SOUND SLEEP HEALTH

# The Impact of Sleep on Weight Loss/Gain

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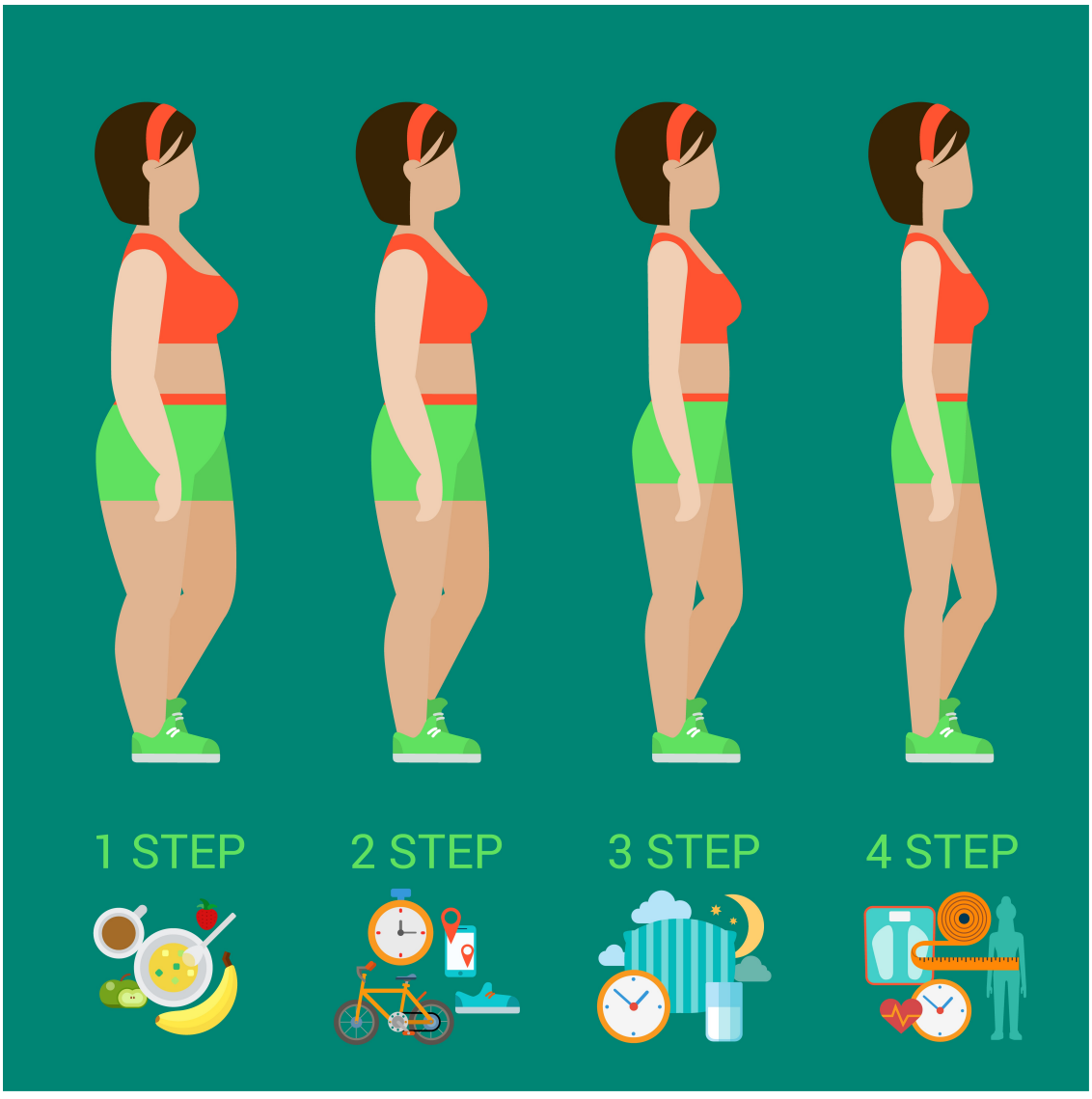
# The Role of Sleep and Weight Loss




Following a healthy diet and getting ample exercise have long been the fundamental building blocks for achieving weight loss. However, you could sabotage your own best efforts by not factoring in a third and equally important practice: *getting enough quality sleep.*

It seems counterintuitive to push sleep as part of a successful weight-loss program, but the fact is that sleep is crucial to managing appetite as well as metabolism.

# What happens during sleep

To understand how sleep and weight loss (and gain) go hand in hand, let's review what happens during sleep which can make an impact on our ability to manage our weight.

## Appetite

During sleep, the brain is hardly taking a break. In certain stages of sleep, it's quite busy with tasks such as sending out human growth hormone (HGH) to the cells to repair damage, consolidating new memories, resetting rhythms, cleaning out waste products in the brain, and balancing the body's chemistry. Ideally, a good night's sleep will take care of all of these tasks and more, allowing you to waken refreshed and ready to go the following morning.

The last task—balancing body chem


Chemical control of appetite

istry—relates specifically to certain kinds of hormones which regulate many body processes.

Two of these hormones, *leptin* and *ghrelin*, work in tandem to help you regulate your appetite. If you get enough sleep, they make a fine team.

*Ghrelin* lets you know when you are hungry (or in need of fuel). Meanwhile, *leptin* monitors your sense of fullness (or *satiation*) after meals so you know when you've had enough.

After a bad night's sleep, you're groggy during the day. Your brain does not correct for imbalances in ghrelin or leptin if it is sleep deprived. Instead, it releases more ghrelin and less leptin, creating an imbalance that can be disastrous for anyone trying to lose weight.

Ghrelin, in too much supply, mistakenly senses fatigue as a signal for you to consume more energy. The best kinds of quick energy come in high-calorie packages: high-fat foods promise lots of calories, and high-carbohydrate foods pack a quick energy punch. Your cravings for these kinds of foods happen as a result of sleep loss.

Meanwhile, leptin is in short supply. Without enough leptin to oversee calorie consumption, there's no way to know for sure when you are actually full. People who are sleep deprived frequently refer to feeling hungry all day long, even after meals. Without enough leptin, brain chemistry can often overpower our sense of willpower over snacks and unnecessary meals.

## Sleep and metabolism

A third hormone, *insulin*, comes from the pancreas. Insulin's job is to convert, or *metabolize*, incoming calories into energy that the body can use efficiently as fuel at the cellular level. It is only released into the bloodstream when there are calories that need to be processed.

Poor sleep makes it hard for insulin to do this important work, which is troubling if you are victim to cravings and an unchecked appetite.

When incoming calories aren't properly metabolized, blood sugar ( *glucose*) remains in the blood when it should be absorbed by the cells to be used as fuel.

You've heard the term *insulin resistance*, no doubt. It refers to the body's inability to recognize insulin in the system. This important regulating presence in the bloodstream, if overlooked, creates the conditions which lead to the body becoming up to 30 percent less insulin sensitive.

The end result? Slowed metabolism, which leads to weight gain, as well as the development of type 2 diabetes or prediabetes.

Remember our friends, ghrelin and leptin? They have a relationship to insulin imbalances following sleep deprivation as well.

Ghrelin, thanks to poor sleep, is on a binge, urging the body to satisfy what ends up being an endless appetite, which is completely at odds with insulin's inability to metabolize these foods.

Leptin, the hormone that signals for us to stop eating, can also develop resistance, like insulin. Someone with leptin resistance may have enough leptin in their bloodstream, but the body and brain are ignoring its messages to stop eating.

