

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

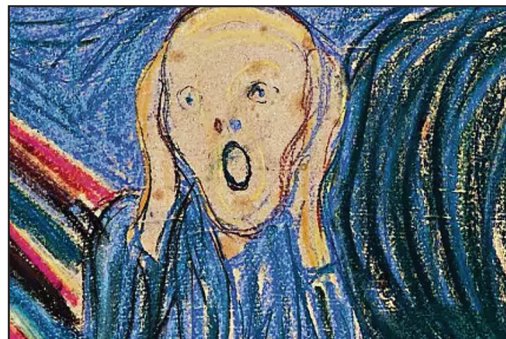
Understanding Parasomnia Disorders

What are parasomnias?

PARASOMNIAS ARE DISRUPTIVE SLEEP DISORDERS that can occur during arousals (awakenings) or partial arousals from rapid eye movement (REM) sleep or non-rapid eye movement (non-REM) sleep. Parasomnias are marked by undesirable physical or verbal behaviours (walking/talking), confusional states, momentary paralysis, and/or hypnagogic hallucinations. They occur in association with sleep, specific stages of sleep, or sleep-wake transitions. These can be disruptive to the patient, bed partners and families.

TYPES OF NON-REM PARASOMNIAS

Night Terrors



Night terrors (or sleep terrors), are considered a type of disorder of partial arousal. The person (usually a child) experiencing a sleep terror abruptly arouses from sleep in a terrified state, often crying or screaming, with a rapid heart rate, rapid respiratory rate, sweating, or flushing of the skin. The child may appear to be awake, but is confused and inconsolable. They may be unable to communicate normally for several minutes.

Night terrors are usually brief but can last (rarely) – up to 30-40 minutes, after which time the person lies down and appears to fall back asleep. People experiencing sleep terrors are most often amnesic of the event the following morning. Night terrors occur during stage 3 sleep (deep non-dreaming sleep), which is a sleep stage usually confined to the first few hours of sleep.

Therefore, a true night terror is almost exclusively experienced during the first half of the night.

Children with sleep terrors may pose dangers to themselves or others from jumping on the bed or running around. During the night terror, they may become more agitated and the episode may last longer if someone tries to interact with or console them. Gentle (non-physical) verbal communication is the most effective to re-direct their behaviour and guide them back. These events are often much more troublesome for the caregiver or partner than for the individual actually experiencing the night terror, as it is actually not a reflection of a true emotional state.

Sleepwalking (somnambulism)

Sleepwalking is another type of disorder of arousal. It occurs when a person appears to be awake and moving around with eyes wide open, but is actually asleep. Sleepwalkers generally have no memory of their actions. They may wake up in the middle of the episode and appear confused, or get back in bed and go back to sleep without waking.

Sleepwalking also most often occurs during deep non-dreaming sleep (stage 3), early in the night. It is most common in children aged six to twelve; however, sleepwalking can occur among younger children, adults, and the elderly.

See Parasomnia Disorders: page 2 ... /

EVERY NIGHT since humans first evolved, we have made what might be considered a baffling, dangerous mistake. Despite the once prevalent threat of being eaten by predators, and the loss of valuable time for gathering food, accumulating wealth, or having sex, we go to sleep. Scientists have long speculated and argued about why we devote roughly a third of our lives to sleep, but with little concrete data to support any particular theory. Now, new evidence has refreshed a long-held hypothesis: During sleep, the brain cleans itself. Most physiologists agree that sleep has come to serve many different purposes, ranging from memory consolidation to the regulation of metabolism and the immune system. While the “core” purposes of biological functions (such as breathing and eating) are easy to understand, however, scientists have never agreed on any such original purpose for sleeping. The new study, by Nedergaard and colleagues at the University of Rochester in New York, provides the

The Housekeeping Functions of Sleep

first direct experimental evidence at the molecular level for what could be sleep’s basic purpose: it clears the brain of toxic metabolic by-products.

This new work fits with a long-standing view that sleep is for recovery – that something is paid back or cleaned out.

