"	5'2"	5'4"	5'6"	5'8"	5'10"	6'0"	6'2"	
& weight in lbs is >	167	179	191	204	216	230	250	258	272	
If height is m	1.47	1.52	1.58	1.63	1.68	1.73	1.78	1.83	1.88	1.93
& weight in kgs is >	75	81	86	92	97	104	113	116	122	129

Then body mass index (BMI) kg/m2 is > 35

If you count positive responses in STOP and BANG and three out of eight factors are applicable then you should have a sleep assessment.

Circadian Rhythm Disorders (sleep timing disorders) can be advanced, delayed or totally irregular. Delayed Sleep Phase Syndrome (DSPS) is commonly seen in teenagers when hormonal changes alter sleep onset by a few hours. For example, instead of sleeping from 11:00 p.m. to 7:00 a.m. (8 hours of sleep), they may sleep from 2:00 a.m. to 10:00 a.m. The disorder gradually reverts to the normal sleep cycle after the teenage years, provided no maladaptive behaviours such as addictions to drugs and alcohol have developed. This condition needs to be recognized and treated appropriately. (See chapter 16).

The advance of the sleep cycle (Advanced Sleep Phase Syndrome) results in an urge to sleep much earlier than the regular time. This disorder is commonly presents in the elderly. They therefore sleep earlier and awaken earlier (before sunlight). They may feel that they are not sleeping much because they have a long period in bed awake at the end of the night. These patients may feel they are too awake at the end of the night (terminal insomnia). There are good behavioural techniques to help this situation.



This booklet is available to help those who start on CPAP

9. What are the Psychological Causes of Insomnia?

Stress, anxiety and depression are the most common causes of insomnia. Stress can involve either minor, but repeated irritations that build up over time or may result from catastrophic life events. Anxiety and depression can present as symptoms or full blown disorders.

MINOR STRESSORS

Virtually everyone experiences minor stressors, irritations, or hassles at home, at work, or while commuting in between. These may involve conflicts with an employer or a co-worker, relationship problems or disagreement with a significant other, or everyday traffic problems. People react differently to these situations. Some are equipped with effective strategies to cope with stressors as they arise during the day and as a result, sleep well at night, while others are more emotional and often remain keyed up for the rest of the day. Inevitably, people who take their daytime problems to bed are more vulnerable to experience sleep problems at night.

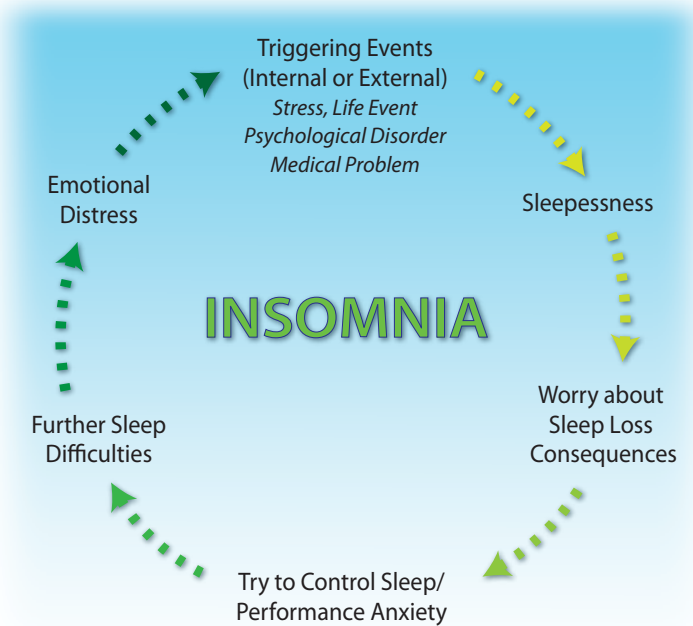
MAJOR LIFE EVENTS

There are also major life events that are likely to disrupt sleep in almost anyone, at least temporarily. The break-up of a relationship, the death of a loved one, the loss of a job, or an acute medical problem will almost always trigger sleep disturbances, even among otherwise good sleepers. Under such circumstances, insomnia is a natural emotional reaction, often part of the grieving process or the stress response about a life-threatening condition (e.g., cancer). Sleep will usually, but not always, return to normal once the initial triggering event has gone away or the person has adjusted to its more enduring presence.

THE VICIOUS CYCLE OF PERFORMANCE ANXIETY AND INSOMNIA

Trying too hard to get to sleep can have the opposite effect and keep you awake – the classic “performance anxiety”. This type of anxiety arises when the desire to control or excel at something backfires and impairs performance. When you try too hard to get to sleep or return to sleep after awakening at night, it may result in you taking longer to go to sleep than if you were not trying hard. Trying too hard may result in increased tension, perhaps because you are aware of the consequences sleep loss will result in the next day. In other words, the harder you try to control sleep, the longer you are likely to stay awake, simply because you cannot induce sleep on command. You can control or create circumstances that are conducive to sleep, but you cannot produce sleep at will.

THE VICIOUS CYCLE OF PERFORMANCE ANXIETY



PSYCHOLOGICAL DISORDERS

Sleep difficulties may also be associated with more deeply rooted psychological or psychiatric disorders. For instance, insomnia is a common symptom of several anxiety and mood disorders. Trouble falling asleep is especially common in those who suffer from anxiety, while problems staying asleep or early morning awakening are classic symptoms among people who are depressed.

What if one suffers from both insomnia and a psychological problem? A dilemma that often arises is to determine which of the psychological and sleep problems is the cause and which is the consequence – the classic chicken-and-egg puzzle! There is an intimate relationship between sleep and emotional disturbances and this relationship can go in both directions, i.e., sleep is almost always disrupted when a person experiences psychological distress and, conversely, chronic sleep disturbances heighten the risk of developing psychological problems such as depression, even among those without any prior history of mood disorder. For example sleep disruption in children aged 5 to 10 is predictive of the development of depression in the teen years. Sleep will usually, but not always, improve as the co-existing anxiety or mood disorder is treated with psychotherapy, medication, or both. The bottom line is that if you suffer from insomnia and another co-existing psychological or psychiatric disorder, both conditions should be treated.

HOW DOES SITUATIONAL INSOMNIA EVOLVE INTO A CHRONIC PROBLEM?

There are three types of contributing factors which play a different role at different times during the course of insomnia.

PREDISPOSING FACTORS

Predisposing factors are those characteristics that make an individual at greater risk for insomnia. These include increasing age, being female, an anxiety-prone personality, a family history of insomnia, and having medical and psychiatric illnesses (see chapters 7 and 8).

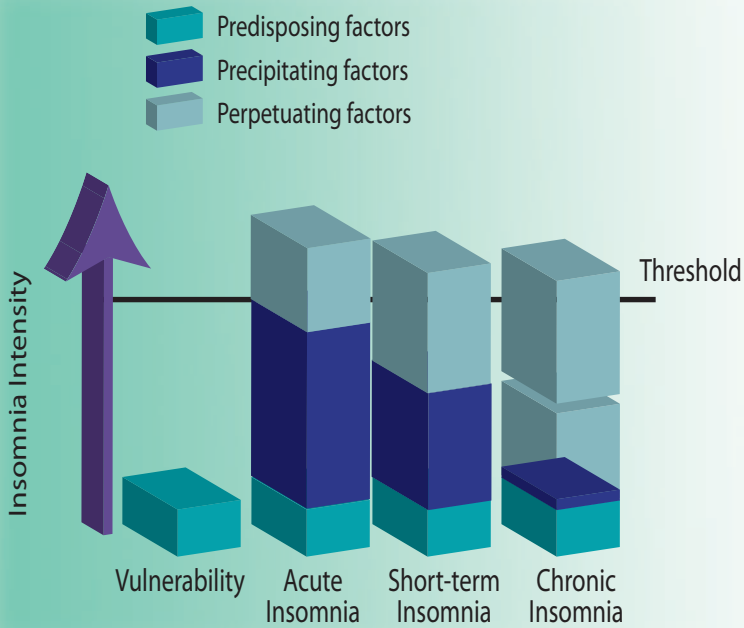
PRECIPITATING FACTORS

Precipitating factors are those events associated with the onset of insomnia and include major life events such as a separation or an illness. While most people resume normal sleep after an acute episode of sleep disturbances, others, perhaps those more vulnerable to insomnia, continue experiencing sleep difficulties independent of what triggered them in the first place.

