MedSleep

Sleep Matters®

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About MedSleep

MedSleep's network of clinics are committed to providing the highest quality sleep medicine services across Canada.

MedSleep is dedicated to improving health and promoting wellness by providing a comprehensive and patient-centered approach to the diagnosis and treatment of sleep disorders.

We strive to be pioneers in sleep medicine utilizing the latest in technology, promoting education, and participating in clinical research and the advancement of new treatments.

MedSleep clinics provide clinical consultation, diagnostic services (sleep testing) and treatment for the full spectrum of sleep disorders.

DID YOU KNOW?

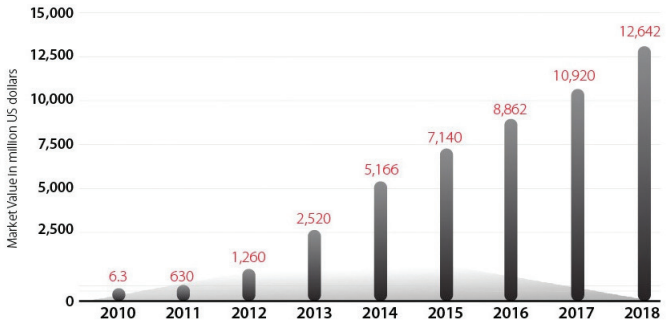
Our referral forms are now available electronically as fillable pdfs.

Contact us at: info@medsleep.com

Sleep Apps and Wearable Devices for Tracking Sleep

SLEEP IS CRUCIAL TO BRAIN FUNCTIONING, memory formation and physical restoration. But all too often, sleep is elusive. The average daily adult sleep requirement varies from person to person, and is mostly determined by genetics. The National Institute of Health (NIH) suggests that adults get between 7 and 8 hours of sleep each night. To keep people from falling short, a number of smartphone apps have appeared on the market that claim to track sleep. The apps not only provide quantification of the total sleep time, but also help the user to understand what might lead to a bad night of sleep, so as to help avoid these triggers.

The number of available sleep apps is growing at an alarming rate. Sales of all wearable technology will more than double by 2018, which would increase the market from 6.3 billion in 2010 for 12.6 billion by 2018. Much of this technology will be aimed at tracking various personal physiological activities, and sleep tracking devices may be among the most popular.



As interesting as this kind of data is for the user, at this point in time, we (as sleep specialists) are highly skeptical that any consumer gadgets can accurately measure how well a person sleeps. However, we are encouraged by the fact that people are generally taking their sleep more seriously, and are genuinely interested in optimizing sleep schedules, and even crudely screening for various sleep disorders. But all this information without the benefit of an expert opinion can lead to inaccurate conclusions.

Generally, there are two types of sleep gizmos on the market. The first are the fitness trackers that have sleep-tracking capabilities. Most of these gadgets involve a wearable wristband or sensor that tracks your body movements as you sleep. The second category is smartphone apps that can be downloaded to certain phones. For tracking sleep, both require an accelerometer to measure body movements.

The trackers that have wearable sensors are likely to be more accurate in detecting body movements. However, it is unlikely that they can accurately measure how long people spend in the various stages of sleep. Your body movement does not necessarily correspond to sleep stage. A smartphone set next to you on the mattress introduces even more room for error, as its measurement of your movements will vary depending on factors like mattress firmness and whether you sleep with a partner. But some smartphone apps have an added advantage of being able to record sound, so that excessive snoring can be detected and roughly quantified.

One of the more accurate wearable devices is called an Actigraph. This device has been used in many clinical and research settings for more than 20 years.

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A Review of CPAP Therapy

THE NON-INVASIVE APPLICATION OF POSITIVE AIRWAY PRESSURE to treat obstructive sleep apnea (OSA) had to await the application of a positive pressure device by Colin Sullivan in 1981. This was actually a Hitachi suction pump (used in the OR) in reverse. Dr. Sullivan had played with this concept while working as a post-doctoral Fellow with Dr. Eliot Philipson at the University of Toronto. Modern-day devices are infinitely more sophisticated than a mere reversal of the vacuum pump. This increased device complexity requires even more training in order to effectively deliver optimal therapeutic intervention for a variety of sleep-related breathing disorders.

