



# *On the Alert for Excessive Daytime Sleepiness*

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## Martin's fatigue

Martin, 50, presents with a complaint of "feeling tired all the time."

He describes his tiredness as an overwhelming urge to sleep. He will sometimes fall asleep during passive activities, such as during meetings or as a passenger in a car. He has not fallen asleep during more active pursuits, such as driving.

His Epworth Sleepiness Scale Score is 14/24 which is suggestive of substantial sleepiness.



Daytime sleepiness is a common complaint, with potentially serious consequences. According to the 2001 National Sleep Foundation Poll, 16% of adults report they are so sleepy during the day that it interferes with their daily activities at least a few days per week.<sup>1</sup> Sleepiness negatively impacts memory, mood, concentration, work productivity, and psychosocial functioning. Furthermore, excessive sleepiness contributes to the occurrence of automobile collisions and work-related injuries. More than 50,000 motor vehicle collisions per year in the U.S. are attributed to driving while sleepy,<sup>2,3</sup> and patients with obstructive sleep apnea have triple the risk of motor vehicle crashes compared to controls.<sup>4</sup> It is, therefore, important that the practicing physician have an

approach to evaluate and diagnose the patient presenting with excessive somnolence.

Sleepiness is best described as an increased physiologic drive to sleep. This leads to falling asleep unwillingly. True sleepiness should be differentiated from physical exhaustion or anhedonia, which are not accompanied by the need to sleep. Normal individuals who obtain adequate daily sleep should be able to maintain daytime wakefulness with little difficulty. With mild sleepiness, sleep episodes are present during times of rest or when little attention is required. As severity of sleepiness increases, sleep episodes become more frequent and occur even during activities that require moderate attention. Sleepiness is especially worrisome if the patient falls asleep in active situations, such as during conversations, or while driving or eating. Subjective sleepiness should be quantified using the Epworth Sleepiness Scale. (Table 1).<sup>5</sup> The Scale is generated from the responses to a series of eight questions pertaining to patients' tendency to fall asleep under various conditions. The score ranges from 0 (least sleepy) to 24 (most sleepy). A score of 11 or greater is generally considered abnormal and should prompt further investigation.

There are six major causes of excessive daytime sleepiness (Table 2). Multiple causes may be present in a single patient.

Table 1

### The Epworth Sleepiness Scale

How likely are you to doze off or fall asleep in the following situations, in contrast to just feeling 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 may have affected you. Use the following scale to choose the most appropriate number for each situation.

- 0 = Would never doze off
- 1 = Slight chance of dozing off
- 2 = Moderate chance of dozing off
- 3 = High chance of dozing off

#### Activity score

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

## What are the most common causes?

### Obstructive Sleep Apnea Hypopnea (OSAH)

OSAH is a common under-recognized disease characterized by recurrent collapse of the upper airway during sleep.<sup>6</sup> Characteristic symptoms and signs include loud snoring, nocturnal gasping, witnessed apneas, hypertension, obesity, increased neck circumference (> 17 inches in men, > 16 inches in women), narrow pharyngeal airway, and micrognathia. Other predisposing factors include male sex, increased age, positive family history, menopause, hypothyroidism, and

acromegaly. Overnight polysomnography is considered the gold standard for diagnosing OSAH. Therapy may be initiated in a patient with suggestive symptoms and a positive overnight oximetry.

### Cheyne-Stokes respiration (CSR)

CSR is characterized by a waxing and waning of respiratory drive during the night. This breathing pattern is found in up to 30% of patients with congestive heart failure (CHF), and is an independent risk factor for mortality. Treatment options include maximizing therapy for CHF, nocturnal oxygen, or continuous positive airway pressure.<sup>7</sup>

### Periodic limb movement disorder (PLMD)

PLMD is characterized by involuntary rhythmic, repetitive, muscle contractions of the legs during sleep. PLMD is usually idiopathic, but may be secondary to a medical disorder (e.g., iron-deficiency anemia, neuropathy, pregnancy, renal failure) or medication (e.g., selective serotonin reuptake inhibitors). Some patients with PLMD have restless legs syndrome. PLMD is usually diagnosed with an overnight sleep study, and can be treated with a variety of pharmacologic agents, such as dopaminergic agents, sedatives, opiates, and anticonvulsants.<sup>8,9</sup>

### Circadian misalignment

When patients try to sleep or stay awake at non-optimal circadian phases (i.e., circadian misalignment), sleep quality and alertness are adversely affected. This situation occurs regularly in night-shift workers who commonly complain of poor sleep quality and excessive daytime sleepiness.