PERPETUATING FACTORS

A perpetuating factor is one where a situational sleep problem has transformed into a chronic one. A number of psychological and behavioural factors may fuel this vicious cycle. For example, a person may sleep in late in the morning or nap during the day to compensate for poor nocturnal sleep. While some of these strategies may be adaptive to cope with insomnia initially, they become part of the problem in the long run. Likewise, apprehensions about not sleeping and worrying about the possible consequences of insomnia may be a normal reaction to sleeplessness. However, when sleep becomes a source of chronic worrying, a conditioned reaction often develops whereby a person comes to associate certain cues (bedtime routines, bedroom surroundings) with the fear of not being able to sleep. With repeated occurrence, this pattern reinforces a negative association and triggers further worries about one's inability to sleep, bodily tension (when your muscles are more tense and you have more adrenalin), and this can result in further sleep disturbances. To short-circuit this vicious cycle, it is essential to directly target these psychological and behavioural factors that perpetuate and exacerbate insomnia.

HOW ACUTE INSOMNIA MAY BECOME A CHRONIC PROBLEM



A well known sleep researcher, Arthur Spielman, described what is known as the 3 P's of Insomnia

As we can see on the graph above, certain people may be more vulnerable to developing insomnia (predisposing factor). There may be a sudden triggering factor (e.g., loss of a job, family illness) which causes great stress. This would be the precipitating factor that takes one over the threshold which would indicate that insomnia was present. The concern about the precipitating cause might decline over time but the pattern of insomnia may have become a habit, meaning that the insomnia carries on. The habit would be the perpetuating factor.

10. When should Insomnia be Treated?

Virtually everyone experiences insomnia at least occasionally in a lifetime. Does that mean that everyone should be treated for insomnia? No, it does not. However, if you have trouble sleeping on a regular basis and it lasts for more than a few nights, you may benefit from treatment. Below are some questions you should answer in order to determine whether further evaluation and/or treatment would be indicated.

QUESTIONS TO DETERMINE WHETHER YOU SUFFER INSOMNIA THAT NEEDS TREATMENT

- *Do you have trouble falling asleep at bedtime?*
- *Do you wake up in the middle of the night and have trouble going back to sleep?*
- *Do you wake up too early in the morning and can't get back to sleep?*
- *Do you get up in the morning feeling tired or as if you never reached a deep sleep?*

Some of these issues are measured by the questionnaires in chapter 6 and on page 41.

The questions above reflect the classic symptoms of insomnia (see chapter 1). Although there is no hard rule as to how long is too long, if you take more than 30 to 45 minutes to fall asleep, are awake for more than 30 to 45 minutes in the middle of the night, or wake up several times during the night, this may be an indication that you have insomnia. Likewise, if you wake up much earlier than desired and can't get back to sleep, this may also be insomnia. Whether or not you have insomnia depends also on what time you went to bed. It is probably normal to wake up at 4:00 a.m. or 5:00 a.m. if you already have slept for 7 or 8 hours. Thus, to determine whether you wake up too early in the morning, it is important to consider the last awakening, the time you went to bed the night before, and how much you slept in between. A sleep diary may be helpful.

Total sleep time alone is not a good indicator of insomnia because there are individual differences in how much sleep is needed to feel rested and function well during the day. Typically, people who have insomnia will also feel tired during the day and have a hard time functioning properly. On the other hand, there are some people who sleep only 4-5 hours a night and do not experience any significant daytime impairment; these individuals may be "natural short-sleepers".



Natural short sleeper
John F. Kennedy



Natural long sleeper
Albert Einstein

• **How many nights per week do you have trouble sleeping?**

If you have trouble sleeping only one night a week, perhaps on Sunday night, this may simply be because you slept in later or took naps on the weekends, or that you are anxious (or excited) about returning to work on Monday morning. (See vignette on page 32). This type of situational insomnia, although unpleasant, may not necessarily require treatment. On the other hand, if you have trouble sleeping several nights per week (e.g., 3 nights or more), this is frequent enough to affect your daytime performance and quality of life.

• **How long have you had trouble sleeping for?**

It is best not to panic after one or two nights of poor sleep as this may simply be a normal reaction to some stressful events; your sleep is likely to return to normal after the stressful reaction runs its natural course. Conversely, if you have trouble sleeping repeatedly and this lasts for more than a few nights or a few weeks, it is best to do something about it before it becomes a chronic problem.

• **How does insomnia affect you during the day?**

This is the most important question to ask yourself. If you have trouble sleeping at night and it affects you negatively during the day, this is real insomnia. The main consequences of insomnia are daytime fatigue, reduced energy, problems with attention and concentration, mood disturbances (e.g., irritability), social withdrawal, and difficulty accomplishing even simple tasks. (See chapters 4 and 5). Most people who decide to seek treatment usually do so because of one or more of these daytime problems.

The bottom line is that you should seek treatment and talk to your family doctor or to a sleep professional whenever you have sleep difficulties occurring several nights per week and when they interfere with your work, your relationships and your quality of life. You don't have to suffer because there are effective treatment options available.

One way to gauge if your insomnia is problematic is to complete the insomnia severity index. Do that now and then total your score on the following page.



By Charles M. Morin

INSOMNIA SEVERITY INDEX (ISI)

For the first three questions, please rate the SEVERITY of your sleep difficulties				
1. Difficulty falling asleep:				
None 0	Mild 1	Moderate 2	Severe 3	Very Severe 4
2. Difficulty staying asleep:				
None 0	Mild 1	Moderate 2	Severe 3	Very Severe 4
3. Problem waking up too early in the morning:				
None 0	Mild 1	Moderate 2	Severe 3	Very Severe 4
4. How SATISFIED/dissatisfied are you with your current sleep pattern?				
Very Satisfied 0	Satisfied 1	Neutral 2	Dissatisfied 3	Very Dissatisfied 4
5. To what extent do you consider your sleep problem to INTERFERE with your daily functioning (e.g., daytime fatigue, ability to function at work/daily chores, concentration, memory, mood)?				
Not at all Interfering 0	A Little Interfering 1	Somewhat Interfering 2	Much Interfering 3	Very Much Interfering 4
6. How NOTICEABLE to others do you think your sleeping problem is in terms of impairing the quality of your life?				
Not at all Noticeable 0	A Little Noticeable 1	Somewhat Noticeable 2	Much Noticeable 3	Very Much Noticeable 4
7. How WORRIED/distressed are you about your current sleep problem?				
Not at all 0	A Little 1	Somewhat 2	Much 3	Very Much 4

GUIDELINES FOR SCORING/INTERPRETATION:

Add scores for all seven items

Total score

Total score ranges from 0-28

Score between 0-7: No clinically significant insomnia

This result suggests that there is no clinically significant insomnia at this time; if you are still concerned about your sleep, you may want to repeat this test in a few days or talk to a health-care professional about it.

Score between 8-14: Subthreshold insomnia

This result suggests the presence of insomnia symptoms of mild to moderate severity. Although this degree of insomnia severity may not require immediate treatment, you may still want to talk to a health-care professional about your sleep (for further evaluation) or continue monitoring these symptoms to check if they worsen over time.

Score between 15-21: Insomnia of moderate severity

This result suggests that you experience insomnia symptoms of moderate severity; such symptoms are usually significant enough to warrant further evaluation and treatment. You should talk to a health-care professional about it.

Score between 22-28: Severe insomnia

This result suggests that you experience severe insomnia associated with significant impairment of daytime functioning. You should talk to a health-care professional about additional evaluation and treatment.

11. Psychological Treatment of Insomnia

Cognitive-Behavioural Therapy (CBT) is the only psychological approach with adequate scientific proof for treating insomnia. CBT is a psychotherapeutic method that has been shown to be effective for treating a number of psychological and health-related conditions such as anxiety, depression, and chronic pain; it is also a very effective method for the management of chronic insomnia.

WHAT IS CBT FOR INSOMNIA?

CBT-I (I = Insomnia), is a brief, sleep-focused, and problem-solving therapeutic approach. As the label implies, its main goal is changing sleep-related behaviours (e.g., poor sleep habits, sleep schedules) and cognitions (i.e., the way a person thinks about sleep and insomnia) that cause or exacerbate insomnia. It may also involve relaxation techniques to alleviate stress, worries and tension and education to promote good sleep hygiene practices.

