



A Science-Based Approach to Sleep

Quality Sleep

OUR PREMISE: The right type of exercise, done properly and at the right time, can promote quality sleep and better sleep habits.

Sleep is a barometer of health similar to an individual's temperature or blood pressure measurement. If a person indicates he or she isn't sleeping well, research studies have confirmed data that suggests this person is more likely to be in poor health, and more prone to be managing lifestyle conditions such as hypertension or diabetes.

Extensive research has been done on the effects of sleep, consistently showing that sleep plays as vital a role as diet and exercise in promoting physical health, longevity, and emotional well-being. Sleep statistics researchers report that over 60 million Americans have trouble sleeping: 40 million are chronic sufferers and 20 million have intermittent bouts of sleeplessness. Sleep researchers also suggest that the quality of your sleep is just as important as how many hours of sleep you get.

The good news is, researchers who study sleep habits and patterns have found that participants who exercise regularly report that both the sleep quality and amount of time they sleep improved, along with less daytime drowsiness and more energy overall.

The Vigoroom Sleep Support Room is designed

Want More Zzzzz's? Exercise is the Answer

Scientists at Northwestern University say sleep problems affect millions of adults, who could likely improve their quality of sleep, vitality, and mood with regular aerobic exercise. The study, published in *Sleep Medicine*, 2010 is the first to examine the effect of aerobic exercise on insomnia in middle-aged and older adults.

Investigators studied 23 sedentary adults, mostly women aged 55 years and older, who had difficulty falling asleep or staying asleep and also reported impaired daytime functioning. Participants were randomly placed in one of two groups to participate in the 16-week study. One group exercised for two 20-minute sessions 4x/week; the other did 30-40 minutes 4x/week. The participants exercised 75% of their max heart rate in at least two aerobic activities, such as stationary cycling, walking, or treadmill.

A control group didn't participate in physical exercise, instead, taking part in recreational/educational activities, such as cooking classes or lectures, for 45 minutes, 3-5x/week for 16 weeks.

The results indicated that those who exercised reported that their sleep quality improved, raising their diagnosis from a poor to good sleeper, showing an average increase in sleep duration by 1.25 hours. They also reported fewer depressive symptoms, more vitality, and less sleepiness in the daytime. Phyllis Zee, MD, senior author and director of the Sleep Disorders Center at Northwestern Medicine, says the study is important because it is relevant to "a huge proportion of the population." Zee says, insomnia increases with age; at mid-life sleep begins to change dramatically.

to assist individuals in diminishing, decreasing and potentially eliminating unhealthy sleep habits and symptoms of insomnia as well as resultant health issues due to the inability to consistently get quality sleep.

THE IMPACT OF SLEEP ON HEALTH IS NOT OVERSTATED

According to the Division of Sleep Medicine at Harvard Medical School, the body manages and requires sleep in much the same way that it regulates the need for eating, drinking and breathing. Extensive research has been done on the effects of sleep. These studies consistently show that sleep plays a vital role in promoting physical health, longevity and emotional well-being. This explains why, after a good night's sleep, a person feels better, thinks more clearly and is in a more stable emotional state. Without adequate sleep a person's judgment, mood and ability to learn and retain information are weakened.

Getting enough "quality" sleep daily helps support the immune system, stave off illness, improve the ability to handle stress, and even helps deter the aging process! Current studies are clear: sleep deprivation IS dangerous to both an individual's health and other people.

Top debilitating effects of unhealthy sleep:

- Weight gain; carb cravings leading to junk food binging
- Higher risk of cardiovascular disease, including heart attack and stroke
- High blood pressure, diabetes, obesity
- Immune disorders, early mortality
- Car accidents and injuries on the job
- Impaired judgment, inattention, difficulty in concentration, reasoning and problem solving; loss of memory, making it more difficult to learn efficiently.
- Depression, lower libido and sex drive

Studies consistently show that sleep plays a vital role in promoting physical health, longevity and emotional well-being. A quality sleep helps one feel better, thoughts are clearer and emotions are less unstable.

What exactly does sleep provide? Here are the key dynamics:

How Do You Know IF You Are Sleep Deprived?

Most people with sleep deprivation symptoms do not recognize or acknowledge the symptoms; which is why diagnosing lack of sleep as the cause of prevalent health issues is so difficult. There is a clear difference between "tired," (e.g., after a long workday or after exercise) and "sleepy."