And all of this happens simply because *you aren't getting enough sleep.*

# Sleep deprivation as a roadblock to weight loss

The thing about sleep deprivation: while it leads to these interior chemistry imbalances that drive behaviors and habits we succumb to, it also saps us of the energy necessary to intellectually discipline ourselves to eat sensibly or make better choices.

Sleep deprivation also causes dips in mood, which leave us feeling shabby, even blue, and these moods are powerful informants of behavior. Depression and anxiety also commonly lead to emotional eating, choosing "comfort foods," and other behaviors that perpetuate weight gain instead of weight loss, such as forgoing the gym for a day on the couch watching TV.

## Causes of sleep deprivation

There are lots of reasons why we are sleep deprived. Most commonly, we find ourselves short on sleep because:

- *We have an unidentified sleep disorder such as obstructive sleep apnea or insomnia*
- *We have other medical or mental health conditions which interrupt quality sleep*
- *We take medications which may interfere with or fragment sleep*

- *We simply don't allow ourselves adequate time to sleep*

- *We don't give ourselves quality sleeping conditions, or we practice bad habits which interfere with sleep*

## Adding sleep to your weight loss program

Diet and exercise are certainly major keys to improving weight loss goals and managing a healthy weight.

Watching what we eat is critical because thoughtful calorie intake is at the heart of weight management. Exercise helps jumpstart our metabolism and can prevent insulin resistance as well as improve muscle tone, bone strength, mood, and body processes (including sleep!).

Without a good night's sleep, these valiant efforts could be thwarted if brain and body chemistry shift out of balance. It's better to think of your weight loss program as a three-pronged approach, then: diet, exercise, and *sleep*, if you are to achieve your weight loss goals over the long term.

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At Sound Sleep Health, we work in concert with Sound Medical Weight Loss to help those struggling with the sleep-weight connection. If you are challenged to lose those unwanted pounds, you may wish to consider working with a knowledgeable, trained physician who can help you lose weight and reclaim your health in a safe, healthy way.

# When sleep loss leads to weight gain

We lose sleep for all kinds of reasons. We also gain weight for all kinds of reasons.

However, when it comes to either concern, there's a well-established association between insufficient sleep and obesity.

While there are a multitude of factors that determine whether these two are linked for any particular individual, the odds still suggest that losing sleep is one of the main reasons why we are overweight.

## What we're talking about when we talk about sleep loss

***Sleep loss*** generally refers to not getting enough sleep. This could be for any reason; life is full of reasons for missing sleep, and they're not always bad ones. However, the loss of sleep becomes an issue when it happens more than every once in a while. Make it a habit, and you'll experience, first hand, its adverse side effects.

## Other terms to consider:

***Insufficient*** or ***inadequate sleep*** describes the incidence of not getting the recommended amount of sleep necessary in order to have normal mental and physical function and performance. What are the recommended amounts of sleep we need?

Occasionally, people will have insufficient sleep because they have an early plane to catch (for instance) or their sleep was interrupted by normal means (such as a sick child in need of care or a nocturnal pet looking for attention).

***Restricted sleep*** is the voluntary act of sleeping less than is recommended (usually because of a social or work-related situation). Generally, most people restrict their sleep from time to time, but normally recover. Also, sometimes sleep restriction is used to reset one's circadian rhythms, such as in the case of recovering from jet lag across several time zones.

***Sleep deprivation*** describes the altered state of your body's and brain's functionality after losing sleep over a period of time. To be sleep deprived means you are not getting sufficient or adequate sleep on a regular basis.

The result: changes in hormone levels, daytime symptoms, reduced physical and mental performance, mood dysregulation, and the potential for developing other chronic health conditions like hypertension, obesity, or diabetes, and the likelihood for traffic accidents, mistakes made at work, and relationship problems increases.

***Chronic sleep deprivation*** culminates in what is known as a ***sleep debt***. For many, sleep debt can be difficult to reverse if the continued and chronic loss of sleep has been going on for months or years.

Sleep debt most certainly guarantees that sleep loss will lead to developing major life-threatening conditions like stroke, depression, heart disease, metabolic syndromes, and other diseases and disorders, as well as amplified risk for accidents, injuries, and mistakes in judgment that can have dangerous consequences.


## What we're talking about when we talk about weight gain

The Centers for Disease Control and Prevention (CDC) correlates many, if not most, of our most chronic adverse health outcomes with direct measures of body fat.

In light of this, here are some terms to consider.

***Body Mass Index (BMI)*** describes the screening tool used to identify people who are overweight or obese.

Being ***overweight*** refers to having a BMI score of between 25 and 30.

***Obesity*** refers to having a BMI score higher than 30.

These definitions are widely used and provided by the CDC, which further categorizes obesity as:

- Class 1: When BMI measures between 30 and 35
- Class 2: When BMI measures between 35 and 40
- Class 3: When BMI measures higher than 40 (also known as “extreme,” “morbid,” or “severe” obesity)

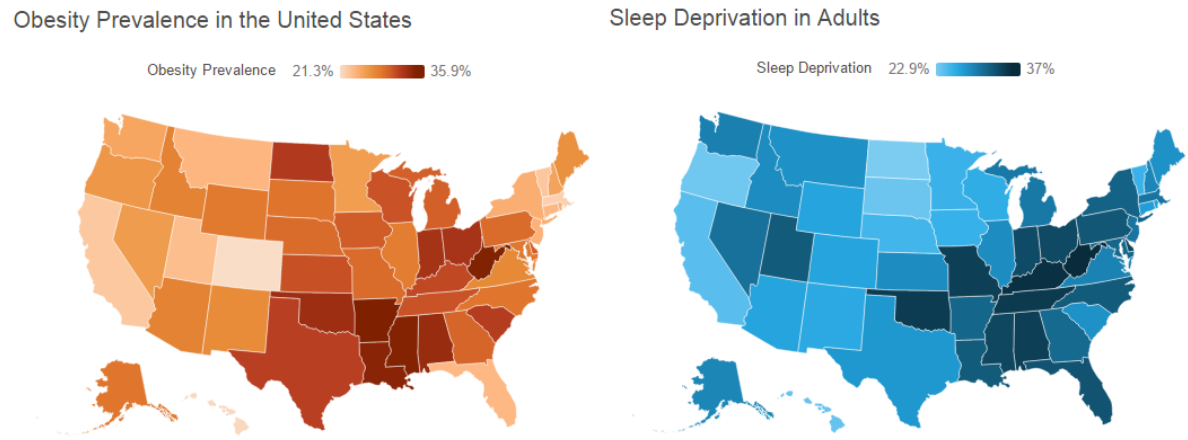
Explaining why we gain weight may seem like a fairly simple exercise in cause and effect. You gain weight usually because you consume more calories than you burn.

But is it really that simple? Weight management depends upon other factors, such

as rate of metabolism, activity levels, and hormone balances, all of which can be influenced by sleep loss.

## Let's talk about lost sleep and gained weight

The rise in obesity across the world has been paralleled by a trend in sleep loss among both adults and children. The majority of research into links between obesity and sleep suggests chronic partial sleep loss increases the risk for becoming obese.




This visual map from HealthGrove/ *Fusion* (right) charts both trends and mirrors these findings.

Among the most prominent studies is one known as the Wisconsin Nurses' Health Cohort Study, which followed more than 60,000 women for more than 15 years; obesity rates among these volunteers were positively correlated with sleep loss (in this case, among subjects who slept 5 hours or less nightly). Women with higher sleep debt were 30 percent more likely to gain 30 pounds over the period of the study than those subjects who slept at least 7 hours nightly.