Nedergaard’s recently discovered a network of microscopic, fluid-filled channels that clears toxins from the brain, much as the lymphatic system clears out metabolic waste products from the rest of the body. Instead of carrying lymph, this system transports waste-laden cerebrospinal fluid (CSF). Before the discovery of this “glymphatic system,” the brain’s only known method for disposing of cellular trash was to break down and recycle it within individual cells.

In the original work, Nedergaard’s group showed that glia, the brain’s non-neuronal cells, control the flow of CSF through channels in their cell membranes.

– See *Housekeeping Functions*: page 4 ... /

Parasomnia Disorders

/... Continued from page 1

Sleepwalking appears to run in families. Sleepwalking can sometimes be dangerous as the sleepwalker is unaware of their surroundings and can injure themselves by not negotiating their environment adequately.

Confusional arousals

Confusional arousals also can occur when a person is partially aroused from a deep sleep (stage 3) during the first part of the night. The person usually remains in bed, but may sit-up abruptly, looking around in a confused manner. The person may cry or be inconsolable. The episodes are generally brief, but can last (rarely) up to 30-40 minutes. People experiencing confusional arousals react slowly to commands and may have trouble with verbal comprehension.

All of the non-REM parasomnias are fairly common in children aged four to twelve. This sleep disorder, which may run in families, also can occur in up to 3% of adults. Other concomitant sleep disorders should be ruled out as part of the assessment, as this could be a provoking influence in a predisposed individual. For example, a child in our Clinic presented with extreme night terror symptoms.

A sleep study revealed significant obstructive apnea (in addition to night terrors), compounded by severe tonsillar hypertrophy. After T&A surgery, the apneas were abolished, and there were no further night terrors reported by the parents. It is likely that the apnea arousals were “kick-starting” the confusional arousal process, leading to a night terror episode. Although periods of increased emotional distress, sleep deprivation, travel across time zones, and/or excessive use of alcohol can increase the incidence of night terrors in adults with a childhood history.

TYPES OF REM PARASOMNIAS

Nightmares

Nightmares are vivid dreams during sleep that can cause feelings of fear, terror, and/or anxiety. Usually, the person having a nightmare is abruptly awakened from REM sleep (dreaming sleep) and is able to describe the dream in detail. Since REM-sleep is more prevalent during the second half of sleep, nightmares tend to occur more frequently in the early morning hours. This can be a simple way to differentiate the nightmare from the night terror (*i.e.*, do the events occur in the first or second half of sleep).

Nightmares can be caused by many factors, including illness, anxiety, any traumatic event such as the loss of a loved one, or negative reactions to a medication (especially serotonergic psychotropic medications). Interestingly, low dose prazosin (Minipress) has been shown to have some benefit for recurring nightmare in PTSD patients.

Sleep paralysis

Sleep paralysis is a sleep disorder in which people are not able to move the body or limbs when falling asleep or waking up because their muscles are briefly paralyzed, even though they are awake. Episodes last from seconds to a few minutes and can be quite distressing.

Sleep paralysis occasionally runs in families. Although the cause is unknown, the physiology is clear. There is a descending inhibitory control over spinal motor neurons during REM-sleep (REM-sleep atonia) which prevents dream enactment. Release from this inhibitory influence can be delayed after an abrupt awakening, leading to momentary paralysis. This can be provoked by sleep deprivation and/or irregular sleep-wake schedules, or the abrupt arousals that accompany obstructive apnea.

– See *Parasomnia Disorders*: page 4 ... /

Sleep Disturbance in Menopause

WOMEN IN GENERAL EXPERIENCE MORE TROUBLE SLEEPING THAN MEN, and it's largely due to fluctuation or deficiency of female hormones. It has been noted that 25% of all women between the ages of 50 and 64 years report chronic sleep difficulties. Sleep difficulties are much more common in post-menopausal than in pre-menopausal women, and much more severe in those subjected to surgical menopause.