Here are classic sleepless symptoms that could indicate a person needs more quality sleep!

- Groggy in the morning
- Wake up exhausted and tired
- Slow reaction time
- Fall asleep during the day
- Chronically cranky or moody from being tired
- Trouble sleeping through the night
- Difficulty falling asleep, even if exhausted
- Need caffeine to get through the day
- Trouble concentrating
- Crave carbs
- Tend to be a mindless muncher all day
- Slow reaction time

- Helps to repair the body: The body produces extra protein molecules while a person is asleep, strengthening the body's ability to fight infection and stay healthy.
- Keeps the heart healthy: Helps the body reduce the levels of stress and inflammation called "inflammatory markers", which are linked to heart disease and strokes. Also key in keeping blood pressure and cholesterol levels in check.
- Reduces stress: Helps lower blood pressure and elevated levels of stress hormones; a result of high stress, which produce aging "wear and tear" on the body and cell degeneration, propelling the aging process. Relaxed sleep helps to slow these effects.
- Improves memory: Sleep allows the brain to process better, increasing cognitive function and understanding; improving memory and the ability to formulate and retain information.
- Controls weight issues: Sleep helps regulate the hormones that affect and control appetite. Studies have shown that when the body is deprived of sleep, the normal hormone balances are interrupted and appetite increases.
- Reduces potential for diabetes: Research has shown that lack of sleep may lead to Type 2 diabetes by affecting how the body processes glucose. Additionally, research suggests that adults who usually sleep less than five hours per night have a greatly increased risk of developing diabetes.
- Improves mood and reduces the occurrence of mood disorders: Lack of sleep clearly can make a person cranky. However, when deprived sleep becomes a chronic issue, studies show it can lead to long-term mood disorders such as depression or anxiety.

How Much Sleep Is Enough?

According to the National Institute of Neurological Disorders and Stroke, an uninterrupted 7 to 8 hours each night is generally considered the optimal amount of sleep for most adults; some people may need as few as 5 hours or as many as 10 hours of sleep daily. The goal is to find the number of hours that are right for you, so you feel REFRESHED every day. Experts say that if you feel drowsy during the day, you haven't had enough sleep. Studies show that people who get the appropriate amount of sleep on a regular basis tend to live longer, healthier lives than those who sleep too few or even too many hours each night. The importance of making sleep a top priority cannot be emphasized enough.

Sleep Requirements by Age

Newborns (0-2 months old)	12-18 hours
Infants (3-11 months old)	14-15 hours
Toddlers (1-3 years old)	12-14 hours
Pre-schoolers (3-5 years old)	11-13 hours
School-aged Children (5-10 years old)	10-11 hours
Teens (11-17 years old)	8-9 hours
Adults	7-9 hours

The amount of sleep needed will increase if a person has been deprived of both adequate number of sleep hours and quality of sleep in previous days. Getting too little sleep creates a "sleep debt." At some point, the body will demand that the debt be repaid. It takes approximately 2 hours to make up for every hour of lost sleep during the week. Even sleeping-in 14 hours on a Sunday won't really catch you up effectively, if you haven't gotten enough sleep each night. The truth is, we don't adapt to getting less sleep than we need; even if we feel we have successfully acclimated to a sleep-deprived schedule, our judgment, reaction time, and other functions are still impaired.

What Is Insomnia?

Insomnia can be described as the inability to fall asleep, stay asleep, or both. It is also characteristic of those who consistently wake up several hours earlier than desired and can't fall back to sleep. Insomnia affects approximately 1 out of 3 individuals worldwide. Insomnia can strike anyone, anytime, anywhere. And it can be caused by many factors, including stress, physical illness, lifestyle changes, chronic pain, irregular work patterns, jet lag or diet.

The causes of insomnia vary, based on whether an individual is experiencing short-term (one to a few weeks) or chronic insomnia symptoms (lasting a month or more). The effects of chronic, long-term insufficient sleep add up over time.

According to lead author Kathryn Reid, PhD, of the Department of Neurobiology and Physiology at Northwestern University, of their study published in Sleep Medicine, October 2010, "drug-free treatment is best for insomnia because it eliminates the potential of sleep medications interacting with other drugs a person might be taking."

Modern Causes of Insomnia

Today's technology driven society potentially has escalated sleeplessness in the US. The National Sleep Foundation's 2011 Sleep in America Poll, published in

INSOMNIA STATS:

It is important to understand the debilitating effects of sleep deprivation.