EFFECTIVE PSYCHOLOGICAL STRATEGIES TO OVERCOME INSOMNIA

There are several practical methods you can use to overcome insomnia. These methods are fairly straightforward but they require a good deal of self-discipline. A brief description of those procedures is presented below (see Tables 1-4 on pages 44 to 46).

WHAT RESULTS CAN YOU EXPECT?

Clinical studies have shown that 80% of people with chronic insomnia benefit from CBT-I, with more than 50% achieving complete remission. Typically, people who follow this treatment systematically will fall asleep faster (usually within 30 min), wake up less frequently and for shorter durations (usually for less than 30 min), and sleep more efficiently. In addition, CBT-I provides relief from daytime fatigue, reduces emotional distress, and enhances quality of life.

The success of this approach depends largely on your motivation and on how diligent you are in following the different recommendations. It is very important to implement all procedures consistently for a period of 4 to 6 weeks in order to optimize sleep improvements. CBT requires time, effort, and discipline but the benefits on sleep are well worth it and are well sustained over time.

CAN I USE CBT WITH MEDICATION?

CBT and sleep medication are not necessarily incompatible; they can complement each other. Sleep medication is indicated for short-term insomnia and in the initial treatment phase of chronic insomnia, while CBT targets directly psy-

chological and behavioural factors that perpetuate sleep disturbances. Combined treatments should optimize therapeutic benefits, with the medications producing rapid relief and the behavioural approach producing more sustained results over the long run.

Table 1. Behavioural and Sleep Scheduling Strategies

- Restrict the amount of time in bed as close as possible to your actual sleep time
- Go to bed only when sleepy, not just fatigued, but sleepy
- If unable to sleep (e.g., within 20 min), get out of bed and go to another room and return to bed only when sleep is imminent
- Use the bed and bedroom for sleep (and sex) only - no eating, TV watching, radio listening, planning or problem-solving in bed
- Maintain a regular sleep schedule, particularly a strict time to get out of bed. This should be done every morning regardless of the amount of sleep the night before
- Avoid daytime napping

Table 2. Stress and Anxiety-Reduction Methods

- Allow at least one hour to unwind before bedtime
- Set aside a time/place, other than bedtime, to write down worries and plans for the next day
- Never try to sleep as it will produce performance anxiety
- Cover the alarm clock and avoid clock watching
- Practice relaxation regularly

A 62-year-old woman presented with a five-year history of poor sleep and daytime fatigue. She would fall asleep properly and sleep the whole night and yet wake up feeling tired. She snored lightly. She was not on any medications. All blood tests were normal and her sleep duration seemed normal. After a few visits and with no clear answer, a sleep study was undertaken during which a normal sleep was recorded. The patient was very surprised at how well she slept. “The best sleep in years” was how she described her night in the sleep laboratory. A more careful review about her sleeping environment at home revealed that she lived in a corner house on a busy, noisy road. In addition, she had a little dog that would sleep on her bed. She was advised to wear ear plugs at night and have the dog sleep elsewhere and her sleep was greatly improved and her fatigue disappeared. This identifies that a good history of the sleep environment may identify what is causing sleep disruption once other abnormalities are ruled out.

Table 3. Changing some Misconceptions about Sleep and Insomnia

<ul style="list-style-type: none"> Keep realistic expectations 	Even good sleepers do not always get 8 hours of quality sleep. Also, there are individual differences in sleep needs
<ul style="list-style-type: none"> Do not blame insomnia for all daytime impairments 	Consider alternative explanations that might contribute to those impairments
<ul style="list-style-type: none"> Do not catastrophize after a poor night’s sleep 	Insomnia can be unpleasant, but it is not dangerous; the worst that can happen is that you will be more sleepy the next day, and sleep more soundly the next night
<ul style="list-style-type: none"> Do not give too much importance to sleep 	Even if sleep occupies one third of your life, don’t make it the sole focus of your existence
<ul style="list-style-type: none"> Develop some tolerance to the effects of insomnia 	Rearrange your schedule but do not cancel planned activities

Table 4. Adopting Healthy Lifestyles

- Avoid all stimulants (e.g., caffeine, nicotine) several hours before bedtime
- Do not drink alcohol around bedtime as it fragments sleep
- Exercise regularly as it deepens sleep, but don't exercise too close to bedtime
- Keep the bedroom environment quiet, dark, and comfortable

A 58-year-old female presented with complaints of inability to fall asleep without taking sleeping medications. She had been tried on many medications over the years and all had worked for about a week or two and then stop being effective. The lack of sleep was “ruining my life” and “if I could just find the correct sleeping pill, it would be all fixed.” All testing was normal and she was started on a treatment approach of cognitive behavioural therapy (CBT) where sleep is explained in terms that are understandable. Relaxation techniques and discussions regarding what to expect from sleep were added to her therapy sessions. Exercise on a daily basis was encouraged and the therapist eased her concern about the sleep at each visit. Over time there was a progressive improvement in her sleep and she stopped taking sleeping pills. She still woke a few times each night but was able to meditate and allow herself not to be overly upset by these awakenings. She no longer considered that she needed to have a full night of sleep to function properly. This indicates how effective CBT can be in this type of insomnia.

WHAT IF I NEED FURTHER HELP?

Sometimes it is necessary to get help from a professional therapist who can provide support and guidance in implementing CBT more efficiently. If you wish more personalized help, you should seek a professional consultation with a psychologist or a psychiatrist with training in behavioural sleep medicine. You may also seek a complete sleep evaluation (including an overnight diagnostic test) from a sleep clinic. (For further information, see www.canadiansleepsociety.com).

12. What are the Pharmacological Treatments of Insomnia?

Since time immemorial, man has tried to find “sleeping potions” to induce sleep. In ancient times the Romans used alcohol to try induce sleep. At the turn of the last century our grandparents and great-grandparents used barbiturates (drugs that cause sedation) to help them to fall asleep. In the 1960s, 70s and 80s benzodiazepines (a different type of medication that causes sedation) came on to the scene and were widely used and very popular. Today a third improvement has taken place and the so called “Z drugs” hold sway and are common sleep-inducing agents. These include zolpidem, zopiclone and zaleplon. There are also a number of medications and herbal treatments that are used sometimes for their side effect of inducing sleep. For example, in children, antihistamines have long been used to help children sleep and it is the side effect of the antihistamine (an anti-allergy or hay fever medication) that is really being used in this situation – the side effect being sedation. Similarly, some people use antidepressants such as amitriptyline, an older antidepressant that is a sedative, to help induce sleep but this is because of reasons of tradition and not because it is better or safer - it is actually worse in both regards.

It is also confusing when a medication is not used for its intended purpose, but rather for its side effect of inducing sleep. For example, one doctor will put a patient on a low amount of an antidepressant to help with sleep and another doctor will come along and think that the first doctor had made a mistake and had given too low a dose of an antidepressant and bump up the dose to try and get an antidepressant effect when the person was never depressed in the first place. Part of this has to do with regulatory issues. There are restrictions about sleep-promoting agents which have led doctors to use drugs in a different category about which there can be no criticism. Using antidepressants for their hypnotic purpose alone would be a mistake. This is not in the best interests of patients, nor does it make for good medicine. It has become quite common for physicians to use a category of medication called “atypical antipsychotics” as sleeping aids. These drugs can cause significant long-term side effects and should only be used as a last resort.

In general terms medications for sleep problems should be used for a short period. However, the reality is that about a third of individuals who go onto sleeping pills end up remaining on sleep pills for the long term. On the one hand one might think that this is because sleeping pills are in some ways “addictive”. On the other hand it may be that one understands that for some individuals sleep problems are lifelong and a solution that works and improves their ability to function is a blessing. One should bear in mind information from the chapters on the consequences of insomnia (chapters 4 and 5), which gives an insight into the

problems a person faces if they have chronic insomnia. One statistic that is sobering is that people with insomnia have double the rate of motor vehicle accidents as a result of poor sleep.

There are, of course, other treatments besides pharmacological approaches and these are discussed elsewhere in this book. One needs to consider the role of psychological treatments and if there is a simple behaviour that can be corrected, for example reducing caffeine consumption, then this of course should be done as a first step (see chapter 11). Similarly if there is a specific underlying problem, for example sleep apnea or periodic leg movements in sleep (which occurs in 12% of people with insomnia) then these conditions should be treated first (see chapter 8) and the clinical vignettes on pages 45 and 46.