For children, more recent studies suggest a similar trend. According to data published in *Pediatrics* in 2014, chronic sleep loss between birth and school age results in higher risks for obesity by mid-childhood. Researchers in that study agree: Improving childhood sleep "could be an achievable intervention" for reducing the incidence of childhood obesity.

What happens if these children do not overcome weight gain? They become obese adults and experience a lifetime of related problems.

## Why should we worry about sleep if it's BMI we're most concerned about?

Sleeping is not the only circadian process that our brains and bodies experience. Sleeping and wakefulness are primarily regulated by our central circadian system, but we have "body clocks" in every system and cell in our bodies.

Eating holds a significant amount of influence over those circadian rhythms regulated "peripherally" by the digestive system. Problems with overeating, or eating "off schedule," or metabolism profoundly impact our ability maintain a healthy weight.

## Sleep loss and slowed metabolism

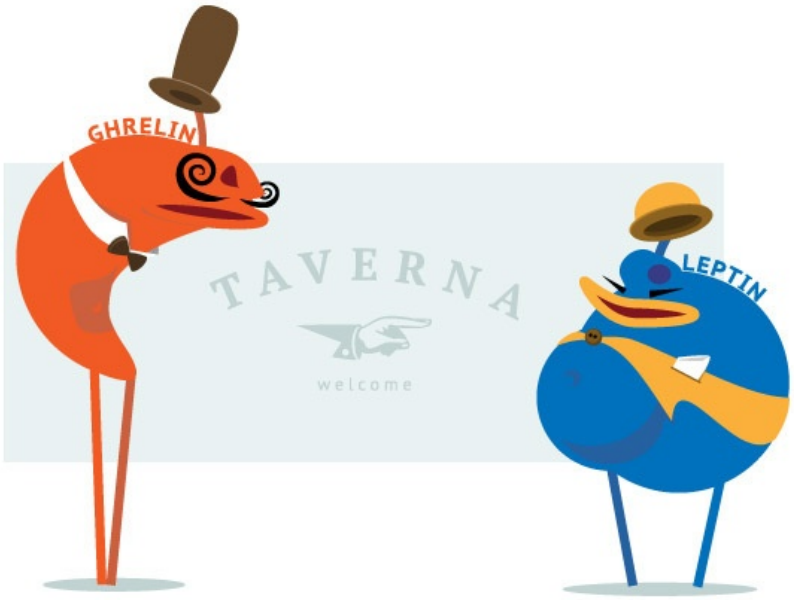
Research has shown a relationship between sleep loss and changes in cortisol levels, which can lead to slower metabolic rate (the body doesn't burn fuel as efficiently as it might); insulin resistance may also occur. Also, thyroid stimulating hormone (TSH) levels are reduced as a result of sleep deprivation. In both situations, weight gain can result.

## Sleep loss and higher incidence of overeating

Clinical studies demonstrate a link between sleep loss and reductions in the hormone *leptin*. This substance regulates satiation (our sense of feeling full). Without appropriate levels of leptin in the bloodstream, overeating can become a problem which can logically lead to eventual weight gain.

## Sleep loss and increase in hunger drive

The hormone *ghrelin* regulates our hunger drive. After regular sleep loss occurs, higher amounts of ghrelin in the bloodstream amplifies our desire to eat more, and we can begin to crave unhealthy foods that are higher in fat, as well. This



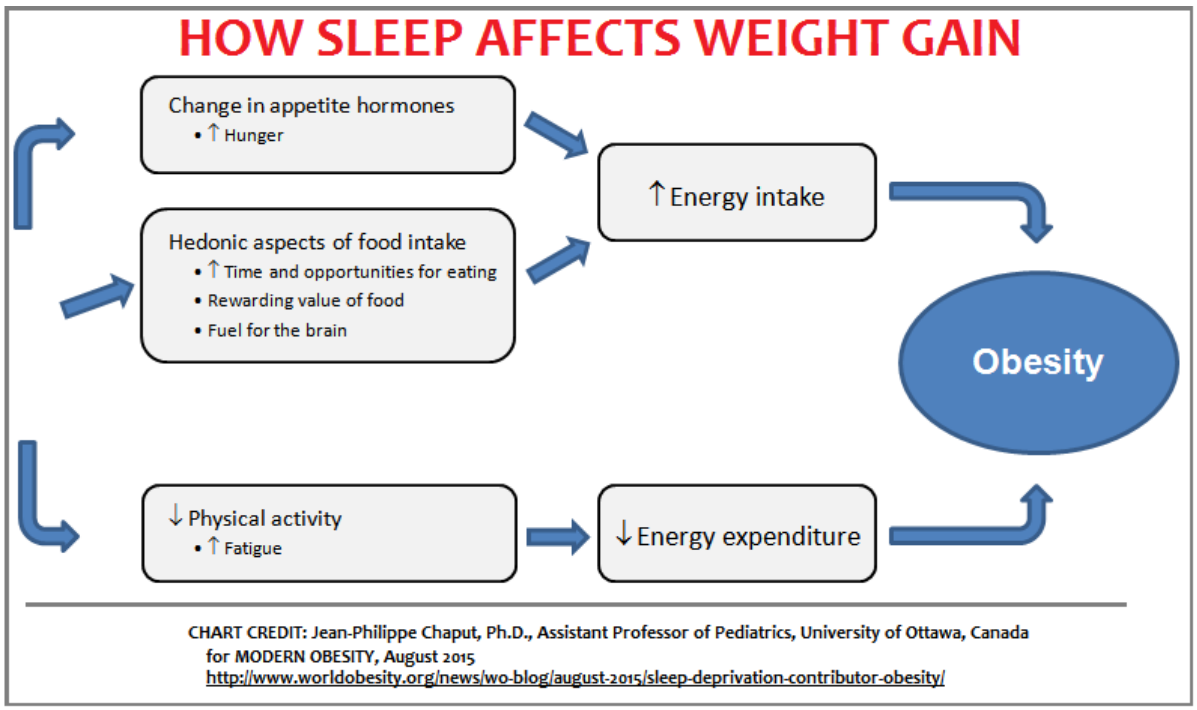

Chemical control of appetite

becomes yet another reliable predictor of obesity.

A study by King's College in London published just last month indicates that sleep-deprived people tend to consume 385 calories more a day than their well-slept counterparts due to dysregulation of both leptin and ghrelin as the result of sleep loss.

## Sleep loss makes active living harder to achieve

Daytime fatigue and reduced physical and mental performance are two outcomes of sleep loss which can make it more difficult to exercise, or to even choose to exercise, especially if the other alternative is to take a nap. Prolonged periods of sedentary living becoming a self-fulfilling prophecy, then: less activity means fewer calories are burned, and that leads to weight gain.




## Some sleep disorders are more prevalent among the obese, further increasing the odds for sleep loss

Untreated sleep disorders are frequently associated with disturbed sleep and a higher incidence of weight gain.

### Sleep apnea

Around 18 million Americans suffer from sleep apnea, which is often associated with people who are overweight. While not all people who suffer from sleep apnea are obese, many people who are obese find themselves more likely to develop sleep apnea.

Sleep specialists Margaret Moline, PhD, and Lauren Broch, PhD, of New York Weill Cornell Medical Center, explain that "As the person gains weight, especially in the trunk and neck area, the risk of sleep-disordered breathing increases due to compromised respiratory function."

This leads to compromises in sleep duration and quality, and when left untreated, sleep deprivation.