Progesterone promotes sleep through one of its major metabolites (*allopregnanolone* - ALLO) which interacts with GABA_A receptors. ALLO acts as a highly potent positive allosteric modulator of the GABA_A receptor thus enhancing global neural inhibition (similar to benzodiazepines). The sleep-enhancing effects of progesterone are reflected in the sleep EEG. When progesterone is high (just after ovulation), women's brains produce more "sleep spindles" (brain-waves that indicate the deeper sleep). Conversely, when progesterone is low, women's brains show fewer sleep spindles, increased K-complexes, and fewer restorative sleep cycles.

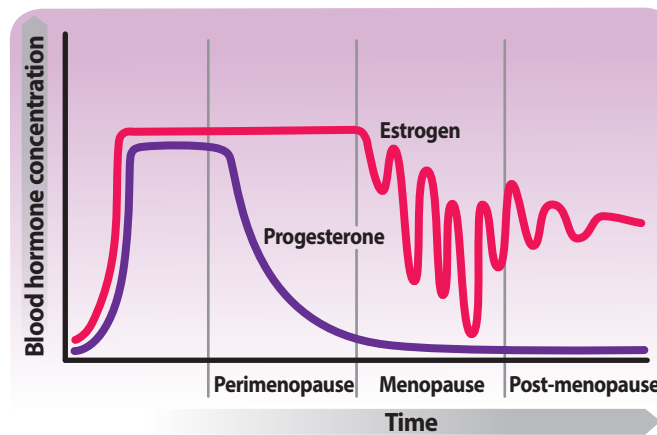
Allopregnanolone possesses a wide variety of additional effects, including (in no particular order), antidepressant, anxiolytic, stress-reducing, rewarding, prosocial, antiaggressive, prosexual, sedative, anticonvulsant, neuroprotective, and neurogenic effects, all of which may be beneficial for sleep.

Perimenopause

Hormonal sleep problems occur during perimenopause because of progesterone deficiency and relative estrogen excess. This may cause irritability, tension, and trouble falling asleep. It also increases histamine intolerance, which can cause insomnia.

Menopause

Hormonal sleep problems occur during menopause because of progesterone and estrogen deficiency. Estrogen deficiency causes difficulty in staying asleep, and many women report sleep maintenance insomnia



(waking at 2am) as the single most distressing symptom of menopause. Falling estrogen levels are a major cause of hot flashes and night sweats, two of the leading causes of insomnia during menopause. Fortunately, sleep most often improves on its own two to three years after menopause.

Contributing factors

- Estrogen appears to help control body weight. With lower estrogen levels, lab animals tend to eat more and be less physically active. Reduced estrogen may also lower metabolic rate. Lack of estrogen may also cause the body to use starches and blood sugar less effectively, which would increase fat storage and tip the balance in favour of weight gain. This increases the risk of developing sleep apnea.
- Higher levels of estrogen and progesterone protect women prior to the onset of menopause. These hormones maintain the airway's muscle tone and thus reduce the risk of collapse. However, as these levels decline during perimenopause and drop to their lowest levels as part of menopause, the incidence of sleep apnea climbs.
- Mood disorders (depression and anxiety)

- Abnormalities of the circadian rhythm
- Co-morbid sleep issues (snoring, restless legs syndrome, periodic limb movement disorder, musculoskeletal discomfort, and fibromyalgia)
- Lifestyle factors (poor sleep hygiene, irregular schedules, caffeine, alcohol, a snoring partner).

Investigations

- Take a thorough history, including the type of sleep disturbances, co-morbid conditions, contributing factors, medications and impact on quality of life.
- Assess level of resulting daytime impairment.
- Self-reported questionnaires may provide information regarding perceived sleep quality.
- Subjective assessment measures of sleep disturbance may include the use of a sleep diary to assess issues related to sleep hygiene, duration of sleep, and circadian rhythm.
- Objective measurements may also be indicated:
 - Overnight polysomnography (PSG) to assess for sleep-disordered breathing, narcolepsy, motor restlessness, and periodic limb movement disorder. The sleep EEG will also provide details of sleep duration and architecture, and can sometimes demonstrate sleep-state misperception by the patient (underestimation of total sleep time).