Continuous positive airway pressure (CPAP), as the name implies, requires the airway pressure to be constant between inspiration and expiration. Most often, such a pressure is achieved by a servo-controlled air compressor that maintains the airway pressure as closely to the prescribed pressure despite the pull (inspiration) and push (exhalation) of the patient. Modern day CPAP devices are more compact, primarily due to miniaturization of the controllers and electronics.

Physiologically, the CPAP device works to splint the airway open and prevent the collapse of the upper airway that is the cardinal event of OSA. Besides such a beneficial effect, there are other physiological benefits to CPAP: greater end-expiratory lung volume and consequent increase in oxygen stores and increased tracheal traction to improve upper airway patency and lower cardiac after-load, such that cardiac output is improved. Conversely, CPAP may provoke anxiety in susceptible individuals, and propagate central apneas by destabilizing breathing. In some patients, the administration of CPAP may eliminate CO_2 and reduce arterial P_{CO2} below the apnea threshold, and consequently lead to ventilatory instability characterized by central apneas and periodic breathing. Despite some undesirable side effects, CPAP remains one of the most cost-effective forms of medical therapy.

There is a real art to the implementation of CPAP therapy. Effective implementation can determine the difference between treatment refusal and long-term compliance. Many issues must be addressed: What is the optimal pressure? How do we titrate the pressure? What mask interface do we use? Do we use a humidifier? Should we set ramp feature? If so, at what level? How soon should we measure adherence to therapy? When should the patient follow up? When and how often should we re-titrate the pressure setting? How do we prevent non-adherence to CPAP? How do we promote adherence to therapy? What are the determinants of non-adherence?

And who is at greatest risk for non-adherence? How should the multidisciplinary healthcare providers work as a team to improve quality of service?

It's complicated, but studies have demonstrated those things associated with the best therapeutic outcomes. CPAP candidates should receive adequate PAP education, hands-on demonstration, careful mask fitting, and acclimatization prior to titration. Special care must be taken to fit the patients with the appropriate size and shape of mask or nasal pillows. The choice of humidification (heated humidification in dry climates and cold pass-over humidifier in warm and humid environs), though dictated by local weather and patient preference, are vital to prevent oronasal dryness and discomfort. Close follow-up the sleep physician and home-dare company to troubleshoot problems encountered while on CPAP and to manage the ensuing side effects, is vital for a successful outcome. ❖

Sleep Apps and Wearable Devices

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By use of carefully designed algorithms, this device can fairly accurately determine total sleep time, measure sleep disruption, and even roughly differentiate between dreaming and non-dreaming sleep. It also has the added benefit of measuring ambient light levels, which may be an important factor when evaluating certain circadian rhythm disorders. We often use this device at our various MedSleep clinics, especially for evaluating various sleep schedule disorders. However, once again, it is important to emphasize that collecting this kind of data, in the absence of an expert opinion, is of little practical value.

Further studies assessing the use of portable sleep studies in patients with conditions other than obstructive sleep apnea, and in patients with obstructive sleep apnea and comorbidities, are needed.

As technology moves forward, level 3 sleep studies may eventually rival level 1 sleep studies in terms of comprehensive data collection. However, as the testing becomes easier to implement, the analysis and interpretation of the data must remain in the hands of health care professionals with comprehensive training in sleep disorders medicine in order to minimize the risk false positive and negative findings. ❖

Managing Insomnia in Elderly Patients

INSOMNIA IS A PREVALENT PROBLEM in the elderly. These sleep difficulties are often mistakenly considered a normal part of aging. Insomnia, the most common sleep disorder, is a subjective report of insufficient or nonrestorative sleep despite adequate opportunity to sleep. Approximately 50% of elderly people have insomnia, yet it is typically undertreated, and non-pharmacologic interventions are underused by health care practitioners. The aim of this article will be to review the causes of insomnia in the elderly, the approach to patient evaluation, and the non-pharmacologic and pharmacologic treatment options.