## Insomnia

People who are obese have been shown to be more significantly likely to report insomnia or difficulty with sleep, according to a *Nature of Science and Sleep* report in 2013. These subjects were more likely to develop chronic insomnia, to lose more sleep due to complaints of chronic emotional stress, and to be more predisposed to overeating.

Also, eating as an emotional behavior may come into play here, with some insomniacs using food as a comfort object, especially during the night when they are awake but should be asleep. These midnight snacking behaviors can also contribute to weight gain.

The conclusion of a study focused on obesity, sleep deprivation, and diabetes, published in *Sleep Medicine* in 2008, makes it clear:

> ***"Adequate sleep duration and quality are important for the normal functioning of daily metabolic and hormonal processes and appetite regulation. It is clear that chronic sleep deprivation has deleterious effects on carbohydrate metabolism and is associated with an***

***increased risk of diabetes....***
***"With the marked changes in sleep patterns that seem to have occurred in westernized countries over the last 50 years and an apparent reduction in average hours of sleep way beyond that predicted by aging of the population alone, it is probable that an increasing proportion of people suffer from chronic sleep deprivation. "This has important implications for individual physical and psychological well being and serious consequences for society as a whole. Avoiding the build up of a chronic sleep debt through awareness, education and effective management of sleep disorders may be important to limit the rise in cardiometabolic dysfunction, diabetes and obesity that has occurred over recent years."***

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# Sleep Apnea and Weight Gain: Reasons and Answers

You may have noticed that we're big fans of healthy weight management at Sound Sleep Health, and that's no coincidence: we know first-hand how untreated sleep apnea can lead to weight gain and how being overweight can contribute to sleep apnea.

Research shows that up to 80 percent of sleep apnea sufferers are obese. But what about the 20 percent who aren't obese? They also have sleep apnea. So which comes first… Obesity or sleep apnea?

## How weight gain can cause sleep apnea

A person of healthy weight can gain pounds over a short period of time for any number of reasons: pregnancy, medications, sudden change in activity level caused by an injury, a radical shift to a less healthy diet. Some body types include extra

weight around the neck which can be affected by weight gain.

As a person adds weight, they might find they don't sleep as well as they used to. They may get up several times a night to use the bathroom, or they might experience insomnia. Their sleeping partners may complain that they snore, though they didn't before. They may wake up with a sore throat or a headache. A trip to the doctor might reveal a spike in blood pressure.

Chances are good they have developed a case of sleep apnea.

## How sleep apnea works

Sleep apnea (or, specifically, obstructive sleep apnea, or OSA) refers to a condition in which the upper airway is partially or completed obstructed while you sleep.

The tissues in the area of the mouth and throat—the tongue, tonsils, uvula, even the fat pads that line the neck—are to blame for these obstructions, either because they are overlarge or swollen. Fatty areas also retain fluids in the body.

Any or all of these tissues can block the airway, which is already relaxed because you are asleep. Pauses in breathing that last at least ten seconds are considered apneas.

Apneas generally result in arousals so that your body can consciously breathe. Someone with sleep apnea wakes up dozens of times over the course of the night. What's worse, patients with untreated OSA face a vicious cycle of events that perpetuate problems with weight management.

- Their sleep apnea leads to sleep deprivation.
- Sleep deprivation leads to daytime fatigue and sleepiness as well as unhealthy food cravings.
- Daytime fatigue and sleepiness leads to low energy, sedentary living, and less exercise.
- Less exercise slows metabolism, making weight loss difficult.

It makes sense, then, that weight gain can lead to developing sleep apnea. However, the reverse cause-and-effect also occurs: Sleep apnea, it turns out, is one of the most dangerous side effects of obesity, if left untreated.

## How untreated sleep apnea can lead to obesity

Sleep apnea and obesity together share common health risks that should not be

ignored. Both contribute to hypertension, heart disease, diabetes, stroke, and other chronic health conditions. And sleep apnea leads to sleep deprivation, which may be the way it connects the dots with so many other chronic health problems.

Sleep apnea can lead to obesity because of sleep deprivation. Chronic poor, insufficient sleep leads to chemistry imbalances that make it difficult for the body to maintain a healthy metabolism. Even 30 minutes of lost sleep every night can compromise your metabolism, which is critical to balancing key hormones related to weight management: insulin to balance blood sugar, and two appetite regulators, leptin and ghrelin.

## Insulin

When we don't have quality sleep, our ability to use insulin to manage blood sugar is affected. Also, when we are sleep deprived, our compromised insulin levels lead to a domino effect in which our bodies make less of the hunger-regulating hormone, leptin.

## Leptin

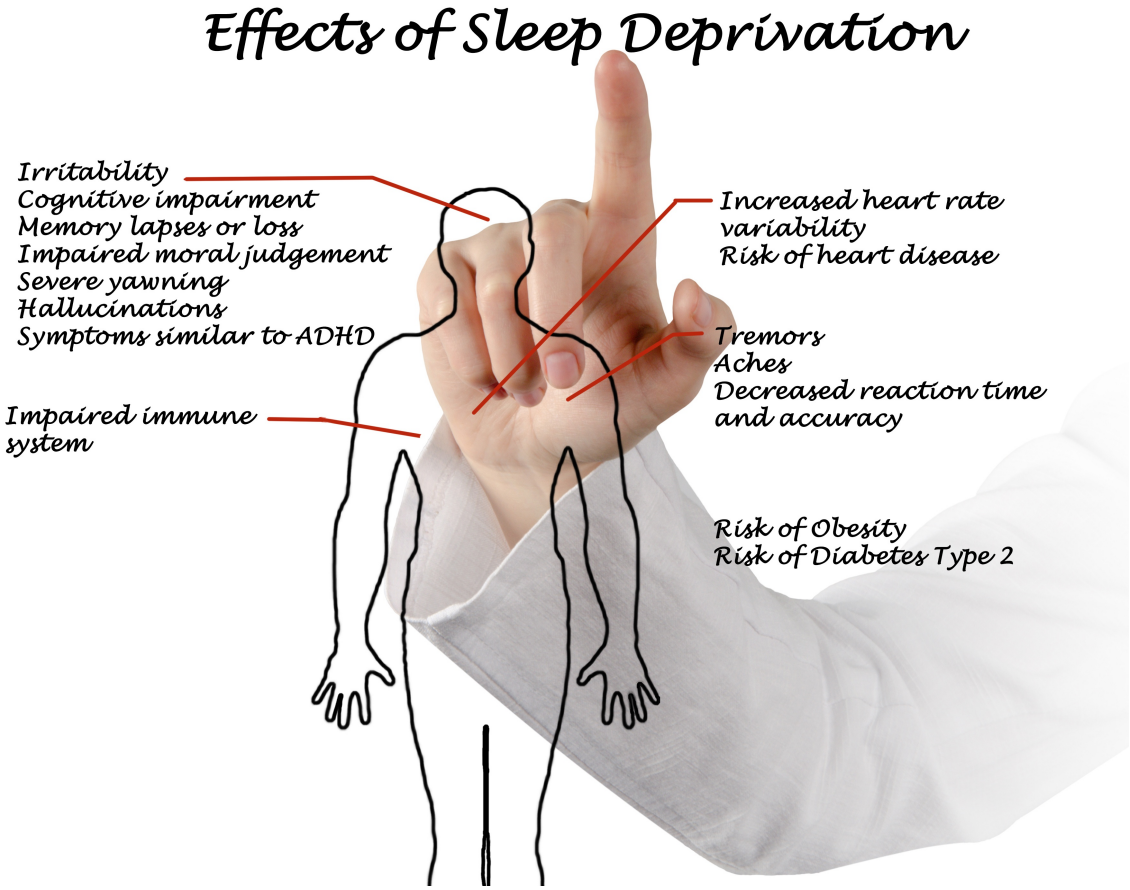
Leptin is the hormone released from our brain that tells us we are full. With fewer leptin signals, we tend to overeat. What's worse, its cousin, ghrelin, begins to be produced in higher than normal amounts.