A 56-year-old woman of Scottish ancestry presented with difficulty initiating and maintaining sleep. Her legs were somewhat restless at night. She complained of a burning mouth on a daily basis. Her bed was in disarray by morning and she had daytime fatigue and no energy. She was a blood donor. Testing revealed a very low iron level (ferritin) in the blood. She was told to stop her blood donations until her iron was normal and was started on iron tablets and over the course of 3 months her symptoms disappeared. Her repeat ferritin level was 63 and her burning mouth and restless leg symptoms (which was the reason her blankets were messy in the morning) were gone and her sleep and energy markedly improved. Low iron levels may be associated with restless legs and burning mouth symptoms. Testing for iron should be taken if these are the presenting symptoms.

This vignette shows that a treatment of a cause of insomnia (in this case low iron levels) can be specifically treated with a medication.

The issue of dependence is an important one. The way one needs to think of it is that any addiction process depends on both the “seed” and the “soil”; the seed being the medication, the soil being the individual. There are some people who are more prone to dependence on drugs, and with these individuals, physicians need to be more cautious when prescribing sleep medications. Most people are

not very prone to drug dependence, and do not run into difficulties with long term sleep medication use. Such treatment can help the quality of life of these people with insomnia enormously.

In young people there is a particularly strong social opprobrium to using hypnotic drugs (sleeping pills) although historically, more dangerous drugs for the purpose of sleep induction have been used. An example of one of these older drugs is chlorylhydrate which was more dangerous because there is a relatively narrow safety range from the dose that promotes sleep to a dose that can lead to a coma.

In children and adolescents some turn to the use of a “food substance”, called tryptophan which is a building block of protein and is found in all proteins such as fish, meat, eggs, cheese, milk. The body absorbs the tryptophan which is then converted into a chemical called serotonin which facilitates sleep. Serotonin is subsequently converted to melatonin which helps in the function of controlling the body clock. The use of tryptophan which used to be sold in health food stores but which is now (in Canada) sold on prescription is not indicated officially because of its safety and effectiveness in children has not been tested but some of us have used it this way with great benefit to our patients.

TABLE OF SLEEP MEDICATIONS AND EFFECTS

Name	Half-life	Dose (maximum /24 hours)	Drug interaction	Best used for
Zolpidem (Sublinox, Ambien, Ambien CR)	2-3 hours	5 mg, 6.25 mg, 10 mg and 12.5 mg extended release (20 mg)	chropromazine, fluconazole, imipramine, rifampicin, carbamazepine, phenytoin	initial insomnia
Zopiclone (Imovane)	3.5-6.5 hours	5 mg, 7.5 mg (15 mg)	carbamazepine, phenytoin, erythromycin, rifampicin, ketoconazole, imipramine	insomnia
Zaleplon	1-2 hours	10 mg	cimetidine, rifampicin, thiorizadine	middle-of-the-night insomnia
Temazepam (Restoril)	8-10 hours	15 and 30 mg (60 mg)	CNS depressants	insomnia, muscle relaxant
Lorazepam (Ativan)	9-16 hours	0.5, 1 and 2 mg (4 mg)	Divalproex, Phentoin, Theophylline, co- administration of IM benzodiazepine and IM olanzapine	insomnia, anxiety disorder, seizure disorder
Clonazepam (Rivotril)	18-50 hours	0.5 mg and 2 mg (8 mg)	CNS depressants, opioids, antihistamine, disulfiram, phenobarbital, phenytoin, carbamazepine, theophylline, rifampicin	insomnia, PLMS, status epilepticus, anxiety disorders parasomnia
Melatonin	unknown	2 mg, 3mg 5 mg (6 mg)	unknown	circadian rhythm disorders
Tryptophan (Tryptan)	4-8 hours	750 mg (6000 mg)	vitamin B6, citalopram	insomnia, temperature sensitivity

The “Z” drugs (top 3) are more specific and for many provide a better quality of sleep. They are less likely to suppress REM sleep which plays an important roll in memory formation. They are easier to stop using and have less likelihood of dose escalation and dependence.

Medication	Advantages	Disadvantages
Zolpidem (Sublinox, Ambien, Ambien CR,	<ul style="list-style-type: none"> • Short acting with minimal daytime sedation • Useful for both initial (sleep onset) and maintenance (middle of night) insomnia • Drug of choice if hypnotic indicated in elderly • Now available in Canada • Only contraindication is hypersensitivity to drug • Minimal or no effects on dream sleep • Less tolerance than benzodiazepine • Rapid onset • No accumulation • No withdrawal 	<ul style="list-style-type: none"> • Headache in up to 10% • Extra care in elderly
Zopiclone (Imovane)	<ul style="list-style-type: none"> • Used for both initial and maintenance insomnia • Can be used for long term management • Minimal or no effects on dream 	<ul style="list-style-type: none"> • Headache in up to 20% • Unpleasant taste in the mouth in up to one third of patients • Abnormal dreams • Accidental injury in elderly due to falls
Zaleplon	<ul style="list-style-type: none"> • Very short acting • Useful for initial insomnia or for middle of the night insomnia • Does not disrupt dream sleep or slow wave sleep (deep sleep) • Negligible next day drowsiness • Less likely to induce tolerance or rebound insomnia 	<ul style="list-style-type: none"> • Headache is the most common side effect • Not recommended in severe hepatic impairment • Care in elderly • Waking after sleeping for too short a period
Temazepam (Restoril)	<ul style="list-style-type: none"> • Preferred benzodiazepine drug in elderly when hypnotic required as no active metabolites • Less alteration of psychomotor performance • Minimal rebound insomnia • Absence of accumulation • Useful in middle and terminal insomnia 	<ul style="list-style-type: none"> • Confusion and lethargy • Hangover effects the next day • Tolerance and dependence • Longer duration of action • Potentiation of effects with alcohol and nervous system depressant drugs • Needs to be discontinued slowly • Caution in elderly -risk of falls
Lorazepam (Ativan)	<ul style="list-style-type: none"> • Rapid absorption • Short acting • Lack of metabolism in the liver offers an advantage in those with liver failure 	<ul style="list-style-type: none"> • Clinical indications are uncertain in terms of its use in insomnia • Absorption variable • High risk of dependence • Potentiation of effects with alcohol and nervous system depressant drugs • Caution in elderly -risk of falls
Clonazepam (Rivotril)	<ul style="list-style-type: none"> • Used for initial and middle insomnia • Also useful for other sleep disorders including restless legs syndrome, parasomnias (sleep walking and night terrors) 	<ul style="list-style-type: none"> • Potentiation of effects with alcohol and nervous system depressant drugs • Longer acting with daytime impairment • Caution in elderly -risk of falls
Melatonin	<ul style="list-style-type: none"> • Naturally occurring hormone • Primarily effective in circadian rhythm disorders such as delayed sleep phase syndrome • Minimal side effects 	<ul style="list-style-type: none"> • Availability in Canada as an over-the-counter medication and not being pharmaceutically regulated raises the question of quality • May cause abdominal cramps and daytime sedation • Should have confirmed deficiency before use • Concerns about impact on reproduction based on animal studies
Tryptophan (Tryptan)	<ul style="list-style-type: none"> • Effective for insomnia • Minimal side effects • May also benefit depression 	<ul style="list-style-type: none"> • May cause anorexia, nausea and headaches • Should be used with caution with antidepressants that alter levels of serotonin. In rare cases, may cause serious life threatening serotonergic syndrome

Consider the specific reason for the medication and the balance of advantages and disadvantages

13. Physical Treatments for Insomnia

ACUPUNCTURE

Acupuncture is often used in traditional Chinese medicine for the treatment of insomnia using the insertion of very fine needles into the skin at specific points on the body. The results of recent studies have been encouraging. In one study both objective measures of sleep using polysomnography and melatonin secretion, acupuncture appeared to improve sleep. More research needs to be done on this treatment.

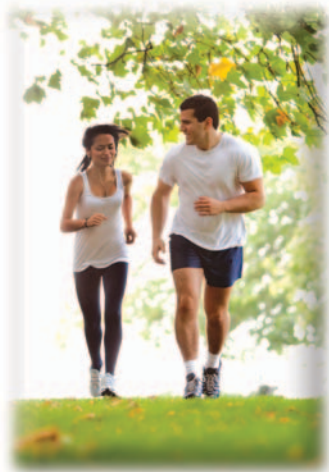
Acupressure is an ancient treatment using fingers to press key points on the surface of the skin to stimulate the body. When these points are pressed, they release muscular tension. Acupuncture and acupressure use the same points, but acupuncture employs needles, while acupressure uses the gentle but firm pressure of hands.