The Biology

Two primary factors control the physiologic need for sleep: the total quantity of sleep (average of 7 to 8 hours of sleep each 24-hour period) and the daily circadian rhythm of sleepiness and alertness. Sleep requirements and patterns change throughout life, but sleep problems in the elderly are not a normal part of aging. It is unlikely that older people simply need less sleep, as has been assumed in the past. It is more likely that they cannot get the sleep they need, likely related more to circadian factors. The aging central nervous system appears to be less sensitive to the typical zeitgebers (time-givers) that would have kept the sleep-wake cycle more precisely regulated in earlier years. Perhaps various systems are also less sensitive to the circadian signals issuing from the suprachiasmatic nucleus and the pineal gland. Add to that the lack of a schedule in the retired elderly, the opportunity for daytime napping, and various medical issues that can interfere with sleep continuity, and you have the perfect recipe for insomnia.

Sleep Architecture

The sleep architecture changes significantly in the healthy elderly individual. Sleep initiation is more difficult; total sleep time and sleep efficiency (time in bed vs time asleep) are reduced; slow wave sleep decreases; sleep fragmentation increases; and more time is spent in bed awake after retiring. A natural shortening of the circadian rhythm period length occurs, such that the circadian clock now has a period length of approximately 23.5 hours. This lead to the elderly tendency of retiring to bed earlier and to waking up mush earlier. These factors can contribute to a perceived deterioration in sleep quality and less total sleep. With aging, the duration of REM sleep tends to be more preserved, but sleep latency is significantly decreased. At the same time, the elderly find it increasingly difficult to stay awake during the day.

Assessment and Management of Sleep Issues

The first step in assessing the elderly person complaining of insomnia is to establish whether they really have insomnia. Is it related to chronic pain, polyuria or another condition, the effective management of which would lead to an improvement in sleep? Is it related to a vicious circle of poor sleep hygiene, where frequent daytime napping leads to reduced sleep efficiency at night, which leads to an increasing need for daytime napping? Is it an over-expectation of perfect sleep, with a focus on the early morning insomnia? Here the person may dwell on the fact that they are awake before the rest of the world has started the day, not realizing that this phase advance is common (normal) in the elderly.

One very important issue for review when assessing an elderly insomniac is their medications and dose scheduling. Many medications have significant effects on sleep quality and alertness, and thus the dose timing can make a significant difference. For example, a diuretic may have been added for the control of blood pressure. The patient has other medications which they take at bedtime, so they add the diuretic to this regime, unless instructed otherwise.

- Consider eliminating, or changing dose or timing of these agents; may cause fragmented sleep, nightmares, nocturia, or stimulation
- Antidepressants (potentially stimulating/ sleep disrupting): buproprion, citalopram, duloxetine, escitalopram, fluoxetine, MAOIs, sertraline, venlafaxine
- Cardiovascular: α-blockers (tamsulosin), β-agonists (salbutamol) β-blockers (propranolol, metoprolol), statins
- Decongestants: Phenylephrine, pseudoephedrine
- Diuretics: chlorthalidone, furosemide, hydrochlorothiazide, indapamide, metolazone, spironolactone
- Caffeine in combination products e.g., TYLENOL #3
- Opioids: fentanyl, methadone (may cause central apnea-induced insomnia)
- Respiratory: Salbutamol, theophylline, ipratropium
- Others: acetylcholinesterase inhibitors (e.g., donepezil), alcohol, antineoplastics, corticosteroids, levodopa, nicotine, medroxyprogesterone, phenytoin, thyroid supplements

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Sleep in Teens

Adolescents are notorious for not getting enough sleep.
The average amount of sleep that teenagers get is between 7 and 7 ¼ hours.
However, studies show that most teenagers need about 9 hours of sleep.

Teenagers do not get enough sleep for a number of reasons:

- **Shift in sleep schedule**. After puberty, there is a biological shift in an adolescent's internal clock of about 2 hours, meaning that a teenager who used to fall asleep at 9:00 PM will now not be able to fall asleep until 11:00 PM. It also means waking 2 hours later in the morning. There is also a natural increase in the period length of the circadian clock. This means that it is much easier for the teenager drift towards a delayed sleep phase pattern.
- **Early high school start times**. In most school districts, the move to high school is accompanied by an earlier school start time. Some high schools start as early as 7:00 AM, meaning that some teenagers have to get up as early as 5:00 AM to get ready for and travel to school.
- **Social and school obligations**. Homework, sports, after-school activities (often occurring during the evening), and socializing lead to late bedtimes.

