# A Good Night's Sleep

Why It's Difficult for People with Parkinson

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# Why Can't People with Parkinson Get a Good Night's Sleep?

# **Practical Tips**



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leep is an essential part of life. Humans spend approximately one third of their lives sleeping. Although once considered a passive state, sleep is marked by differing levels of brain activity as the sleeper cycles through light stages of sleep (stages 1 and 2), deep sleep (stages 3 and 4) and REM (rapid eye movement) sleep. REM sleep in the past was also called paradoxical sleep. During this stage of sleep, brain activity closely resembles that of wakefulness, there is the occurrence of dreaming, muscles are paralyzed with the exception of eye movements and respiratory muscles, and there are rapid eye movements. Although the precise function of sleep and dream sleep has not been completely clarified, it is clear that sleep is necessary for normal health and clear mental functioning.

Sleep problems are frequent in Parkinson disease, affecting up to 80-90% of PD patients at some time during the course of their disease. Sleep problems may be manifested as nighttime sleep disruption, abnormal

behaviors during sleep or excessive daytime sleepiness (Comella 2003). The negative impact of sleep problems on quality of life and daytime functioning is well described. The effect of sleep problems extends to the caregiver and family. Some patients with sleep problems observe that their motor symptoms may be more severe and their overall functioning more impaired following a poor nights sleep. Sleepiness during the day can affect attention, thinking and memory, and may cause disruption of social relationships. This article will describe some of the more common sleep

problems faced by people with Parkinson disease and emphasize the need to report these to your neurologist.

# Nighttime Sleep Disturbances

Sleep fragmentation is the disruption of sleep during the night. Often PD patients will find that falling asleep is not difficult, but they may awaken frequently and sometimes find it difficult to fall back to sleep. It has many causes. Sleep fragmentation may arise due to recurrent symptoms of PD, with increased difficulty rolling over, recurrence of tremor, and feelings of stiffness, restlessness and discomfort (Factor, McAlarney et al. 1990). When monitored overnight, there is an increase in muscle tone that corresponds to these complaints (Askenasy and Yahr 1985). These recurrent symptoms and increased muscle tone may be improved by the addition of a long acting levodopa preparation at bedtime, or the judicious use of small doses of rapid release regular levodopa at the time of awakening.

Another cause of sleep fragmentation in PD is the occurrence of sleep apnea or hypopnea, a respiratory disturbance during sleep in which normal breathing is impaired either through partial obstruction of the airways (obstructive sleep apnea) or secondary to a reduced drive to breath (central sleep apnea). Sleep apnea is a common disorder in the non-parkinsonian population. It is associated with cardiovascular (heart) problems and stroke. In PD patients complaining of daytime sleepiness referred to a sleep laboratory, sleep apnea has been found in up to 20% (Arnulf 2005). The clues that someone may have sleep apnea includes the occurrence of heavy snoring and pauses in breathing, or choking during the night. These clues, however, are not found in every patient. If suspected, the diagnosis of sleep apnea is made through a sleep study (polysomnography). Sleep apnea, particularly obstructive sleep apnea, is treatable using a variety of methods, including continuous positive airway pressure (CPAP). Treatment may markedly improve the quality of nighttime sleep and daytime alertness.

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Restless Legs Syndrome (RLS) is a common disorder that increases in frequency with increasing age. RLS is a disorder that includes an urge to move the legs usually accompanied or caused by uncomfortable or unpleasant sensations in the legs. The urge to move worsens at rest, is relieved by movement and occurs or worsens in the evening or night (Allen, 2003 #1812). The diagnosis of RLS is made through a careful history. In some patients, it is associated with iron deficiency. It is not clear that PD patients have RLS at a greater frequency than the general population at a similar age.