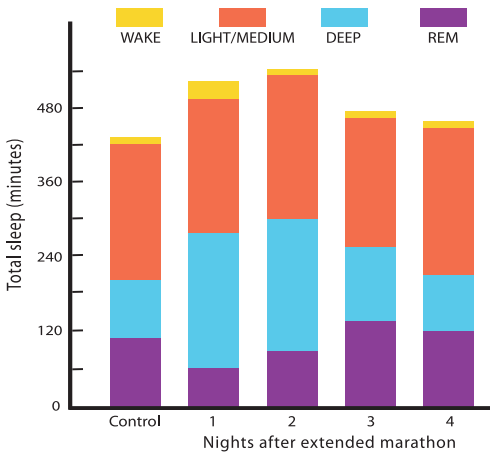


EXERCISE

Regular exercise deepens sleep in adults of all ages. It should not be done too close to bedtime as it may have an alerting effect. Regular exercise three times per week lead by an occupational therapist has been shown to a doubling in deep sleep in people over 65 years.

Recent studies show that Tai Chi and yoga may improve sleep quality in older people and in cancer patients.





This graph shows the dramatic change in sleep quality after the intense exercise of running a double marathon. It proved the point of exercise promoting sleep and paved the way for the wider use of exercise for improving sleep.

MASSAGE

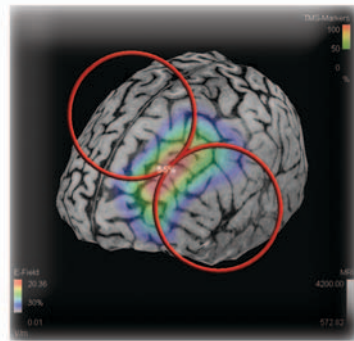
Massage of the back has been found to improve sleep in older people in hospital.

Self massaging pillows and body massage products, which incorporate magnetic components, may be used. However in some cases the company making the magnetic devices has indicated that they do not want research done to prove the efficacy of their products.



TRANSCRANIAL MAGNETIC STIMULATIONS

Transcranial magnetic stimulations involves the use of an electronically induced magnetic field that can impact on nerve function in the brain. This has been used in depression and is now being investigated to see if it can be used to treat insomnia. Early studies are promising.



TRANSCRANIAL ELECTRICAL STIMULATION (AC CURRENT AND DC CURRENT)

These are newer techniques that are being investigated and show an increase in brain blood flow. Early studies have shown improvements in sleep quality.

FASTIGIAL NERVE STIMULATION

This technique was developed to help insomnia and as yet studies are not convincing. Fastigial nerve stimulation involves attaching a small unit to the back of the ear and stimulation is believed to result in an improvement in sleep.

HEAT (SAUNA AND HOT TUB)

Passive heating of the body in a hot tub or sauna before bed raises the body temperature and when the body starts cooling down, it is much easier to fall asleep. There are several studies that support this. Many patients remark on the beneficial effects of sleeping in a cool temperature, i.e., a situation that “allows” the temperature to fall.



COOLING IN HOT ENVIRONMENTS

A fan can be very helpful for sleep in hot environments and can also provide a low level background noise that is relaxing for some people.

All of the techniques described in this chapter have their advocates, but there needs to be more evidence for these approaches to be endorsed.



14. Alternative Therapies for Insomnia

Newer therapies are being investigated and some appear to be promising. People with insomnia often will try to experiment with treatments that are not yet fully tested and the results are quite inconsistent.

MEDITATION

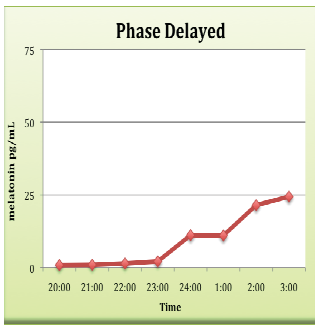
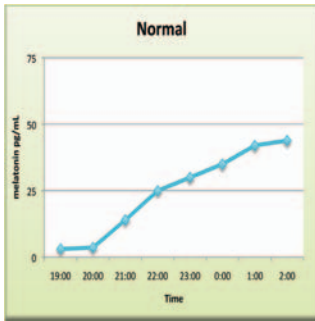
Many studies have looked at meditation alone or coupled with yoga and found that it improved blood pressure and reduced pulse rates and has also been helpful in insomnia. There is considerable evidence in the literature to support the concept of insomnia being a disorder of inappropriate physiological arousal during the night and daytime. For example insomnia sufferers tend to have higher heart rates and were shown to have increased sympathetic activation and decreased parasympathetic activation as assessed in a study looking at heart rate variability.

Meditation has been shown to decrease autonomic activity by stimulating the parasympathetic nervous system thereby achieving a relaxation response. The objective of meditation in a clinical setting is to produce physical relaxation accompanied by a deep sense of mental calm and thought reduction. Thus it can be used in relieving stress and facilitating sleep. The sustainability of beneficial effects, lack of harmful side effects and the ability to complement conventional pharmacological and psychological treatments makes meditation an appealing option. When reviewing proper sleep hygiene, meditation can be considered an ultimate “wind down” routine prior to sleep.



Meditation as a discipline has many different forms and is practised in a wide variety of settings. One can categorize the various disciplines into either “focused attention” or “open monitoring” meditation. In focused attention, the practitioner concentrates on internal events (such as breathing) or a particular object that may be abstract or concrete. In comparison open monitoring involves non-judgmental moment by moment awareness. Certainly some forms of meditation incorporate both elements.

MELATONIN



In Canada, this is being used as an over-the-counter supplement to help insomnia. It has a double function of improving sleep and setting the body's rhythm. However results are inconsistent and may worsen sleep. Melatonin is a hormone and it is very unusual for a hormone to be sold over the counter; we do not buy insulin (for diabetes) in the grocery store, nor do we buy testosterone at the gym. Unfortunately, there is no standardized quality control for melatonin and patients get very variable results as compared with pharmaceutical-grade melatonin. Furthermore it is odd that the precursor of melatonin (tryptophan) is available only on prescription but the hormone is available over the counter.

Melatonin largely controls the body clock and usually rises in levels in the blood at dusk (around 7:00 p.m.) It sends a message to the brain to go to sleep in about four hours. This is the chronobiotic (body clock) role. There is a small sleep promoting role and it may help some to sleep at first use but it may delay sleep after a while.

Finally melatonin has a role in controlling reproduction in animals and for this reason some doctors are concerned about its common use in young children without adequate research. Hormones (e.g., thyroid hormone), are only prescribed if there is a test done that shows the hormone level to be abnormal.

VALERIAN ROOT

This supplement is prepared from the root of the plant, Valerian. It has been studied in Europe for its potential to reduce anxiety and improve sleep. Results are inconsistent.

KAVA

This Polynesian plant has been used as a relaxant and now has a serious warning after it had toxic effects that caused liver damage. It should not be used.



Valerian plant

MUSIC THERAPY

Studies looking at the calming effect of classical music to help people with insomnia have had promising results and many find listening to the same music every night a useful habit.



Music Therapy

ART THERAPY

Children and adults who cannot express their fears can often draw them. The distraction of drawing, for example, a nightmare, may help a child describe a bad dream. A skilled art therapist can help alleviate fears and thereby help the child to return to regular sleep.

HERBAL BATHS

Some studies suggest that this may be helpful but it may also be the effect of the heat allowing easier descent into sleep.



AROMATHERAPY

Aromatherapy, which uses the scent of concentrated oils from plants, has been shown to have an effect on people while asleep and may be helpful for people with insomnia. There are no scientific studies on aromatherapy.

15. Insomnia in Children

Children and teens experience many of the more than eighty sleep disorders described in the literature. Kids with neurodevelopmental disorders, physical disabilities and learning disabilities tend to experience sleep difficulties more often and more severely. Many children with emotional difficulties have trouble sleeping. Situations often exist in which more than one factor may be responsible for causing a sleep problem in a child or adolescent. In this respect, there may be combinations of two or more emotional, behavioural, developmental, physical and pharmacological causes. In this chapter and the next, we give a somewhat broader perspective.