### Delayed sleep phase syndrome

The syndrome is characterized by shifting of the circadian rhythm to a later time, resulting in persistent difficulty in falling asleep and waking up

## Sleepiness

Table 2

### Causes of excessive daytime sleepiness

#### *Disorder of sleep fragmentation*

##### Respiratory

- Obstructive sleep apnea hypopnea
- Cheyne-Stokes respiration
- Central sleep apnea associated with narcotics
- Idiopathic central sleep apnea
- Hypoventilation associated with severe lung or neuromuscular disease

##### Periodic limb movement disorder

#### *Medical/psychiatric disorder*

- Depression
- Chronic inflammatory disease
- Malignancy
- Chronic infection
- Addison's disease
- Hypothyroidism
- Anemia
- Hypersomnolence associated with head injury
- Hypersomnolence associated with pituitary surgery

#### *Primary disorder of hypersomnolence*

- Narcolepsy
- Idiopathic central nervous system hypersomnolence

#### *Chronic sleep deprivation*

#### *Circadian misalignment*

- Shiftworking
- Delayed sleep phase syndrome
- Advanced sleep phase syndrome
- Jetlag

#### *Medications/Drugs*

##### Sedatives

- Benzodiazepines
- Zopiclone

##### Antidepressants

- Selective serotonin reuptake inhibitors
- Tricyclic antidepressants

##### Antipsychotics

- Haloperidol
- Loxapine
- Chlorpromazine
- Lithium

##### Opiates

- Morphine
- Codeine
- Oxycodone

##### Anticonvulsants

- Gabapentin
- Valproate sodium
- Carbamazepine
- Barbiturates

##### Dopamine agonists

- Levodopa

##### Antihistamines

- Diphenhydramine

##### Antihypertensives

- Beta blockers
- Clonidine

##### Alcohol

##### Marijuana



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### Frequently Asked Questions

#### 1. How good is overnight oximetry in diagnosing OSAH?

It is about 87% sensitive and 65% specific.

#### 2. Does OSAH cause cardiovascular or cerebrovascular disease?

There is strong evidence that OSAH predisposes to the development of hypertension, and that therapy with CPAP reduces blood pressure. Although data is accumulating, a causative link between OSAH and the development of coronary and cerebrovascular disease has not been definitively established.

#### 3. What are the treatment options for OSAH?

All patients should be encouraged to lose weight, obtain adequate sleep, decrease alcohol intake, and stop smoking. For moderate to severe disease, CPAP is the first-choice treatment. For patients who fail CPAP or who have milder disease, specially fitted dental appliances can be useful.

#### 4. How can compliance with CPAP be improved?

Education on the potential benefits is paramount. Prompt attention to problems with CPAP will also help. Potential issues include changing the mask design to maximize comfort, adding a heated humidifier and/or nasal steroids to reduce nasal congestion, or using a chin strap to reduce mouth leak.

#### 5. What is the role of auto-titrating CPAP in the treatment of OSAH?

Auto-titrating CPAP increases and decreases the pressure in response to snoring, apneas, and/or flow. The various auto-titrating CPAP models vary considerably. There is little evidence that auto CPAP improves compliance. Auto-titrating CPAP may be useful for performing titration studies at home. Future refinements in technology may improve the utility of the devices in the future.

at conventional hours. Sleep onset is usually between 3 a.m. to 6 a.m., and wake time is 11 a.m. to 2 p.m. Genetic and behavioural factors (*e.g.*, excessive light exposure during the night) contribute to the disease. Treatment is aimed at shifting the circadian rhythm to an earlier time by avoiding light exposure at night, increasing light exposure in the morning, and using melatonin.