Another primary sleep disorder that may be more common in PD is periodic limb movements of sleep (PLMS). PLMS is a

> repetitive movement of one or both legs during sleep. In many cases, PLMS is mild and does not interfere with sleep. In some patients, however, the leg movements may be sufficiently pronounced so as to cause a shift to the lighter

stages of sleep, or an awakening. The bed partner may also be awakened by the kicking movements. In many patients with RLS, PLMS is also present. However, PLMS may exist without symptoms of RLS and is diagnosed by a sleep study (polysomnography). The treatment of PLMS is only necessary if symptoms are disruptive. The direct-acting dopamine receptor agonists are the drugs which have been shown to improve symptoms of both RLS and PLMS. There are other medications which may also be effective.

REM sleep behavior disorder (RBD) is a recently described sleep disorder that affects from 25-50% of PD patients. RBD is a disorder in which the loss of muscle control or muscle atonia, which normally occurs during REM or "dream" sleep, does not occur. This allows the patient to act out their dreams. Often the dreams are aggressive in nature. Some patients dream that invaders are getting into their home, or that they are protecting their families from mysterious assailants. Because they do not have the

normal loss of muscle control, they are able to act out the dream, and may kick, punch or choke their bed partners. Other behaviors include vocalizations, arm movements, and escape behaviors. These behaviors are not remembered by the patient, although the dreams may be. Patients with RBD may injure their bed partners or themselves during an episode of RBD. The diagnosis of RBD is suggested by the presence of dream enactment behaviors, and verified using polysomography. RBD is a treatable disorder if diagnosed. Many treatments including clonazepam, melatonin and dopamine agonists have been found to be of benefit, although controlled studies of these agents have not yet been done.

In addition to the disorders described above, there are numerous factors that may adversely affect nighttime sleep that are not specific to PD. These include the need to urinate during the night, pain, depression, anxiety and the effect of medications used for PD or other medical illnesses or substances such as alcohol.

The evaluation of nighttime sleep disorders includes a careful interview with the patient and the bed partner, as described in Table 2. Further evaluation may include a referral to a sleep specialist for evaluation using polysomnography. Polysomnography is an overnight recording of sleep that includes recording of brain activity, respiration, heart rhythms and body movements during sleep. This study may be carried out in the sleep laboratory, or, when appropriate, may be studied using ambulatory devices at home.

# TABLE 1: SLEEP HYGIENE TIPS

- Set bedtime for specific time each night
- Set wake up time for specific time each morning regardless of sleep difficulty during the night
- Follow the "20 minute" rule: When unable to sleep in bed for 20 minutes, get up and do "boring" activity for 20 minutes, then return to bed. If unable to sleep in 20 minutes, repeat the process
- Avoid heavy meals in the evening

- · Avoid caffeine after noon
- Avoid alcohol in the evening
- Write down "worry" issues to avoid ruminating at night
- Exercise early in the day, not in the evening
- Get plenty of light during the day
- Limit napping (20-30 minutes, 1 to 2 times per day). Do not nap in the evening



# **Excessive Daytime Sleepiness**

There are many factors that can contribute to daytime alertness and the sense of sleepiness during the day. In some patients, the failure to get sleep at night may be the predominant factor. Some of these disorders were discussed in the preceding section. In these patients, treatment of the nighttime sleep disturbance may significantly improve daytime alertness.

A second major factor that can cause sleepiness during the day is the effect of medications. There are a variety of medications that are used for treatment of medical problems that may have sleepiness as a side effect. In addition, the medications used to treat Parkinson disease may also cause sleepiness. The sedating side effects of dopaminergic drugs were highlighted by a description of Parkinson disease patients who suddenly fell asleep (sleep attack) while driving and were involved in minor motor vehicle accidents (Frucht, Rogers et al. 1999). These patients were taking a class of drugs called dopamine agonists, which includes

pramipexole (Mirapex®), ropinirole (Requip®) and pergolide (Permax®). In contrast to levodopa, these drugs have activity directly on dopamine receptors and provide a longer duration of dopamine effect, resulting in a more sustained symptomatic effect and according to several studies, a delay in the onset of some of the motor complications associated with levodopa use (Group 2000; PSG 2000; Rascol, Brooks et al. 2000). However, the concerns about sleepiness as a side effect lead to restrictions in driving in some countries outside the United States. Subsequently, it was shown in large studies that both levodopa and the dopamine agonists can cause daytime sleepiness. In many studies, it is the total amount of anti-parkinson treatment that may give rise to daytime sleepiness rather than any particular medication (Hobson, Lang et al. 2002; Razmy, Lang et al. 2004; Stevens, Comella et al. 2004). However, not all patients treated with these agents develop sleepiness as a side effect, suggesting that other factors are involved.