In general, there are two major categories of sleep disorders: Dyssomnias and Parasomnias. Dyssomnias result in either excessive daytime sleepiness or difficulty initiating and maintaining sleep. Included under this category are conditions such as primary insomnia, primary hypersomnia, narcolepsy, breathing related sleep disorders, and circadian rhythm sleep disorders (internal biological clock disorders).

Parasomnias are behaviours that usually occur during sleep, caused when certain physiological systems activate at inappropriate times. Included under this category are nightmare disorder, sleep terror disorder, and sleep walking disorder. These can cause repeated awakenings during the night and parents may see these as a form of insomnia.

Both these groups of disorders can lead to sleep disruption and features of insomnia. This may result in daytime sleepiness but also, somewhat paradoxically, in daytime hyperactivity as children are often disinclined to report sleepiness and appear to compensate for sleepiness or disrupted sleep by being hyperactive.

INFANTS AND TODDLERS

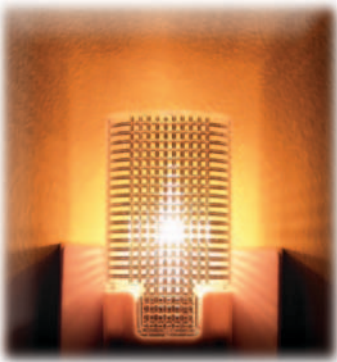
Children require about 14 hours of sleep per night at the age of 1 year, and by 5 years, they require about eleven and a half hours. Napping is usual until about the age of 3 years. In this age group, it is usual for children to experience some degree of wakefulness during the night. However, up to 20% of parents of children below the age of 2 years report that their children experience prolonged or frequent waking.



Behavioural Insomnia of Childhood

Some children have difficulty falling asleep or staying asleep because of behavioural circumstances. This condition is known as behavioural insomnia of childhood, and two types are recognized. These may occur independently or may coexist.

Firstly, the sleep-onset association type occurs at bedtime or if the child wakes up during the night. This typically happens when a parent is not present during these times. This condition develops because the child is used to a certain set of circumstances while falling asleep. It includes the presence of a parent, being in a particular environment, being rocked, watching television, or having certain objects available before going to or returning to sleep. Emotional distress results from the absence of these circumstances, which in turn leads to difficulty falling asleep.



Secondly, in the limit-setting type of behavioural insomnia, the child delays or refuses to go to bed. This is usually the result of sub-optimal or inconsistent limit setting by the parent or caregiver.

Treatment usually involves establishing good sleep hygiene that includes routines indicating disengagement from daily activities. Regular bedtime and wake time encourages rapid sleep onset. Children who are afraid of the dark may benefit from a dim night light.

In early childhood other behavioural interventions may be required if sleep hygiene proves to be insufficient. These will not be described here, but include extinction (systematic ignoring), graduated extinction, positive routines/faded bedtime with response cost, and parent education and anticipatory guidance. A counsellor or psychologist may often facilitate these interventions by pinpointing specific patterns of behaviour to address. Three or four sessions are usually adequate in the majority of situations.

There is a lack of research regarding pharmacotherapy for childhood insomnia. Little evidence exists that supports the efficacy of such products. These preparations include sedating antihistamines, chloral hydrate and melatonin. It is generally best to avoid these products, but one may consider giving melatonin under very specific circumstances (see chapter 16).

Sleep-Related Rhythmic Movement Disorder (RMD)

This condition sees the child making rocking movements or moving part of the body in a repetitive stereotyped rhythmic manner, involving the arm, hand, head, or trunk. It may include other behaviours such as head banging, head rolling and body rocking. It is often accompanied by humming or moaning. It may be seen starting just before sleep onset and sometimes continues after sleep onset. It can be present during any stage of sleep and affect any part of the body. These movements are usually relatively mild and may constitute a form of self-soothing but could also be more extreme with violent movements resulting in injuries.

In healthy children this condition is usually self-limiting and resolves in early childhood. However, it may be more serious and require medication such as a benzodiazepine. Behavioural therapies may be required and sometimes padding and protective headgear is needed. More severe instances of RMD are sometimes seen in children suffering from neurodevelopmental disorders, psychiatric disorders, and following head injury or central nervous system infections.

PRE-SCHOOL-AGED CHILDREN: 3 TO 5 YEARS OF AGE

Nighttime Fears

Many children between the ages of 3 to 5 years experience nighttime fears. This is a normal entity in their development. Many children fear the dark and frightening creatures that may be lurking in the shadows. This condition usually wanes between the ages of 5 to 6 years.

Parents may be easily educated about managing their child's nighttime fears. Occasionally, such straightforward intervention is not enough and requires professional intervention aimed at identifying probable causes that may be perpetuating the child's nighttime fears. This includes family conflict, anxiety disorders, nightmares, and child abuse.

Nightmare Disorder

More than 50% of young children experience nightmares occasionally, while about 3% have them more than once a week. Nightmares are frightening dreams that arise during REM sleep. They usually occur in the latter half of the night.

Nightmares differ from night terrors in several ways. Children wake up fully after a nightmare and are able to recall their dream content immediately following the night-



mare, and the next day are able to remember having had a bad dream. Night terrors have other characteristics. (See description below on NREM parasomnias).

Nightmares can disrupt the sleep of child and parent. They have multiple causes that include anxiety, sleep deprivation, minor and more severe traumatic events, as well as a large number of medications that affect dream (REM) sleep. The impact of evening TV and even a single frightening movie can be considerable in generating nightmares. A variety of helpful behavioural interventions that can be helpful are available.

Parasomnias: Disorders of Arousal from Non-REM Sleep

Children spend more time in deep, non-REM (NREM) sleep than adults do. Accordingly, NREM parasomnias occur more frequently in children than in adults. These events tend to happen within 1 to 2 hours after sleep onset, and usually occur only once per night. They represent incomplete arousal from NREM sleep.

Features of NREM parasomnias include difficulty waking up a child from one of these events, and the child having no, or only fragmented, recollection of the event.

This group of conditions includes sleepwalking, confusional arousals, and night terrors. Parents and caregivers are often alarmed at hearing loud vocalizations,

seeing an expression of terror on the face of the child, and sometimes recognizing associated tremulousness and heavy perspiration. These episodes typically last 5 to 15 minutes, but may continue for up to one hour (see table).

	Nightmares	Night terrors
Sleep Stage	REM (occasionally N1-N2)	Stage N3
Time of night	Middle and late sleep	Mostly 1–2 hours after sleep starts
Associates	Hypnotics withdrawal B-Blockers Reserpine Depression	Stress Previous sleep loss
Other features	Also occur in day naps Some relationship to anxiety	Usually in deep sleep Can accompany somnambulism M>F Occasionally occurs with enuresis

Differences between nightmares and night terrors

NREM parasomnias include a relative lack of sleep or can occur during the course of illness. Other precipitants may possibly include obstructive sleep apnea and restless leg syndrome. It is important for parents to be aware of the importance of adequate sleep and to not attempt waking the child during one of these episodes. Although this can be seen as a form of broken sleep, it is not formally classified as insomnia.

These conditions are benign. They affect up to 17% of children and often run in families. Triggers for

Identifying possible triggers for these events and eliminating them when possible, forms the mainstay of management. These conditions may occur at predictable times, allowing effective treatment by waking the child briefly before the expected event. Sleepwalking demands putting measures in place to prevent possible injury to the sleepwalker.

Occasionally, introduction of medication may be required to control the parasomnic behaviour, and in this respect, clonazepam may be an effective treatment option. There is, for many parents, an opposition to using such a treatment and some of us have the experience of successfully using tryptophan in this situation.

FEATURES OF SLEEP WALKING AND NIGHT TERRORS

- **They occur primarily in the first third of sleep when slow wave sleep is most prominent. Slow wave sleep is deep sleep; it is difficult to wake the patient**
- **Patients rarely remember specific details of the event**
- **Conditions in which there are higher levels of slow wave sleep tend to increase the frequency of these parasomnias, for example, sleep deprivation (and in adults also shift work and alcohol consumption)**
- **These parasomnias may occur in response to stress or anxiety and may be more common when sleep schedules are irregular**
- **Medical disorders associated with these parasomnias include obstructive sleep apnea syndrome, migraine, and epileptic seizures**
- **They are more common in children because they have more slow wave sleep than adults. The onset is usually before the age of 10 years**
- **One person may have more than one form of parasomnia**
- **There may be a common genetic and neurophysiological substrate in somnambulism and night terrors**

School-Aged Children: 6 to 12 Years

In this age group, demands increase on the time available to a child. Commitments and interests vying for a time-slot in the child's timetable include school-work, extracurricular and sporting activities, television and multiple electronic devices, including mobile telephones.