### *Narcolepsy*

There are four classic symptoms of narcolepsy: excessive daytime sleepiness, cataplexy (sudden temporary episodes of paralysis, especially precipitated by a strong emotion such as laughter), hallucinations at sleep onset or awakening, and brief episodes of paralysis at sleep onset or awakening. All symptoms may not be present in a given patient. The diagnosis is verified by a Multiple Sleep Latency Test (MSLT).

### *Idiopathic central nervous system hypersomnia*

This syndrome is a diagnosis of exclusion. Other causes of excessive daytime sleepiness need to be excluded before this diagnosis can be made.

### *Chronic partial sleep deprivation*

At least eight hours of sleep per night is ideal for optimal daytime alertness. Long-term reduction in sleep duration is likely the most common cause of excessive daytime sleepiness, and may also have adverse long-term health effects.<sup>10</sup>

### *How do you assess your patient?*

The following information is useful in formulating a differential diagnosis:

- Detailed sleep habits: daily sleep schedule during workdays and nonworkdays, daily sleep duration, naps, and shiftworking. Having the patient keep a sleep diary may be helpful (see <http://www.sleepfoundation.org/publications/sleepdiary.cfm> for an example).

### What happened with Martin?

On average, Martin sleeps 7.5-8 hours per night. When he wakes up in the morning, he is always tired and never refreshed. He snores loudly and has been noted to stop breathing at night. Family history is significant for a father with loud snoring. He does not take any medications, and his medical history is negative.

On physical exam, body mass index was 32 kg/m<sup>2</sup>, neck circumference was 18 inches, and blood pressure was 160/94 mmHg. The oropharynx was narrow. The rest of the exam was noncontributory.

Given Martin's body habitus and symptoms, OSAH was considered. He had a sleep study performed demonstrating severe OSAH with an apnea hypopnea index of 50 events per hour. He was started on continuous positive airway pressure and did well, with resolution of his daytime sleepiness.

- Any abnormal behaviours during or around sleep (*e.g.*, snoring, apneas, leg movements, paralysis, hallucinations); speaking with the patient's bedpartner is often useful in obtaining corroborating information.
- Symptoms of cataplexy.
- Detailed past medical/psychiatric, and drug history, including prescription/nonprescription medications, alcohol, and substance abuse.
- Family history of narcolepsy, OSAH, or PLMD.

#### The physical exam should include:

- Measurements of blood pressure, neck circumference, body mass index,
- Upper airway examination looking for narrowing of the pharyngeal walls, large tonsils, gross structural abnormalities, and micrognathia, and
- Signs of CHF, acromegaly, hypothyroidism, and peripheral neuropathy.

An overnight polysomnogram is usually very helpful in the evaluation. This test consists of an overnight stay in the sleep laboratory with

### Take-home message



- The complaint of daytime sleepiness should not be taken lightly.
- The degree of sleepiness should be quantified using the Epworth Sleepiness Scale.
- A thorough history and physical exam are crucial in searching for potential contributing factors.
- The presence of OSAH, CSR, or PLMD can be evaluated using overnight polysomnography. An MSLT can be helpful to evaluate for the presence of narcolepsy.

detailed recording of electroencephalogram activity, electro-oculographic activity, leg and chin electromyogram activity, electrocardiogram, oronasal airflow, chest and abdominal movements, and oxygen saturation. The test can determine if OSAH, CSR, or PLMD is present. In appropriate clinical situations, an MSLT to quantify the degree of excessive sleepiness and to evaluate for narcolepsy may be helpful. If a specific medical disorder is suspected, laboratory work such as a complete blood count or thyroid-stimulating hormone may be helpful. CME

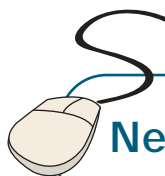
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## Net Readings

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