- People sleep 20% less today than 100 years ago.
- More than 30% of the global population suffers from insomnia.
- More than 50% of Americans lose sleep due to stress and/or anxiety.
- 40-60% of those over age 60 suffer from insomnia.
- Women are up to 2 times more likely to suffer from insomnia than men.
- Approximately 35% of insomniacs have a family history of insomnia.
- 90% of people who suffer from depression also experience insomnia.
- Approximately 10 million people in the U.S. use prescription sleep aids.
- People who suffer from sleep deprivation are 27% more likely to become overweight or obese.
- There is a link between weight gain and sleep apnea.
- A National Sleep Foundation Poll shows that 60% of people have driven while feeling sleepy.
- 37% of people polled admit to having fallen

the Journal of Clinical Sleep Medicine, examined the sleep habits of 1,508 Americans, age 13 to 64 (50% each gender) and the presence and use of a technology gadget in the hour before bed for two weeks.

Nine out of ten Americans reported using a technological device in the hour before bed (e.g., TV's the most popular at 60%). Those under 30 were more likely to use cell phones (72% of adolescents, 67% of young adults) than those over 30 years (36% of middle-aged, and 16% of older adults).

Young adults' sleep patterns were significantly later than other age groups.

Unlike passive technological devices (e.g. TV, mp3 music players), the more interactive technological devices (e.g. computers, cell phones, video game consoles) used in the hour before bed, the more likely subjects reported difficulties falling asleep.

The study concluded that technology use near bedtime is extremely prevalent in the U.S. Among a range of technologies, interactive technological devices are most strongly associated with sleep problems.

EXERCISE INTERVENTION

The Key Parameter: Sleep Rescue Remedy - Why Exercise Works

Researchers say as little as 20 to 30 minutes of moderate to vigorous exercise, at the right time of day, can help to reduce or eliminate sleep disorders, including insomnia. The main factors are choosing the **RIGHT KIND OF EXERCISE**, and doing it at the **RIGHT TIME**, relative to bedtime. This is directly related to body temperature. Body temperature naturally goes up slightly in the daytime and lowers at night, reaching its low just before dawn. Decreasing body temperature seems to be a 'sleep trigger'. When exercise is done at the right time and the right dose, it supports this process. Vigorous exercise temporarily raises body temperature as much as two degrees,

INSOMNIA COSTS!

This sleep disorder costs government and industry billions of dollars a year.

-The Institute of Medicine estimates that hundreds of billions of dollars are spent annually on medical costs that are directly related to sleep disorders.

-The National Highway Traffic Safety Administration statistics show that 100,000 vehicle accidents occur annually due to drowsy driving. An estimated 1,500 die each year in these collisions.

-Employers spend approximately \$3,200 more in health care costs on employees with sleep problems than for those who sleep well.

-According to the US Surgeon General, insomnia costs the U.S. Government more than \$15 billion per year in health care costs.

-Statistics also show that US industry loses about \$150 billion each year because of sleep deprived workers. This takes into account absenteeism and lost productivity.

Sources: National Sleep Foundation, Better Sleep Council, Gallup Polls, Institute of Medicine, National Highway Traffic Safety Administration, US Surgeon General's

and then body temperature gradually falls, signaling to the body that it's time to sleep.

If a person exercises too late in the evening, and too close to bedtime, this can be a sleep deterrent; as moderate to vigorous exercise is a stimulant, making getting to sleep and staying asleep without tossing or turning more difficult. At this late hour, body temperature may not have dropped enough, post-exercise, to signal the body that it's time to sleep. 20-30 minutes of aerobic exercise is enough to keep the body temperature at this higher level for a period of four to five hours. Afterwards, it drops lower than if they hadn't exercised at all. This lower body temperature is what helps one sleep better, but it may come too late for a restful night's sleep.

The Best Sleep Prescription: Exercising five to six hours prior to scheduled bedtime will initiate the body temperature to naturally lower, which serves as an inducement to sleep better when it IS time to go to bed. An individual will then be attempting to sleep at the same time his or her body temperature is beginning to go down.

A Caveat: Without consistency, exercise by itself is not a panacea for insufficient sleep. In other words, if you're often or chronically sleep deprived, exercising for one day and then skipping it altogether isn't going to provide a long-term sleep remedy. An August 2013 study published in the Journal of Clinical Sleep Medicine, indicates that people with sleep disturbances have to exercise consistently in order to continue to see sleep improvements. According to the study's researchers, "patients with insomnia have a heightened level of brain activity and it takes time to re-establish a more normal level that can facilitate sleep."