## Ghrelin

Ghrelin is the hormone released from our brain that tells us it's time to eat. With added ghrelin signals, we are driven to eat more because our hunger drive is actually in overdrive.

## The apnea-deprivation connection

Rather than burn these calories, the sleep deprived body is stressed and decided, instead, to store them as fat. And then the waistline expands, leading to worsened sleep apnea followed by more sleep deprivation followed by more cravings and lower metabolism…




Studies show a strong correlation between sleep apnea and weight gain based on the reality that untreated sleep apnea causes sleep deprivation.

When this happens, appetites run high, energy runs low, and high-calorie foods loaded with fat and sugar promise a burst of energy to endure low periods throughout the day.

### The REM factor

Rapid eye movement (REM) sleep is the stage of sleep when we can enjoy the rapid burning of calories. Unfortunately, people with untreated sleep apnea rarely get to enjoy good REM sleep, so this becomes yet another lost opportunity to manage good health and weight.

## Will sleep apnea disappear if I lose weight?

Weight loss can alleviate the symptoms of sleep apnea if its causes are due to obesity. In fact, obesity itself is the most treatable cause of sleep apnea, and weight loss not only improves this condition, but many others. Weight loss reverses the metabolic cycle for those who have a long-term, comprehensive plan.

A sleep apnea patient who loses as little at 5 percent of their body weight can expect to find some relief. Even greater weight loss may improve it to the point it disappears.

In one study, almost two thirds of patients showed improvements to their sleep apnea symptoms after following a calorie-restricted diet, so the odds are good that your effort to lose weight will result in healthy rewards like better breathing at night.

If weight loss is less than heroic from the start, don't give up: reduced weight, even by just a few pounds, means you might have more comfort using CPAP, with lower pressures that could make it easier to use more regularly. Regular use of CPAP can help restore the focus and energy you need during the day to keep working to lose those pounds.

Here's one e

asy way to informally track your progress in a weight-loss effort: measure your neckline. If men can reduce their measurement to less than 17 inches, that's a good thing. For women, 16 inches is the plateau to break.

Finally, it bears mentioning: remember that 20 percent of people who have sleep apnea but who aren't obese? Some people may still have sleep apnea despite weight loss because they have anatomical problems that directly cause their condition, such as a deviated nasal septum or a severe receded chin.

## Will I lose weight if I treat my sleep apnea?

Maybe, but CPAP is not a weight-loss therapy in and of itself. It may take some time to achieve weight loss following a sleep apnea diagnosis. Focusing on getting better sleep first by way of regular CPAP use will help you find the willpower, daytime energy, and focus necessary to achieve your weight loss goals.

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help those struggling with the sleep-weight connection. If you are challenged to lose those unwanted pounds, you may wish to consider working with a knowledgeable, trained physician who can help you lose weight and reclaim your health in a safe, healthy way.

# When you come to the intersection of sleep apnea and obesity

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any people associate sleep apnea with being overweight, and to a certain extent, it's true.

Obstructive sleep apnea (OSA) can be caused by the bodily conditions that obesity can bring (although being overweight is not the only cause).

Meanwhile, perfectly thin people can also suffer from sleep apnea as well. It might be because they have a neurological condition that leads to central sleep apnea.

Or, they might have problems with the structure of the upper airway (such as a deviated septum) which could make it more likely for them to develop a sleep breathing disorder.

In any event, lost sleep by whatever cause can also lead to unwanted weight gain. Meanwhile, American is getting heavier with each passing year.

## Understanding obesity


Being overweight or obese is one of the the US's biggest public health concerns.

## Obesity in America: The statistics

From the Centers for Disease Control and Prevention:

- *More than one-third of U.S. adults are obese*
- *In 2015, studies showed that the medical costs for people who are obese were more than $1,400 higher than those for people of normal weight*

- *The prevalence of obesity in the state of Washington as of 2015: between 25 and 30 percent*

- *The Midwest has the highest prevalence of obesity, narrowly edging out the South, while the West has the lowest prevalence*

- *The most recent research available shows that 17 percent of children ages 2 to 19 are obese; this is problematic, as other research also shows an increased incidence of sleep apnea in children*

## Obesity, by definition

What does it mean to be obese? The Centers for Disease Control and Prevention offer these definitions:

- *Generally speaking, "Weight that is higher than what is considered as a healthy weight for a given height is described as overweight or obese."*

- *Weight is correlated to health risks; this had led to the adoption of the Body Mass Index to identify scales of weight.*

    - *A BMI of less than 18.5 = underweight*

    - *A BMI of 18.5 to less than 25 = normal weight*

    - *A BMI of 25 to less than 30 = overweight*

- *A BMI of 30 or higher = obese*
    - *A BMI of 30 to less than 35 = Class 1 obesity*
    - *A BMI of 35 to less than 40 = Class 2 obesity*
    - *A BMI of 40 or higher = Class 3 obesity (severe, extreme, morbid)*


## What is BMI?

Body Mass Index (BMI) is a formula that calculates an estimate of body fat based

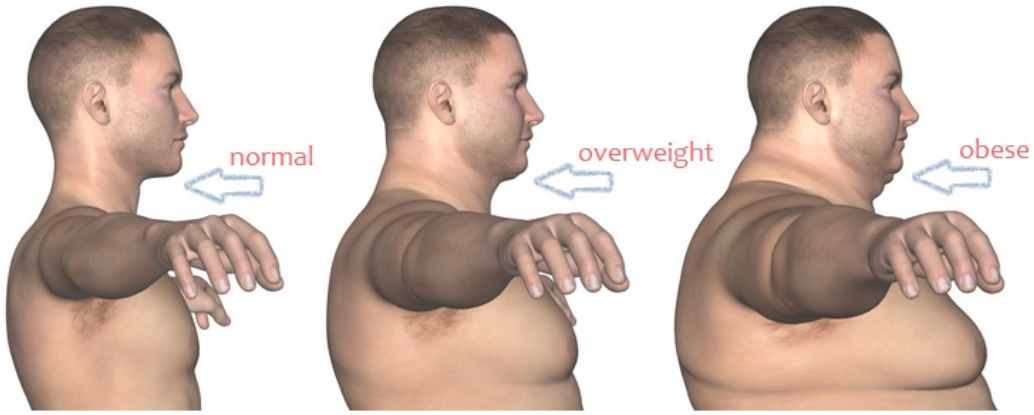
on a ratio of body weight to height. It's been found to be a reliable predictor of risk factors for diseases related to metabolism.

The higher the BMI score, the higher the risk for chronic illnesses that include, among others, heart disease, hypertension, type 2 diabetes, and sleep apnea. To calculate BMI, visit the BMI calculator tool offered by the National Heart, Lung, and Blood Institute.

## The relationship between obesity and sleep apnea

*Bidirectional* may be the best way to describe the relationship between obesity and sleep apnea. Obesity contributes to the development of sleep apnea, and vice versa.

### How obesity contributes to sleep apnea




The Mayo Clinic reports that people who are obese are 4 times more likely to develop sleep apnea.