– See Sleep Disturbance: page 3 ... /

Parasomnia Disorders

... Continued from page 2

It is also seen in narcolepsy, a disorder marked by excessive daytime sleepiness.

An episode of sleep paralysis can often be ended by sound or light touch.

REM sleep behaviour disorder (RBD)

Rapid eye movement (REM) sleep behaviour disorder (RBD) is an REM parasomnia in which people act out dramatic and/or violent dreams during REM sleep. Opposite to sleep paralysis, the REM-sleep atonia is prematurely lost during REM sleep, enabling dream enactment. Individuals with this condition are often heard to be involved in a one-side coherent (often abusive) conversations.

Flailing, punching, and/or vigorous exits from the bed can lead to significant injury for the individual and/or the bedpartner.

RBD occurs predominantly in men aged 50 and older, but it can also happen to women and younger adults. It is sometimes caused by certain medications, including some antidepressants. A sleep study is required for a definitive diagnosis. Once the diagnosis is made, a neurologic assessment is highly recommended.

About 15% of Parkinson's patients, 70% of multiple system atrophy patients, and 85% of Lewy body dementia patients also have RBD. Recent studies have shown that RBD symptoms can occur 10 years before definitive symptoms of Parkinson's are detected. ❖

Night terror graphic: The Scream by Edvard Munch © The Munch Museum / The Munch-Ellingsen Group / Artist Rights Society (ARS) New York.

Sleep Disturbance

... Continued from page 3

- Wrist actigraphy to assess sleeping patterns and awakenings on consecutive nights and to provide information on certain sleep disorders, including shift work disorder and circadian rhythm disorders. This may also be used to assess the response to therapy.
- Multiple Sleep Latency Tests (MSLT) conducted during the day will assess for pathological daytime sleepiness.

Management

- Formulating a strategy is dependent on a thorough investigation and evaluation of all contributing factors.
- Lifestyle modification *e.g.*, regular schedules, sleep hygiene, elimination of caffeine and alcohol, appropriate and comfortable bedding and temperatures.
- The use of estrogen, alone or in combination with progesterone, has showed mixed results, but did show some improvement with regard to perceived sleep quality and fragmentation.

Women with hot flushes treated with HRT show a marked improvement in sleep quality. It is essential to assess the risks associated with HRT prior to commencing this treatment option.

- Judicious use of hypnotics can be used, after other contributing factors have been ruled-out and/or managed (*i.e.*, zopiclone, zolpidem, trazodone).
- The serotonin modulating antidepressants have been shown to reduce hot flashes, depression and insomnia (*i.e.*, venlafaxine).
- Low dose tricyclic antidepressants (TCAs) may assist in alleviating insomnia (*i.e.*, Silenor).
- A fixed sleep-wake cycle is important to improve sleep quality. Reducing total time in bed can also be beneficial, as insomniacs often compensate by spending longer hours in bed hoping to sleep. It is also important to minimize daytime napping.

Sleep-specific cognitive behavioural therapy should also be considered (*i.e.*, Sleepio; SHUTi). ❖

Housekeeping Functions

... Continued from page 2

A comparison of the volume of space between nerve cells while the mice were awake and asleep revealed that the glial channels carrying CSF expanded by 60% when the mice were asleep. The team also injected labeled β -amyloid proteins into the brains of sleeping mice and awake mice and found that during sleep, CSF cleared away this "dirt" outside of the cells twice as quickly – "like a dishwasher," Nedergaard says. Such proteins can aggregate as pathogenic plaques inside cells and are associated with Alzheimer's disease, she says. Many neurological diseases – from Alzheimer's disease to stroke and dementia – are associated with sleep disturbances, Nedergaard notes.