In the America Poll of 2004, the National Sleep Foundation found that 37% of parents of children in this age group reported their children were experiencing sleep problems. A Chinese study of 10,000 older children showed that the more electronic devices the child has in the bedroom, the shorter the sleep period.

Inadequate Sleep Hygiene and Insufficient Sleep

A spectrum of situations known as Sleep Hygiene promotes good sleep quality. Inadequate sleep amount and quality usually have several unhealthy consequences that include irritability, negative attitude, excessive daytime sleepiness, fatigue, poor concentration and a decline in school performance.

SLEEP HYGIENE CHART

Advice	Reason
Get up and go to bed the same time every day	You will feel better when your sleep cycle has a regular rhythm
Refrain from exercise at least 4 hours before bedtime	Regular exercise will help you sleep well, but the timing of the workout is important. Exercising in the morning or early afternoon will not interfere with sleep
Develop sleep rituals	It is important to give your body cues that it is time to slow down and sleep. Listen to relaxing music, read something soothing for 15 minutes
Only use your bed for sleeping	Do not use your bed to watch TV, do work or read. This will let your body know that when you go to bed it is time to sleep
Stay away from caffeine at least 4-6 hours before bed	Caffeine is a stimulant that interferes with falling asleep. Cola, cocoa, and hot chocolate contain caffeine
Have a light snack before bed	If your stomach is too empty, it may interfere with sleep. However, a heavy meal before bedtime can interfere as well. Dairy products contain tryptophan, which acts as a natural sleep aid, and is why a warm glass of milk before bedtime is sometimes recommended
Take a hot bath 90 minutes before bedtime	A hot bath will raise your body temperature. However, it is the drop in body temperature that helps to make you feel sleepy
Make sure your bed and bedroom are quiet and comfortable	A hot room can be uncomfortable. Sleep in a cooler room along with enough blankets to stay warm. If light in the early morning bothers you, get a blackout shade or wear a slumber mask. If noise bothers you, wear earplugs or get a "white noise" machine
Use sunlight to set your biological clock	As soon as you get up in the morning, go outside and turn your face to the sun for 15 minutes
Don't take naps	Not taking a nap will ensure that you are tired at bedtime. If you just can't make it through the day without a nap, sleep less than one hour before 3:00 p.m.

The first step in addressing a child's sleep problem is setting up and maintaining good "sleep hygiene". This includes setting up a consistent daily schedule of bedtime and morning rising times, disengaging from regular activities by following a relaxing routine of activities starting about one hour before the planned bedtime.

Sleep-Related Bruxism

Bruxism is the habit of unconsciously gritting or grinding the teeth or clenching the jaws especially in situations of stress and during deep sleep. Approximately 50% of infants grind their teeth with eruption of incisors, but overall it is only problematic in about 5% of the population.

Several conditions may be linked to bruxism, including anxiety, cerebral palsy and mental retardation, as well as a number of medications, notably certain antidepressants, for example, Prozac. It is usually a self-limiting condition in this age group, but if dental damage occurs, a dental appliance may be necessary or stress management may be required. Lack of sleep and insomnia can make this condition worse.

RESTLESS LEG SYNDROME (RLS) AND PERIODIC LIMB MOVEMENT DISORDER (PLMD)

RLS occurs in approximately 2% of children, and has only recently been recognized in the pediatric population. Therefore, the stated prevalence may be an underestimation. RLS in children is closely associated with periodic limb movement disorder (PLMD).

Symptoms include "growing pains" and complaints of unpleasant feelings in the legs accompanied by an urge to move the legs. Movement relieves these discomforts.

RLS and PLMD may occur independently but may also co-occur. PLMD is associated with complaints of disturbed sleep.

Children with these conditions may resist going to bed, have difficulty falling asleep, wake up during the night, and have daytime consequences related to poor sleep quality. This includes difficulty concentrating and other symptoms similar to those of ADHD. Many children with nighttime waking due to PLMD are unaware of their legs twitching during sleep. Treatment for this condition differs from treatment of other causes of nighttime waking, and it is therefore important to do a formal assessment to rule out this possible cause.

Genetics, brain chemistry (dopamine), and iron play a role in the pathophysiology of RLS. Determining serum ferritin levels in these children is important since iron deficiency occurs commonly in this age group and correcting low or below normal iron levels may alleviate the problem in many children. There are specific treatments, which are usually prescribed in a specialist centre.

A twelve-year-old girl from Glasgow was seen because of violently and rapidly waving her right arm from side to side in her sleep. The noise of her arm hitting the bed disrupted her sister's and mother's sleep. She had done this since infancy and as a small child had once struck herself in the eye, causing internal eye bleeding. Her mother had tried tying her arm with a bandage to the crib side, but this was abandoned as the child's efforts to move her arm were so violent that the whole crib would move.

A plan was made to set a movement detector above the child's bed that would be activated by the swing of the arm, triggering a flashing light above the bed, waking the girl but not disturbing her mom or sister in the other bedrooms.

Within a week of initiating the new device, her arm swinging that had been happening every night for 12 years, stopped. Six months later, in the span of a single week, the girl experienced a number of emotionally traumatic events that included the death of a close family friend, going to see her new high school and starting to menstruate. These stressors caused her arm swinging to start again. The disassembled alarm system was put back in place above her bed and the swinging stopped within 5 days. She had no further arm swinging problems.

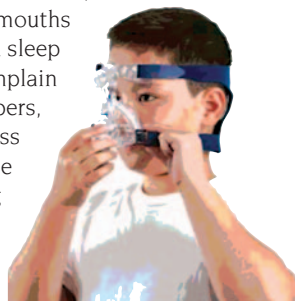
SLEEP DISORDERED BREATHING IN SCHOOL-AGED CHILDREN: 2 - 8 YEARS



A separate discussion is necessary to address the condition of sleep-disordered breathing in children of this age group, encountered most frequently between the ages of 2 – 8 years. The condition is also known as obstructive sleep apnea or OSA. Approximately 2% to 4% of children develop this disorder. At this age, compared to the size of their airway, the child's adenoids and tonsils are at their largest.

Partial or full airway obstruction causes sleep apnea, while there is continuing respiratory muscle effort to remain breathing. Children that have this condition often snore, breathe through their mouths

while sleeping, perspire excessively during sleep, and sleep in unusual positions. In the morning, they often complain of a sore throat and dry mouth. They are restless sleepers, may wet their beds, and complain of daytime tiredness but usually not sleepiness. They may become irritable and unable to sustain focus on tasks at school, leading to poor school performance. Behavioural difficulties may also develop. Children with Down's syndrome have a high likelihood of developing OSA.



Complications of sleep apnea include reduced oxygen to the brain and sleep fragmentation. This in turn may lead to behavioural problems, inattentiveness, learning difficulties, mood swings, and hyperactivity. OSA also puts strain on the right side of the heart. In addition, it may lead to a reduction of growth hormone release and failure to thrive. Glucose intolerance may also develop that can lead to type 2 diabetes. There are many problems associated with OSA.

A child diagnosed with sleep disordered breathing is usually referred to an ear, nose and throat specialist to provide an opinion regarding surgically rectifiable conditions. Adenotonsillectomy is the most common treatment for childhood OSA.

Removing the adenoids and tonsils is not always feasible or indicated. Continuous positive airway pressure, or CPAP, is the alternative treatment option and available to children of all ages. It is safe and effective. There are a small number of children with complicated OSA requiring other more complex surgical interventions. Once the underlying problem is treated, the broken sleep usually normalizes rapidly.



*Applies exclusively to adults

Some of these items are more relevant to children

16. Insomnia in Teens

INTRODUCTION

One of the big differences in the teen years is that there is a significant change in lifestyle and body function. Lifestyle changes include increased social and academic pressure causing many adolescents to go to bed later, and in some situations having the freedom to wake up later. Teens strive toward independence from parents, developing the ability to make their own arrangements for social interaction and extramural activities. The extra pressure on an adolescent's time frequently results in reduced sleep duration.

