

Performance, Wellness, and Longevity

by B. Christopher Frueh

Sleep is a critical component of life and survival for all living animals, especially humans. While we still don't have an exact understanding, we know our bodies require significant periods of it on a regular basis to consolidate memories and learning, restore and rejuvenate energy systems, grow muscle and repair tissue, synthesize and balance hormones, and clear out waste products (i.e., metabolic toxins) from our brain via a lymphatic system that's only activated during slow-wave sleep. In fact, during nighttime sleep our brain is very active. There's almost as much neural activity during sleep as there is during waking periods.

During the night, our brain cycles through two major types of sleep. Non-REM sleep involves high-amplitude, low-frequency rhythms, whereas REM (rapid eye movement) sleep is characterized by low-amplitude, high-frequency EEG rhythms. There are four stages of non-REM sleep that occur before we reach the REM stage. The first state in a sleep cycle is light sleep (non-REM stage 1), followed by deeper sleep (non-REM stages 2-4), and a dream state referred to as REM sleep.

After the first REM stage is completed, we cycle back down through non-REM stages, 4, 3, and 2 before cycling back up through them again to REM. A full sleep cycle lasts about 90 minutes the first time through and is normally repeated several times each night, growing shorter each time. The last two sleep cycles of the night are usually alternations between stage 2 and REM sleep.

Brains that are deprived of REM sleep will subsequently produce more of it (i.e., REM "rebound"). It's likely that each cycle of sleep has distinct neurorestorative processes. Also relevant to our understanding of sleep are our circadian rhythms. These are cycles

of sleep and wakefulness lasting about one day. Circadian rhythms occurring in an environment free of natural time cues (like if you lived in a dark cave) stabilize at a little over 24 hours. At any given moment, our degree of alertness depends in part where we are in our circadian rhythm. People fall somewhere on a continuum, with “morning people” being on one end and “evening people” being on the other end of that continuum, but this changes as we age. Young people tend to be “evening people” or have no preference; while older people (e.g., over 65) are “morning people.” There’s reason to believe that nocturnal lighting, especially the “blue” lights of computer screens and smart phones have a disruptive effect on our circadian rhythms.

Although many aspects of sleep remain scientifically mysterious to us, there’s no question that getting sufficient amounts of quality sleep on a regular basis is one the pillars of human health and wellbeing. Most adults require seven to nine hours of sleep per night for optimal health. Some people need less sleep than others, though. There are individual variations around the universally acknowledged eight hours. The quality of sleep during those hours is also important. Sleep efficiency is the ratio of the total time spent asleep in a night compared to the total amount of time spent in bed (a sleep efficiency of 85 percent is typical).

There are both psychological and physical consequences associated with chronic sleep deprivation. Negative psychological consequences of chronic sleep deprivation include: irritability, cognitive impairment, memory loss, impaired judgment toward morals and risk taking, impulsivity, restlessness, distractibility, poor concentration, depression, and, in acute situations, even hallucinations and paranoia.

The physical and medical effects on the human body are also profound. Chronic sleep deprivation contributes to: impaired immune functioning, increased risk of Type 2 diabetes, increased risk of heart disease, obesity, impaired psychomotor skills, and body aches and pains.

All living animals sleep, but there is a wide range of sleep needs across species, with humans somewhat in the middle of that range. For example, horses (2.9 hours/day) and cows (3.9 hours/day) need very little sleep compared to humans (8 hours/day), cats (14.5 hours/day), and bats (19.9 hours/day).

The Sleep Protocol

Sleep schedule:

- It’s important to keep a regular and consistent sleep schedule.
- Go to bed about the same time every night; get up about the same time every morning.
- Avoid going to bed late and sleeping in on weekends.
- Limit daytime napping.

Sleep environment:

At night your bedroom should be a sanctuary. Optimize your environment by doing the following:

- Keep room very dark (though leave the shades cracked so some natural light is allowed to come in the morning).
- Put the thermostat to 68 degrees. That's the ideal temperature for sleeping, as long as there are blankets on the bed.
- Be sure you have a comfortable mattress, bedding, and pillows.
- Do not put the television on at night. It's best to not even keep one in your bedroom.
- Do not keep a visible clock near your bed.
- Do not leave your phone within reach of your bed and do not leave the ringer on.

Activities That Promote Proper Sleep Hygiene

1. Go for a walk when you first wake up

Try to get 10-20 minutes of sunlight early in the morning, this helps synchronize your hormones and circadian rhythms.

2. Keep a regular schedule for sleep

Go to bed and get up at the same times every day.

3. Protect the time right before bed and develop a relaxing routine

- Spend some quiet time with yourself immediately before going to bed – listen to soothing music, meditate, pray, practice deep breathing, and/or read a calming book, though not in your bedroom.
- Hot showers or baths immediately before bed change body temperature and prepare us for sleep.
- For at least an hour or two before going to bed do not argue with a spouse or do anything even slightly stressful or activating (i.e., do not pay bills, do not work, do not read emails).
- For at least an hour or two before going to bed, do not expose your eyes to light from a computer, tablet, or smart phone screen. The unique “blue” light these emit affects your eyes and brain in a way that impairs sleep.

4. Use your bed for sleep and sex only

If after going to bed you are awake for longer than 20-30 minutes or so, get up and do something relaxing in another part of the house. When you begin to feel sleepy again, go back to bed. This strategy will help to train you to sleep better in your bed.

5. Consider using a sleep sound machine at night

Many people find that some type of constant, gentle noise in their sleep environment helps to block out other external sounds and lull them to sleep. Sleep sound machines typically provide a range of options, including “white noise,” “rain,” “babbling brook,” “waves,” “thunder storm,” and many others. According to a large survey conducted by Consumer Reports several years ago, sound machines were found to be one of the most effective strategies for promoting quality sleep.

6. Exercise

- Exercise regularly, preferably in the morning and not after 2p.m.
- A combination of regular aerobic and strength training is important for maximizing health and sleep.

7. Diet

- Alcohol may seem to relax and help you sleep, but it interferes with the quality of sleep by impairing your brain’s ability to go through the sleep cycles, and often leads to middle-of-the-night awakening, reduced REM sleep, and fragmented sleep.
- Be aware that caffeine after midday impairs sleep for most people because it has a long half-life and stays in your system for 12 hours or so.
- Nicotine contributes to fragmented sleep.
- Avoid large meals close to bedtime.
- Eliminate or at least limit your consumption of soda, especially after midday.
- Consider eating on a time-restricted feeding (TRF) schedule where you get 100 percent of your daily caloric intake in a window of 6 to 12 hours, then fast the rest of the time.
- Eat a diet high in protein, fiber, and healthy fats. Eliminate most added sugar and processed foods (i.e., junk food, fast food, frozen food).

B. Christopher Frueh, PhD is a novelist, clinical psychologist, professor of psychology at the University of Hawaii, and chair of the SEAL Future Foundation medical advisory board. He has thirty years of professional experience working with the veterans/military community, has conducted clinical trials, epidemiological, and neuroscientific research, and has authored 9 fictional crime novels and co-authored over 300 scientific publications. This article is excerpted from “Operator Syndrome,” forthcoming in 2023.