When we gain weight (especially in our midsection and neck areas), this added fatty tissue joins with gravity to compromise the body's ability to breathe adequately and with ease during sleep.

Heaviness around the girth makes it harder for the diaphragm to do the work of breathing. A large neck (17 inches or more for men, and 16 inches or more for women) has been shown to lead to partially or completed blocked airways during sleep. This is due to excessive tissue here, as well as less overall tone in the muscles. Also, fat deposits hold more fluid than lean muscle, so water retention may contribute to the problem.


## How sleep apnea contributes to obesity

To make matters worse, sleep apnea results in daytime sleepiness, which can sap any motivation a person has to lose weight. In addition, sleep deprivation has been shown to lead to eating behaviors which are driven by the imbalance of chemistry in the brain following periods of lost sleep.

This explains why tired people crave snack foods: the brain's chemical imbalance of leptin and ghrelin fuels a physiological need for carbohydrates to jumpstart one's energy levels.

You can see how it becomes a vicious cycle for so many Americans. Not enough sleep = overeating, but the results of overeating also compromise sleep.

An article in *Hypertension* in 2003 goes as far as to suggest that sleep apnea should be highly suspected in those who are obese, who also have the following:

- *resistant hypertension*
- *absence of a nightly reduction in blood pressure*
- *unexplained weight gain or difficulty losing weight*
- *classic symptoms of sleep apnea, such as witnessed pauses in breathing during sleep, snoring, daytime sleepiness and poor overall sleep quality*

## "If I could just lose 10 pounds..."


... it would be a great start!

Losing weight while simultaneously treating sleep apnea can reduce daytime sleepiness and return energy and motivation to those who need to exercise and practice better vigilance with their diets.

Even the smallest loss of weight can show significant clinical improvement in the

severity of one's sleep apnea. Keep in mind, however, that one's BMI is not the only risk factor for sleep apnea. There are many thin people who, due to other physiological reasons, also have sleep apnea.

At Sound Sleep Health, we work in concert with Sound Medical Weight Loss to help those struggling with the sleep-weight connection.

If you are challenged to lose those unwanted pounds, you may wish to consider working with a knowledgeable, trained physician who can help you lose weight and reclaim your health in a safe, healthy way.

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National Sleep Foundation

**Image credit:** "Vending Machine at a Hospital in Maryland, USA" by Lissandra Melo, courtesy Shutterstock.

# Shift Work, Hormones, and Hunger: A Vicious Cycle


If you're among the 20% of Americans who work shifts other than the typical 9 to 5, you may be aware that your unconventional schedule comes with some challenges. Shift workers often have difficulty getting high quality sleep. Because of this, during your waking hours you may face challenges like excessive sleepiness, brain fog, concentration problems, and workplace mistakes or accidents.

But did you know that working night shifts, third shift ("graveyard shift"), early morning shifts, or rotating shifts can also affect your hormone and hunger levels, causing you to gain weight?

## Why Is Shift Work So Hard on the Body?

Before discussing the hormones and weight gain, it's important to understand how shift work affects your body's ability to sleep.

The body's natural *sleep/wake homeostasis* (tendency toward equilibrium) tells you when your biological need to sleep has accumulated to the point where sleep must happen soon to offset how long you've been awake. Your *circadian rhythm* (body clock) modulates that powerful sleep drive by regulating periods of sleepiness and alertness throughout the day.

When your sleep schedule is rearranged, your circadian rhythm can go awry, similar to how you'd experience jet lag when flying across time zones. Without a properly working body clock, you might want to fall asleep as soon as the sun goes down (an urge you fight off with caffeine). You may also find yourself powerfully alert when you know you need to be catching up on rest (which may lead you to take supplements or sleep aids).

How long you sleep, and the patterns and quality of your sleep, can be negatively affected by the changes to your sleep/wake schedule. This can lead to side effects like drowsiness, hunger fluctuations, and in the long term, health issues that are linked directly to the quality and quantity of your sleep. (For example, cardiovascular issues, memory impairment, or even brain damage.)

Of course, not every shift worker will have these problems. Some who work alternate shifts adapt better than others. For example, if you're a night owl by nature and you work a late night shift, you may not notice a dramatic difference in your sleep or eating behaviors. Conversely, if you're a morning lark (early riser) who reports to work at 6:00 A.M., you may not have any issues at all.

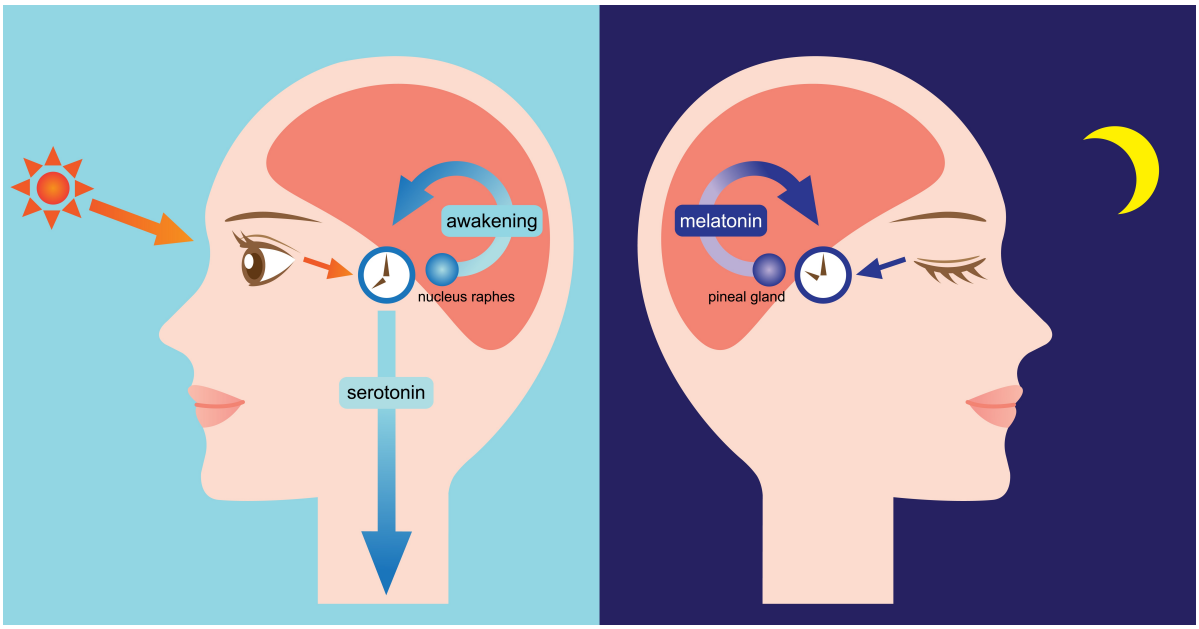
However, when looking at the opposite of these scenarios you're likely to see a problem. Night owls accustomed to a bedtime of 2:00 or 3:00 A.M. will not find early morning shifts an easy adjustment. Early risers who naturally awaken at 6:00 A.M. may find staying awake for a graveyard shift to be grueling.

## Shift Work, Your Body Clock, and Your Sleep Drive

Changing your wake time, sleep time, nap time, and meal times can throw your body into a state of confusion. Suddenly your needs to sleep and eat come into direct conflict with your body's natural urges to synchronize activities with the sun. These urges are difficult to contradict because they're part of the human body's internal biological clock, which dictates the timing of your sleepiness, wakefulness, and yes, hunger.

Circadian rhythm is controlled by a group of cells in the brain's hypothalamus.