# METHODS TO ASSESS SLEEP

# Interview patient and caregiver for sleep problems

- Evaluate sleep patterns
- Total hours of sleep
- Usual bedtime
- Wake-up time
- Number of awakenings during the night
- Snoring and pauses in breathing
- Abnormal movements during sleep
- Daytime sleepiness
- Napping
- Use of medications
- Use of sleeping pills
- Use of alcohol

# Sleep diaries

24 hour diary of sleep-wake patterns, including nighttime sleep and daytime napping

## Sleep questionnaires

- Parkinson disease sleep scale
- Epworth sleepiness scale
- Other sleep questionnaires

#### **Polysomnography**

- Monitors of sleep in sleep laboratory overnight, or ambulatory at home.
- Assesses stages of sleep and presence of sleep disorders

# Multiple sleep latency test

Daytime assessment of sleepiness in a sleep laboratory with monitoring. 4-5 nap opportunities during a day to assess propensity to fall asleep

## Maintenance of wakefulness test

Daytime assessment of ability to maintain wakefulness during "nap" opportunity with monitoring throughout the day

## **Actigraphy**

Monitoring day-night activity patterns over 24 hour period for up to 2 weeks using a wrist-worn activity monitor

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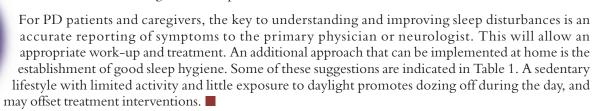
If sleepiness during the day is due to an anti-parkinson medication, it is possible to either adjust the dosage or change the medication to reduce this side effect. Some patients who have persistent daytime sleepiness despite medication adjustments have benefited by the use of mild stimulants, such as caffeine or modafinil (Thorpy and Adler 2005). It is of great importance to recognize daytime sleepiness and to abstain from driving if sleepiness is a problem as there is a significant risk of falling asleep at the wheel that may lead to serious accidents and injury.

In addition to the anti-parkinson medications, drugs administered for medical indications, including some anti-hypertensive drugs, anti-anxiety drugs, and pain medications can cause daytime sleepiness. Consultation with the primary physician and adjustments in these drugs with the elimination overly sedating drugs may be beneficial.

Some studies have suggested that sleepiness may be a part of the Parkinson disease process in some individuals. The evidence in support of this concept comes from several studies showing that some patients are sleepy during the day despite having sufficient hours of nocturnal sleep and regardless of medications. It has been hypothesized that in these patients, areas in the brain that control sleep and wakefulness are affected (Lu, Jhou et al. 2006; Lu, Sherman et al. 2006).

In some patients, there is an association of sleep disorders with hallucinations. In these patients, vivid hallucinations occur against a background of daytime sleepiness and nighttime wakefulness. The daytime hallucinations may correspond to the

intrusion of episodes of REM or dream sleep during wakefulness. The atypical anti-psychotic medications, including quetiapine and clozaril, when given in small doses in the evenings may improve both the hallucinations and the nighttime sleep disturbance.



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The Movement Disorders Center at Rush has been in existence since 1970. The focus is to provide state-of-the-art care for Parkinson disease patients and to conduct research into the causes and treatment of Parkinson disease. There are six movement disorders neurologists on staff and three nurse coordinators. The physicians and staff of the center have three main areas of focus: patient care, education and research. The clinical program includes neuropsychology, social work and psychiatry. There is a close collaboration with the Sleep Disorders Center and the rehabilitation center. As clinical researchers, the Movement Disorders Center team at Rush brings the latest innovations in medicine and surgical interventions to their patients. They also spark innovations by actively researching aspects of Parkinson disease not only through clinical research, but also through their basic science program where scientists are actively researching novel ways to treat, slow progression and prevent Parkinson disease.