Increasingly, teens are staying awake into the early hours of the morning by engaging in traditional entertainment such as television and newer electronic media including social networking and communicating with smart phones.

There is a clear relationship between the number of electronic devices that a teenager has in their bedroom and the decrease in sleep time they experience nightly. This, combined with homework and other academic pressures, is reducing the amount of time available for a teen to sleep.

The "Teens and Sleep" report of The National Sleep Foundation's 2006 *Sleep in America* Poll show that 75% of teenagers get less than the recommended amount of sleep per night. Although most students realize that they do not meet their sleep needs, parents seem unaware of this problem. Nine out of 10 parents believe mistakenly that their teen is getting enough sleep.

Insufficient sleep in adolescents leads to sleepiness at times and places where they should be fully awake, resulting in teenagers feeling tired and sleepy especially during the first and second period of school. Many fall asleep in class, while others arrive late or miss school because they oversleep. The sleep-deprived teen also under performs at school.

DELAYED SLEEP PHASE DISORDER

As children enter adolescence, their biological clocks (circadian rhythms) tend to change whereby approximately 7% to 15% of teenagers are "biologically driven" to go to bed later and get up later. This change is due to a disruption in their secretion of melatonin, which is a hormone that controls the body clock and is produced in the brain. The top graph on page 56 shows a normal melatonin secretion pattern with melatonin usually starting to increase approximately at dusk. In some teenagers, instead of melatonin increasing from 7:00 p.m., there is a delay in the secretion of the hormone, sometimes by several hours. This condition is known as delayed sleep phase disorder (DSPD), or phase delay syndrome. The pattern of melatonin secretion is shown on the lower graph on page 56.

This condition usually results in the teen falling asleep after midnight and therefore finding it difficult or impossible to get up from bed in the morning. This leads to being late for school, feeling overly sleepy, finding it difficult to concentrate, and being irritable.

In teenagers with DSPD, the only way to detect a delay in melatonin secretion is to do a Dim Light Melatonin Onset (DLMO) test. A delay in melatonin secretion detected by the DLMO test makes a positive diagnosis of DSPD. This in turn provides an explanation for the teen's difficulty in falling asleep.

Delayed sleep phase disorder does not require treatment of sleep, but rather treatment that will reset the body clock. The first approach to correcting the body clock setting is to treat with the hormone that controls the body clock, i.e., melatonin. It should be given in pill form at the time that it is normally released, which is about 7:00 p.m.

The DLMO test may find normal melatonin release. This indicates that the teenager's difficulty getting to sleep is not due to a delay in melatonin release, but might be due to behavioural circumstances such as involvement with electronic devices as previously described. It is essential under these circumstances to address the behaviour by developing a regular bedtime and eliminating causes that may be contributing to a delay in retiring to bed. It may include removing electronic devices from the bedroom. Exposure to a bright light in the morning is especially important.



Bright Light Therapy

Many children become extremely frustrated at not being able to fall asleep and being told to use simple sleep hygiene remedies, which are guidelines for promoting better sleep when in fact they have a hormonal problem that needs specific treatment. There is a tradition in medicine of not treating children and adolescents as "real people" and not taking their complaints as seriously as they should be taken.

INSOMNIA

One in 10 teenagers between 13–16 years suffers from insomnia and more than half of them have a co-morbid psychiatric condition. Many factors may contribute to a teenager developing insomnia. These include stress, genetic predisposition, underlying medical or psychiatric conditions, and poor sleep hygiene.

Considerable stress accompanies bullying, which is far more prevalent than previously thought and has the potential to lead to considerable distress, and sometimes to more profound difficulties. Psychiatric conditions, such as anxiety and mood problems, occur frequently in children and adolescents. These conditions are grossly under-diagnosed. Only a quarter of teens suffering from depression are diagnosed with the condition. Depression and anxiety may lead to profound sleep disruption.

Consequences of poor sleep include irritability and changes in mood, fatigue, poor concentration, and difficulty consolidating newly learned information leading to poor school performance.

Treatment follows on determining the possible contributing causes and deciding on an appropriate course of intervention. This may include emphasizing good sleep habits, psychotherapy such as cognitive behavioural therapy for depression or anxiety, meditation, and sleep enhancing medication.

Safety and efficacy data are lacking regarding the use of medication for treatment of insomnia in older children. More than 10% of teens use some form of medication for treatment of sleeplessness. Preparations currently used for insomnia in adolescents include antihistamines, benzodiazepines, tricyclic antidepressants, atypical antipsychotics, shorter acting hypnotics, and L-tryptophan. These agents have advantages and disadvantages. (See table in chapter 12).

A teenage boy in the middle of a viral illness and having a high fever got up in a parasomnic state and tried to strangle his father with whom he had a close relationship. Both he and his father thought it safer for him to be on medication.

NARCOLEPSY

Narcolepsy is a chronic neurologic disorder. More than half the time this condition develops during childhood and adolescence but only 4% of patients is diagnosed before the age of 15 years. On average, it takes 10 years before making a diagnosis. This rare condition affects about 0.05% of the population. Males and females are equally affected.

SLEEP DURATION FOR ANIMALS AND HUMANS

<i>Animals</i>	<i>Total sleep time every 24 hours</i>	<i>Humans at different ages</i>	
	Squirrel	16 Hours	Newborn
	Domestic Cat	13 Hours	6 - 23 mos
	White Leghorn Chicken	11 Hours	3 - 5 years
	Jaguar	10 Hours	5 - 9 years
	Parakeet	9 Hours	10 - 13 years
	Great Tit (a bird)	8 Hours	14 - 18 years
	Indus Dolphin	7 Hours	33 - 45 years

Sleep duration is clearly linked with age. Insomnia will imply less sleep than is age appropriate

Symptoms of narcolepsy include daytime sleepiness, cataplexy (sudden muscle weakness when experiencing intense emotion), sleep paralysis, and hallucinations that occur as one goes to sleep or as one wakes up from sleep. Another typical feature of this condition is disturbed nighttime sleep.

Several other conditions may lead to daytime sleepiness in teenagers. These include insufficient sleep syndrome, long sleepers, sleep apnea, delayed sleep phase disorder, depression, and substance use.

Treatment for narcolepsy is mainly medication that promotes wakefulness. This includes modafinil, methylphenidate, and mixed amphetamine salts. Interestingly, cataplexy is usually treated with certain classes of antidepressants or a specific agent, Xyrem. Non-medication treatment includes scheduled daytime naps.

IN CLOSING

Sleep difficulties can profoundly impact the quality of a person's life and the ability to function. The academic performance of teens in school affects their future prospects regarding higher education and future job opportunities. This is one of the most important reasons why sleep issues of adolescents should be taken seriously.

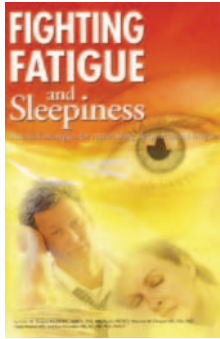
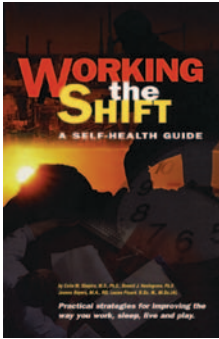
17. Conclusion

Sleep is a complex process that occupies almost one third of our lives. It is not surprising that sometimes there are “problems with sleep”, just as there can be problems with any other body function.

People often suffer with sleep problems for much longer than they would tolerate a different problem, e.g., a chronic cough. In general, problems that are dealt with early are more easily treated.

This booklet has given some guidance to the wide range of issues that can lead to sleep difficulties and particularly insomnia. We have also shown that there are a wide range of treatments that can be helpful. It is a truism that “not one shoe fits all”, i.e., different people are likely to respond to different treatments. Even with a particular treatment one may find that one gets on well with one therapist more than another or that for some people a dose of a particular medication is helpful whereas another person may need a different dose of the same drug.

We urge you not to settle for poor sleep. The consequences of poor sleep at all ages (see chapters 4 and 5) are far-reaching and will impair quality of life. At the same time, striving for unrealistic perfection in sleep can be a problem. We hope you have learnt from this book. Please feel free to refer others to the booklet which is on the websites: canadiansleepsociety.com and sleepontario.com.



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