Parameter 1: What Kinds of Exercise Makes You Sleep Better?

Based on current sleep research, the following three types of activities are 'Sleep Enhancers.' They have been deemed by experts as the best types of activities to engage in IF you want to positively affect your sleep:

- **Aerobic exercise.** Walking, jogging, bicycling, or a cardio-style aerobics class is recommended 20 to 30 minutes minimum per day as the BEST choice of exercise to induce sleep. One reason cardio activity works when it comes to inducing better sleep is that these cardiovascular exercise modes are 'big muscle' activities. The legs and glutes stimulate circulation, which researchers suggest, may have a tranquilizer-type effect over time, encouraging better sleep.
- **Yoga.** The positions and breathing techniques used in yoga help to slow down both the brain and the body. 20 to 30 minutes of slow yoga stretches at least 30 minutes prior to going to bed, or 20 to 30 minutes of more active-style flow yoga - which elevates heart rate, 5-6 hours prior to scheduled bedtime.
- **Tai Chi.** Numerous studies have found that participants who did tai chi for one hour, 3x a week, reported improved overall sleep quality at night as

well as a decrease in daytime sleepiness. The experts speculate that the main benefit of tai chi in relation to insomnia is that it modifies circadian rhythms through relaxation and breathing.

The one thing all three types of exercise have in common is that they help to relieve stress and promote relaxation, each in their own way. When it comes to inducing sleep, all three of these modalities work as a powerful natural remedy for insomnia.

Parameter 2: How Much Time Exercising Impacts Sleeplessness

Our second parameter was to design exercise programming specifically to induce sleep without the stress of taking up too much time in the day. We wanted to make the program 'do-able' so individuals could easily plug it into their daily schedules in relation to their anticipated bedtime. A minimum of 20 minutes up to a full 45-minute workout is recommended to pre-program the body for sleep.

Studies have indicated that exercise is the number one single solution for most individuals as both a preventative and treatment method for either short-term or chronic sleeplessness. The exercise continuity is the key to a long-term solution to eradicate sleeplessness. A 30 day program may work for a person who is experiencing sleepiness, however, research has shown a program is most beneficial in affecting quality of sleep, as well as improving the length of time an individual remains asleep, if it is carried out for a minimum of 90 to 120 days.

Parameter 3: A Fast, Easy Evaluation Process

Finally, we wanted to make the process of getting started as easy and "low invasive" as possible. Rather than ask our prospective client to fill out a typical, lengthy exercise engagement and sleep questionnaire, we narrowed the scope to the following:

1. Ask only one simple question with regard to exercise: "How many minutes do you exercise each week?" If someone exercises less than 100 minutes, then they don't exercise enough to evoke a sleep response from exercise. If someone actually exercises 200 minutes or more, he or she may not be using the best modality of exercise or not exercising at the correct time in relation to bedtime.
2. Ask one question to self-evaluate the quality of sleep: "On average, do you feel you get a good night's sleep and are able to function at full capacity, mentally and physically, each day?" If the answer is yes, then there is no reason to recommend a sleep program as this person is experiencing no symptoms of lack of quality sleep. If the answer is no, then a combination of this single exercise question and the sleep question provides us with the information we need to recommend a sleep protocol to each user.

Our 'Healthy Sleep' Program Protocol

Vigoroom's Sleep Support Room is specifically designed for those who periodically or chronically experience poor or insufficient sleep. We have created Healthy Sleep exercise collections of sleep-inducing workouts to reduce the havoc of sleepless symptoms, and improve daily sleep patterns, so the user can function more efficiently.

Our goal is for the user to begin to see sleep improvement - both in the quality of sleep, as well as how they function and feel during waking hours. We also have recommendations that deal with the sleep environment as well as tips to find ways to get to bed earlier, and most important, reduce stress.

The Healthy Sleep program involves the rudimentary two questions, described above, and then the user is given a selection of programs in the Sleep Support Room to choose from:

90-Day Program; Workout for Healthy Sleep: Includes workouts and activities presented in a 3-month calendar, so the user knows what he or she should be doing across a 90-day time frame to invoke better sleep. The low/moderate intensity program includes a mix of walking, yoga and cardio machine workouts. It's best that you do these about 5 hours before bedtime to get the maximum benefits for enhanced sleep. This program is especially recommended for the chronic insomniac.