The study suggests that lack of sleep could have a causal role, by allowing the by-products to build up and cause brain damage. "This could open a lot of debate for shift workers, who work during the nighttime," Nedergaard predicts. "You probably develop damage if you don't get your sleep." One unknown, however, is whether the need to remove waste products actively regulates sleep – whether, for example, the buildup of metabolic by-products makes us sleepy. Researchers also wonder how the fluid-filled channels change shape during sleep, and whether clearing waste actually improves the function of neurons. No one role of sleep necessarily rules them all, says sleep scientist Derk-Jan Dijk of the University of Surrey in the United Kingdom. "Sleep probably has many functions," he says, just as the weekend is variously for shopping, socializing, and cleaning the house. But now that Nedergaard and her colleagues have identified this nightly brainwashing in mice, scientists can investigate whether it occurs in all species, and to what extent. It is possible that different species have evolved different additional functions of sleep to suit their different habitats, ... but this will help resolve if there is some shared function of sleep across species. ❖

Improving CPAP Compliance

Obstructive sleep apnea (OSA) is a major health problem that has moved into mainstream medicine in a relatively short period of time.

In 1981, *The Lancet* published an article describing the use of continuous positive airway pressure (CPAP) to treat sleep apnea. Since then, CPAP has become the first line of treatment for OSA.

By providing a positive pressure splint to the upper airway, CPAP increases the cross-sectional area and volume of the upper airway, effectively preventing potential obstruction of the upper airway by the tongue and pharyngeal tissue. This allows for completion of each breath cycle throughout sleep.

Patients treated with CPAP report dramatic benefits. The most notable are the improvement in sleep quality and an increased level of alertness during the day. Improvements are most often noted in cognition, mood, road safety and workplace performance. Any erectile dysfunction may also improve. Treating physicians may notice that the existing hypertension and/or diabetes become more easily managed. In some cases treatment may no longer be required, especially if accompanied by weight loss. Despite all of these positive outcomes, CPAP compliance can be a problem for some.

PREDICTING CPAP COMPLIANCE

CPAP compliance is often defined as using the therapy for an average of four hours a night for at least 70% of the nights. However, another recent study indicates that six hours per night should be the goal, as patients often abandon therapy mid-way through sleep, leaving them more susceptible to the more severe REM-sleep related events, which tend to occur in the early morning hours.

An article in the *Canadian Respiratory Journal* (2008) showed a long-term compliance of only 50%. Compliance has gradually improved since then with more effective patient monitoring via

built-in smart cards, communication by modem, or a web-based system to check use patterns. Interestingly, age, sex, and socioeconomic status do not predict compliance. Also, stress, anxiety, or depression do not influence CPAP compliance. However, the severity of the disease (*i.e.*, the apnea-hypopnea index – AHI) showed a relationship with compliance. Those with a higher AHI tend to be more compliant, probably due to a more immediate relief of troublesome daytime symptoms.

Patients who have already demonstrated poor medical compliance carry this forward with CPAP therapy. Compliance tends to be less in those who do not understand the health-related risks of apnea, those who refuse CPAP during titration, and those who complain of claustrophobia. Patients who are self-conscious and reluctant to wear the CPAP interface in the presence of their bed partner will be less compliant, and this is especially true of women.

Minor side effects influencing compliance include nasal drying, increased congestion, sneezing, rhinorrhea, sinusitis, claustrophobia, pressure sores on the bridge of the nose, difficulty exhaling, aerophagia, mask noise/leaks, and skin creases the next morning.

All of these can most often be managed if the health care team (including doctors, technicians, and homecare staff) does a proper job of education, application, and follow-up, with trouble-shooting and early interventions at the start of therapy.

Top 10 List for CPAP Compliance

1 Referral Source

The patient's bed-partner is most often the reason for the initial referral. Input from the partner can be crucial for long-term compliance. To that end, involving the partner (in person or on questionnaires) becomes an important part of the overall assessment and management. The family physician is the next crucial step. The more the family doctor knows about sleep apnea and CPAP therapy, the more likely the patient will feel an essential buy-in for evaluation and treatment. The family doctors should enquire about the CPAP therapy at every visit.

2 Initiation of Therapy

CPAP is most often introduced by the sleep physician after an overnight sleep study in the lab or an in-home study. When there is a strong suspicion of significant apnea, then treatment may be initiated in the middle of an overnight study. It is vital that the patient be aware of exactly what CPAP entails and why it is so important. The sleep physician plays a key role here, and will take the time to fully educate the patient regarding diagnosis and management.