These cells are also responsible for sending signals to the brain regarding hormone levels, body temperature, and other functions that affect sleep.




The direct line between the eye and the body clock means you're wired to respond to the movements of the
sun; light means wake up, dark means go to sleep. Sleep hormones are tied to this cycle and are released by the brain in response to daylight. Darkness signals the brain to release melatonin. Melatonin triggers drowsiness, ushering you into sleep. When the sun rises in the morning, the brain suppresses melatonin production, allowing you to wake up and feel alert again.

Thus, most people's body clock schedules look like this:

- Wake in the morning with the daylight, hungry.
- Feel energetic throughout the morning (assuming you've slept enough.)
- Get hungry mid-day.
- Feel sleepy between 1:00 and 3:00 P.M.
- Get hungry and eat in the evening.
- Feel sleepy again after the sun goes down, with the most powerful sleep drive occurring between 2:00 and 4:00 A.M. (by which point you'd be in a deep sleep, having gone to bed sometime between sundown and midnight).

This schedule can vary slightly depending on whether you are a morning person or a night owl. However, some version of this is every human's default setting.

## Shift Work Sleep Disorder

If shift work disturbs your sleep patterns, preventing you from getting enough

sleep, you may have a circadian rhythm sleep disorder called shift work sleep disorder (SWSD). People with SWSD often get 4 to 5 hours of sleep every 24 hours, whereas the recommended amount of daily sleep for adults is 7 to 9 hours.

This sleep deprivation can manifest in an inability to sleep, premature awakenings (waking up earlier than you want to and being unable to go back to sleep), and fragmented, poor quality sleep.

Though you don't have to have SWSD in order to have hunger and hormone problems, these problems usually are linked.

## Hormones, Hunger, and Nighttime Eating

Sleeping enough every day — and getting uninterrupted, high-quality sleep — is a critical component of staying healthy. Sleep puts the body into repair mode, allowing a variety of biological functions to take place, including hormone regulation and the conversion of food into energy.

If you're chronically sleep deprived, these processes can't perform optimally. And unfortunately, people with shift worker sleep disorder are sleep-deprived, getting significantly less sleep than they need on a daily basis.

How does this affect hunger and weight?

One of the many functions negatively impacted by sleep deprivation is the regulation of the appetite hormones *ghrelin* and *leptin*. Ghrelin activates hunger; leptin suppresses it. When you're sleep deprived, your levels of leptin decrease and ghrelin increase, making you hungry. On top of that, you're exhausted.

When you're famished and tired, you're more likely to reach for high-carbohydrate, high-sugar snacks to fuel you through the energy lull. You'll probably also reach for salt and fat, since your body needs these to send the "I'm full" signals to the brain.

Because your hunger hormones are at the wrong levels due to lack of sleep, you're likely to overeat all of these fatty, high-calorie foods, consuming larger or more frequent portions than you would when you're rested. Unless you have a miraculously fast metabolism, this inevitably leads to weight gain.

A second sleep-related issue affecting weight is your level of glucose (blood sugar). Not sleeping enough can harm your cells' ability to make glucose into fuel. Too much free-floating, unused glucose in your system can lead to insulin resistance — a buildup of glucose in the bloodstream that can lead to Type 2 diabetes.

Studies also show that just a few nights of poor sleep can also lead to a substantial increase in fatty acids levels, a known precursor to pre-diabetes. Being sleep deprived raises the levels of the stress hormone *cortisol* too, which places you at a higher risk for diabetes and obesity.

Many of these metabolic changes have been observed in people who experience *just a few nights* of poor sleep. Imagine what happens if you go without enough sleep for weeks, months, or even years with SWSD.

You don't need to imagine it, because we have the data: individuals who sleep less

than 5 or 6 hours per 24-hour period are *twice as likely* to develop diabetes. They're also at an increased risk of high cholesterol, high blood pressure, heart disease, and many other serious conditions.

## Sleep and Overeating: The Vicious Cycle

Unfortunately, not getting enough sleep and overeating go together, creating a vicious cycle. If you don't sleep well, the next day you're likely to eat a lot more calories, more fat, and more sugar — maybe up to 550 more calories, according to one Mayo Clinic study.

Research also shows that those poor food choices made during the day affect the quality of your sleep later that night. Eating unhealthily can increase how long it takes you to fall asleep. High-sugar foods can also trigger fluctuations in your blood sugar while you're asleep, and these spikes and dips can wake you up.

Getting a poor night's rest a second night in a row will keep the cycle going; exhausted, moody, with your appetite hormones out of balance, you're more likely to overeat and consume sugar and caffeine to power yourself through your day. And so the cycle continues, with you gaining on weight (and a greater risk of diseases) in the process.

Shift work disorder is no joke: the stress of an unusual work shift can pose serious risks to your health. Learning strategies for sleeping better and coping with the change can go a long way towards boosting your wellness.

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# Food and Sleep: What and when we eat matters to the body clock

Much has been made in the media about the relationship between what you eat and how well you sleep.

Since eating and sleeping are two seemingly separate processes, it might seem like a leap to assume that one can influence the other.

However, the human body is an interconnected system. What we eat can influence our sleep, in ways both positive and negative.

## The digestive system during sleep

It might surprise you to learn that the sleeping process and the digestive process

both share a common regulator: the circadian system.

## What should happen as you sleep

It's understood that our sleep-wake system takes its cues to start inducing sleep following (among other things) the last meal of the evening. The liver and pancreas parallel this change in activity, as they have their own secondary circadian rhythms which sync to the main "body clock."

When we eat dinner, then go to bed later, we can usually expect to sleep through the night without needed to void our bowels. This is no accident: after dinner, the digestive system kicks into *postprandial* mode, allowing metabolism to slow so we can "rest and digest."

It's when we eat too much, too late that we can experience a misalignment between these ordinarily synchronized processes. And that's when problems arise.

## What food choices and eating habits disrupt sleep?

Recent studies show that late consumption of higher calorie meals can lead to obesity, heart problems, diabetic concerns, even cognitive dysfunction.

Research published in the January 2016 edition of the *Journal of Clinical Sleep Medicine* suggests that evening meals, composed of low-fiber foods high in saturated fat and sugar, are associated with disrupted sleep that is shallow and less restorative. This kind of sleep is referred to as *sleep fragmentation* or *broken sleep*, and it can lead to sleep deprivation.

"The finding that diet can influence sleep has tremendous health implications, given the increasing recognition of the role of sleep in the development of chronic disorders such as hypertension, diabetes, and cardiovascular disease," said the study's principal investigator, Marie-Pierre St-Onge, Ph.D., of Columbia University Medical Center.

A *Psychology Today* report from July 2015 also revealed that men who ate

high-fat meals at night experienced more issues with sleep fragmentation, and they spent less time in REM sleep. Women in the same study were found to have the same problems as men, but they also took longer to fall asleep and to reach REM sleep. They were also more likely to wake up during the night.

Finally, a recent UCLA study points to timing as a major issue for cognitive function. In that research, it was found that digesting food at a time when we should be sleeping may interfere with the function of the hippocampus, a part of the brain responsible for memory function.

## Foods to avoid before bed

If, for some reason, you must eat a late meal, you may wonder what *not* to eat before bedtime:

- *Chocolate. Its caffeine content, and the present of another substance, theophylline, will make it hard to fall asleep.*

- *Soda. The carbonation might aggravate your stomach; the sugar might tip insulin levels off balance.*

- *Coffee or caffeinated tea. For the obvious reason—caffeine—but also because of the acid.*

- *Deep-fried foods; rich, fatty meats; or dairy products. These take a long time to digest, which could lead to major overnight discomfort*

- *Sugary foods. Your pancreas will have to work double-duty and that can mean interference with sleep.*

## Foods to help you sleep

So, is it always bad to

eat before bed?