As a result, most adolescents are chronically sleep deprived. Sleep deprivation will influence many aspects of a teenager's functioning:

- **Mood**. Sleep deprivation will increase moodiness and irritability. In addition, they may have a more difficult time regulating mood, getting more easily frustrated or upset.
- **Behaviour**. Teenagers who are sleep deprived are also more likely to engage in risk-taking behaviors, such as drinking, driving fast, and engaging in other dangerous activities.
- **Cognitive ability**. Inadequate sleep will result in problems with attention, memory, decision making, reaction time, and creativity, all of which are important in school.
- **Academic performance**. Studies show that teenagers who get less sleep are more apt to get poor grades in school, fall asleep in school, and be late for school. Truancy rates are also increased
- **Drowsy driving**. Teenagers are at the highest risk for falling asleep at the wheel.

How to help teenagers get enough sleep

- **Maintain a regular sleep schedule**: Go to bed and wake up at about the same time each day. The sleep schedule should also ensure adequate time in bed (~9 hrs).
- **Avoid oversleeping on weekends**: Although catching up on some sleep on the weekends can be helpful, sleeping in until noon on Sunday will make it hard for your teenager to get back on a school schedule that night.
- **Turn off televisions, computers, and radios**: Television viewing, computer-game playing, internet use, and other stimulating activities at bedtime will cause problems falling asleep.
- **Avoid caffeine, smoking, alcohol, and drugs**: All of these cause sleep problems.
- **Refer for sleep assessment**: If difficulties falling asleep or staying asleep persist, despite implementation of the suggestions above; if there is significant snoring; if there is excessive daytime sleepiness, despite adequate sleep at night.

Adapted from: *Mindell JA & Owens JA (2010). A Clinical Guide to Pediatric Sleep: Diagnosis and Management of Sleep Problems*. Philadelphia: Lippincott Williams & Wilkins. ❖

Managing Insomnia in Elderly Patients

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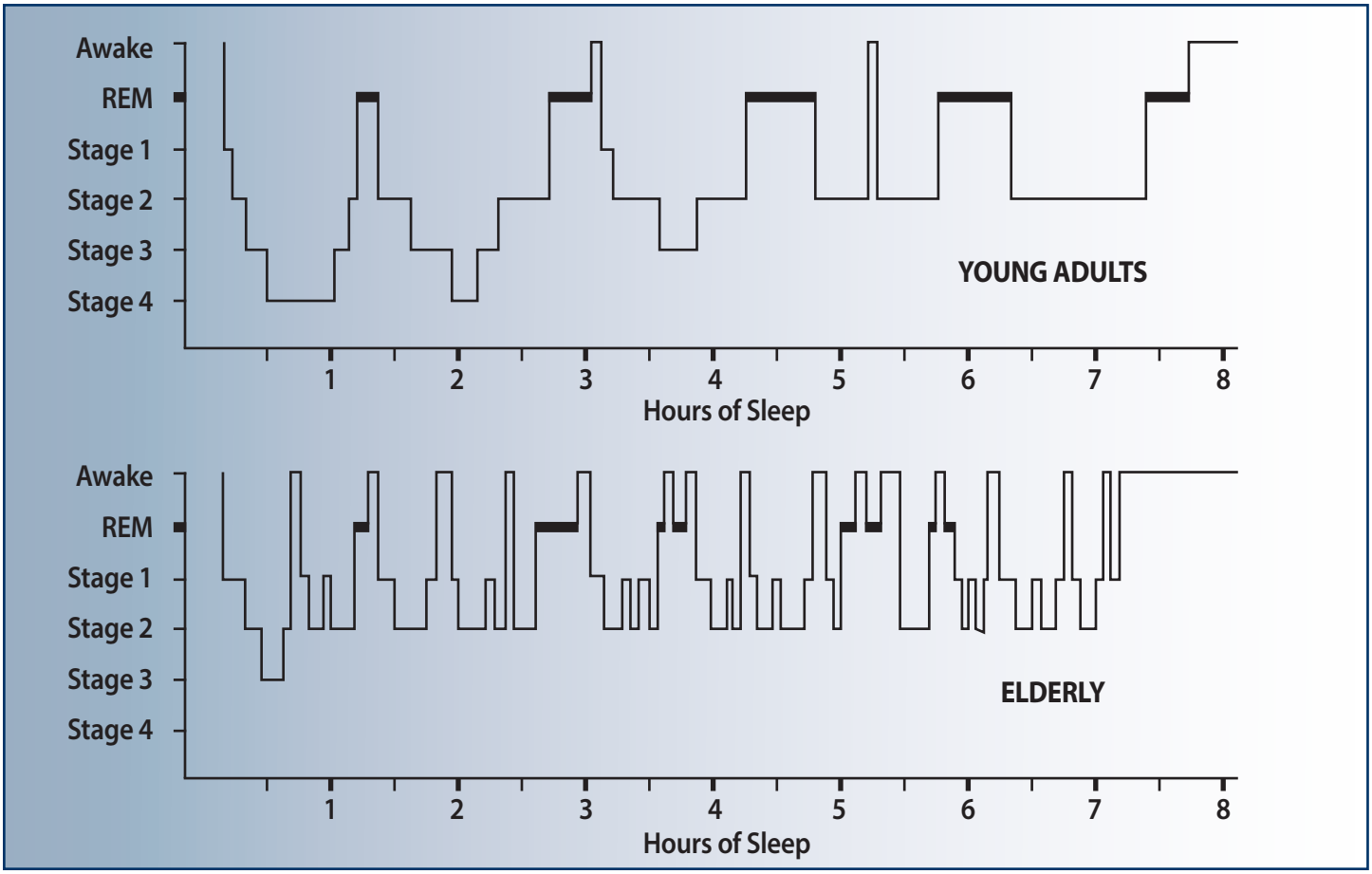