10 Day Program: Vigoroom's 10-day Conscious Sleep Support program takes users from restless, insufficient sleep to rejuvenating sleep. Therapist Shawn Quinlivan, c.ht., deploys a unique mix of hypnotherapy sessions and motivational talks to help users develop a positive relationship with sleep. Hypnosis is a proven and potent anti-anxiety agent, and one of the most common clinical applications of hypnotherapy is the treatment of stress and anxiety, including sleeping disorders.

Collections: These collections are groups of six related workouts. They include the following:

- **Walk/Run for Better Sleep, Sleep Better with Cardio Machines**
 - Exercise Collections include an eclectic selection of 30-minute cardio workouts - machine-based, outdoor walking and running, or body conditioning-like boot camp, at a moderate to vigorous level.
- **Yoga to Sleep Well**
 - Two styles of Yoga; yoga flow, meant to be more aerobic in nature and to be used earlier in the day, just like cardio workouts (5-6 hours pre-bedtime), or a more relaxing style of yoga, including regulated breathing to reduce stress, which can be done 30-60 minutes before bedtime
- **Meditation for Restful Sleep:**
 - Vigoroom's collection of six guided sleep meditations is created by Kent Burden, long-time Mind and Body Program Director at the Ojai Valley Inn & Spa. These meditations include muscle relaxation exercises, visualizations and breath regulation to get a great night's

sleep. These techniques have been shown to increase sleep time, improve sleep quality, and make it easier to fall (and stay) asleep. Meditation may also help reduce blood pressure and ease pain, anxiety, and depression.

- **Hypnosis for Sleep Support.**
 - If insomnia is a problem for you, these sleep hypnosis sessions will tap into images stored in your subconscious mind, ushering you into drowsy relaxation and inviting deep and restful sleep.

Users are advised to be mindful of when they will be going to bed in order to select the best exercise modality. If the goal is to eliminate insomnia, strenuous workouts should be performed earlier in the day, 5 to 6 hours prior to retiring, and more relaxing exercises closer to bedtime.

Sample Tips for getting blissful sleep

- Accept sleep as a necessity and a vital health habit; cutting back on sleep hours consistently can affect more than just being tired.
- Regulate the time you go to bed, regardless of what is going on. Burning the candle at both ends can drastically impact your health and your ability to fully function, mentally, physically and metabolically.
- Exercise daily - 5 to 6 hours prior to your established bedtime - to help establish regular sleep patterns; however, don't exercise vigorously right before bedtime as this could keep you up. Avoid napping before bedtime - instead go to bed if you are tired.
- Reduce light in your house when it gets close to bedtime. This signals the body that it's time to wind down.
- Cut caffeine before bed as well as mindless eating.
- Take the techno out of the bedroom - remove the TV, smart phone, computer and any other techno distractors that can get in the way of you actually falling asleep.
- Don't lay on your bed until you are actually ready to go to sleep. Once asleep you want to stay asleep, not catnap.

SIGNIFICANT SLEEP RESEARCH-ABBREVIATED SUMMARY CITATIONS

A 2013 study, published in Journal of Clinical Sleep Medicine, shows exercise and sleep affect each other in both directions: regular long-term exercise is good for sleep, but poor sleep can also lead to less exercise. Additionally, for exercise to be effective in reversing sleeplessness, it takes at least four months of continuous exercise.

A 2011 study, The effect of Ti Chi exercise on the sleep quality of the elderly residents in an Isfahan, Sadeghieh elderly home (Iran J Nurs Midwifery Res.) found that Tai Chi sessions - three times per week for 12 weeks, and up to 25 minutes per session - can have a significant effect on sleep quality in older adults beyond 65 years of age.

The Sleep and Technology Use of Americans: Findings from the National Sleep Foundation's 2011 Sleep in America Poll, published in Journal of Clinical Sleep Medicine, found that technology use near bedtime is extremely prevalent in the United States and negatively impacts sleep. Among a range of technologies, interactive technological devices are most strongly associated with sleep complaints.

A study, published in Sleep Medicine in 2010, is the first to examine the effect of aerobic exercise on insomnia in middle-aged and older adults; concluded that those who exercised, reported that their sleep quality improved, raising their diagnosis from a poor to good sleeper, and showing an average increase in sleep duration by 1.25 hours. They also reported fewer depressive symptoms, more vitality, and less sleepiness in the daytime.