A small snack eaten late may not be a problem if you keep it small and low in fat and sugar. Your digestive system, with relation to your circadian rhythms, does expect you to eat something.

If you go to bed hungry, that might also, predictably, cause broken sleep or insomnia due to hunger.

Choosing sleep-inducing foods to eat before bed is your best bet. Some popular options include:

- *Warm milk with honey*
- *Certain fruits, like banana, sour cherries, or watermelon*
- *Carbohydrates like oatmeal, rice, or cold cereal*
- *Legumes like chickpeas (in hummus) or lentils*
- *Toasted nuts, such as walnuts or almonds*

- *Herbal tea with honey*

These options may or may not work for you, so it's up to you to practice common sense. If you have food sensitivities (such as to nuts or dairy), then these are obviously not going to be good choices.

## Sleep problems caused by food or eating habits

There are a number of physical problems that can result from making poor food choices or practicing eating habits that aren't friendly to sleep. In all cases, you can suffer not only from the discomfort that these problems cause, but from sleep fragmentation and insomnia, as well.

### Gastroesophageal reflux disease (GERD)

More commonly known as *acid reflux* or *heartburn*, this is what happens when you recline too soon after eating a large meal. Stomach pain and indigestion are other symptoms of GERD than can keep you up at night.

In addition, the eruption of one's stomach contents into the upper airway is painful and unpleasant and may require you that you sleep upright until it passes. If the

situation is severe enough, GERD can lead to problems with insomnia or broken sleep. GERD sufferers must constantly adjust their sleeping position at night, and they may need to get out of bed to take antacids or find other relief.

## Nightmares

For some people, eating rich, spicy foods or eating late into the evening can lead to nightmares. These are caused by elevations in metabolic rate and brain activity due to the digestive system's unexpected need to "work late."

## Other causes of sleep fragmentation

Some favorite foods or nighttime habits can do more damage than good:

- *That evening nightcap that you believe helps you to fall asleep will eventually cost you in sleep a few hours later. When your body metabolizes the alcohol, it will experience a small withdrawal effect that interrupts your sleep. Alcohol at bedtime also robs you of REM sleep and can lead to nocturnal awakenings to use the bathroom.*

- *Sweet dreams don't come from eating lots of sugary foods at bedtime, especially for people with diabetic concerns. The quick rise in blood sugar may make you sleepy, but its precipitous crash later can wake you up. For people managing insulin, a late-night rise and fall in blood sugar can and will interfere with a good night's sleep.*

- *You may discover you have food allergies or*


*sensitivities that make it difficult to sleep. People with celiac disease or irritable bowel syndrome (IBS), for instance, have stomach pain that may keep them up all night, leading to insomnia. Others may have problems with constipation, diarrhea, or nasal congestion that are the result of untreated food allergies.*

If you struggle with heartburn, find yourself eating late-night snacks, or suffer from unusual nightmares or other symptoms that interfere with your sleep, you might discover an unexpected cause: your eating habits.

At Sound Sleep Health, we work in concert with Sound Medical Weight Loss to find solutions to dietary concerns that are nutritionally sound and beneficial to good sleep. Call us today at (425) 636-2400 if you'd like to learn more.

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**Sources:**
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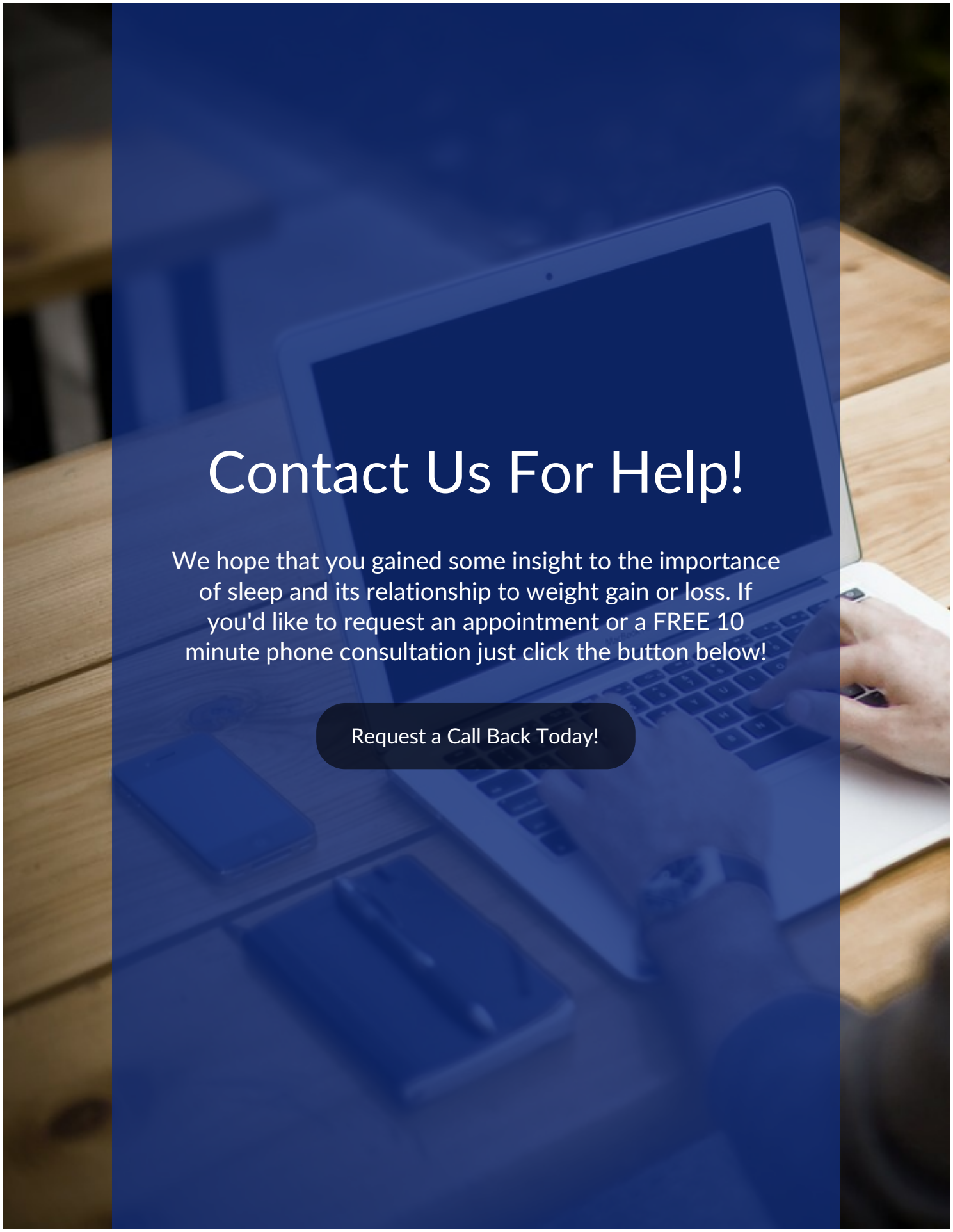

# Contact Us For Help!

We hope that you gained some insight to the importance of sleep and its relationship to weight gain or loss. If you'd like to request an appointment or a FREE 10 minute phone consultation just click the button below!

Request a Call Back Today!