Non-pharmacologic Intervention

If minimal or no daytime impairment is reported, the patient may simply need reassurance that the symptoms are not pathologic, and that they are probably getting all the sleep that they require.

One of the most common misconceptions is that if sleep is disturbed in any way, then stay in bed longer in order to compensate. This most often has the paradoxical effect of making the problem even worse. The person spends longer hours awake in bed, getting more and more frustrated, and without any benefit. They often stay in bed for periods of time that are far in excesses of their normal sleep requirement. One of the simplest and most effective strategies is to advise them to reduce their time in bed back to their estimated total sleep time (maybe 5 to 6 hours). Establish a regular bedtime and rise time, and adhere to this schedule, no matter how poor the previous night of sleep.

Pharmacologic Intervention

Pharmacotherapy for insomnia in the elderly may be complicated by age-related changes in pharmacodynamics and pharmacokinetics. With aging, total body fat increases and fat-soluble drugs (i.e., benzodiazepines, such as diazepam and flurazepam) consequently have an increased volume of distribution and decreased clearance. Drug metabolism can be altered in geriatric patients through impaired oxidation, reduction, and hydroxylation, and drug excretion can decrease markedly as the result of age-related declines in hepatic blood flow and glomerular filtration.

If prescribing a sedative-hypnotics for elderly, short to intermediate-acting agents (e.g., zopiclone, zolpidem, temazepam) are preferred at the lowest available dose (or half-dose); AVOID those with a very long half-life (flurazepam, diazepam & chlordiazepoxide) as well as those that are very short acting (triazolam), or those with high receptor affinity (alprazolam), as the risk of rebound and withdrawal side-effects is increased. The risk of falls and daytime sedation and confusion is greatest with longer-acting agents.

In general, medications for insomnia should only be employed after:

1) screening for a primary sleep disorders;
2) optimizing management of any contributing medical and/or psychiatric disorders;
3) reconsidering other medication dosing and scheduling; and
4) implementing behavioural techniques. ❖

MedSleep

DEDICATED TO ACHIEVING EXCELLENCE
in both the diagnosis and treatment of the full spectrum of sleep disorders,
providing comprehensive evaluation and integrative treatment

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