– See Top 10 List : page 6 ... /

Top 10 List */... Continued from page 5*

The sleep lab technicians also play a vital role. With initiation and titration of CPAP, the techs may have to again explain and encourage. We must remember that anxious/sleepy/cognitively impaired/dysthymic apnea patients may not take all the information in at the first exposure. Repeating the information can never hurt. Poor CPAP titrations lead to poor compliance. The techs have a difficult task, as CPAP may have to be implemented on the fly in the middle of the night. Patience, clarity, and encouragement are essential.

Also, the homecare companies play a vital role in determining compliance. They should have a variety of masks and headgear, and the staff should work with the patient to get the best choice/fit. Before applying the CPAP, issues related to mouth-breathing, leaks, swallowing, and talking should be discussed. They also are the first line in troubleshoot any technical or comfort problems as they arise.

3 Access to Immediate Follow-up

Since the first week of therapy tends to set the pattern of use, the home care team play a vital role in this regard. Follow-up with the sleep physician should be arranged within the first 2 to 4 weeks of therapy (sooner if required). Correcting problems up front is critical.

4 Monitoring Compliance

Compliance should be checked intermittently between 1 and 6 months after the initial CPAP setup. Data downloads from more modern CPAP devices should be reviewed by the sleep physician. Home care teams should alert the sleep physician if any problems are detected. All of the healthcare team should continue to talk to the patient about sleep habits, quality of sleep, and overall health benefits of CPAP, and look for anything that might need to be corrected or anything that might affect compliance.

5 Long-term Follow-up

An annual office visit to the homecare company and to the sleep clinic should be scheduled to check all the equipment and the hours/usage. Masks wear out and break, so an annual replacement should be in the plan. Changes in the patient's medical status (especially variations in weight) may warrant a complete re-evaluation.

6 Mask Choice/Fit

This may be one of the most important factors influencing compliance. All CPAP devices basically do the same thing since they are precision blowers. But interface between the device and the patient plays a major role in determining comfort level.

The nasal mask or the pillows must be carefully fitted by the homecare company. Several mask types and sizes should be available in order to find a good-fitting interface. Patients with claustrophobia may tolerate nasal pillows or nasal prongs more than the nasal mask. Pillows or prongs are also beneficial to interface with someone who has a mustache or is missing dental support needed for a nasal mask. Head straps should not be too tight and should not cause discomfort. An oronasal mask (the so-called "full face mask") may be a better choice for patients with nasal congestion or a persistent mouth leak. A broken or malfunctioning interface/headgear/supply tube must be replaced immediately so that interruption of nightly CPAP use is minimized or eliminated.

7 Nasal Congestion

Not being able to breathe easily through the nose creates a major barrier for compliance and adherence. For someone with congestion or sinusitis, nasal sprays with corticosteroids and antihistamines are essential. A full ENT assessment may be required for some patients with ongoing nasal airflow restriction to rule out more complicated contributing factors (*i.e.*, deviated nasal septum, nasal polyps, etc).

8 Humidification

Drying of the mouth and nose is a frequent complaint of CPAP users. Studies have examined heated humidification versus cold humidification and found that heated systems have better results. Although it may not improve efficacy of therapy, many patients appear to have fewer complaints when using humidification.

9 Choosing the Appropriate Device

Fixed CPAP was the initial standard of therapy. Bilevel PAP therapy came along and opened more options (allowing clinicians to set the baseline expiratory pressure and the peak inspiratory pressure), especially for treating more complicated patients (*i.e.*, obesity hypoventilation). Other options have since evolved. Auto-titrating CPAP devices titrate the pressure up or down as needed to keep the upper airway open at the lowest effective pressure. With pressure-relief PAP, there is a reduction in pressure at the very end of inspiration and beginning of expiration so patients do not have to breathe against the prescribed therapeutic pressure immediately. Although BiPAP therapy is rarely required in typical obstructive apnea, careful selection of these other options may play an important role in compliance.

10 Never Lose a Patient to Follow-up

This applies to the family doctors, sleep physicians, and homecare companies. ❖