

# SLEEP

THE SCIENCE OF

The secret to lasting weight loss and optimal performance could be as close as the bedroom.

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**HOW DID YOU SLEEP LAST NIGHT?** That simple question can make or break your day. When you get a good night's sleep, you feel like you can take on the world, and getting your fair share means enjoying a host of energizing benefits, including improved memory and creativity, decreased inflammation and improved immune function. But of particular note for athletes is the effect of sleep on weight loss, performance and recovery, and more and more research indicates that the hours you sleep are as important — if not more so — than the time you spend training.

“Sleep is foundational and, in my opinion, is even a little more important on the scale than things like nutrition and hydration,” says Dr. W. Christopher Winter, Ph.D., president of Charlottesville Neurology and Sleep Medicine, pro sports team consultant and author of *The Sleep Solution* (Penguin Random House, April 2017). “Sleep has its fingers in everything from mood to mental capacity to physical well-being. And some studies show that just a couple of days of restricted sleep — four to five hours — result in a measurable reduction in performance.”





#### DETRIMENTAL DEFICIT

Sleep deficit does a number of egregious things to your physical performance, causing a decrease in max power, velocity and force, slower reaction times and greater perceived work effort. Surprisingly, however, these effects are not completely because of physiological impairment but rather from a decrease in cognitive ability and function as a result of that deprivation. Case in point: A 30-year study of National Football League game data indicates that teams who traveled across three time zones to play night games were 67 percent more likely to lose, even when the point spread was factored in.

Since sleep debt negatively impacts an athlete's mood, drive and fatigue level, the sports and skills that require accuracy and focus will be those most impacted. "The scientific evidence indicates pretty clearly that sleep loss or disruption causes slower reaction times and diminishes both cognitive and emotional capacity," says Dr. Benjamin Smarr, Ph.D., a Reverie sleep research expert at the University of California, Berkeley. "Even if your muscles are ready to fire after sleep deprivation, if your self-doubt and ability to react are off-kilter, your performance is at risk." Fatigue also can impair reaction time when playing a sport, potentially increasing your risk for injury.

"Athletes are constantly working on and improving their training and performance programs, but honestly, the secret weapon for success is sleep," says Jack Dell'Accio, CEO and founder of Essentia mattresses. "Athletes push their bodies to the extreme, and the only time they really have to repair themselves is at night, during sleep."

#### THE FAT FACTOR

When it comes to body composition, sleep debt scrambles up your hormones and makes fat loss a problematic endeavor. "Ghrelin [the hunger hormone] rises and creates cravings for carbs and fast energy, and leptin [the satiety hormone] decreases, reducing the feeling of satiety you get when you do eat," Winter says. This imbalance makes you more likely to reach for high-fat or high-calorie foods when it's time to nosh, and one study in the *American Journal of Clinical Nutrition* even showed that well-rested people ate on average 300 fewer calories per day than those who were sleep-deprived.

"Also, if you're not sleeping well, cortisol rises to help keep you alert," Winter adds. "Essentially, we stress ourselves awake." Cortisol is associated with fat storage and retention, and a recent study published in the journal *Sleep* found that sleep restriction boosts a chemical signal that increases the pleasure and satisfaction

gained from eating. This means that not only are you more likely to eat more because of your hormone imbalance, but that the experience will be so pleasurable that you'll also want to eat more. Double whammy.

#### THE NATIONAL DEBT

How much sleep you actually need is a matter of eternal debate, and while some people get away with six hours a night, others need 10 or more. "Sleep need is as genetic as eye color, so when you ask how much sleep you need, the only true answer is 'enough,'" Winter says.

There are actually dozens of genes associated with sleep quality and quantity, and these differ from person to person, so truthfully there is no one-size-fits-all Rx for the number of hours of sleep you should get. The rule of thumb from Winter and other researchers is that if you feel well-rested and energized during the day, you're probably getting enough. If you're falling asleep on the way to work or crashing out before *Modern Family* begins, you probably need more.

That being said, it's not that simple in practice, since many of us have a terminal case of social jet lag — where the demands of life and social activities continually interfere with the amount of sleep we get. Often, our innate needs are not met, and in fact, according to the Centers for Disease

Control and Prevention, most Americans get less than seven hours of sleep per night. If you're someone who needs eight or nine or 10 hours to fully recuperate and recover, you're probably in trouble.

#### QUALITY CONTROL

Though there are varying opinions on this, most experts agree that it's best that your sleep cycles be contiguous. "Our brains don't do a great job of getting into a deep-sleep state if we keep waking up," Winter says. "If you subdivide your sleeping hours into four or five at night and take a nap during the day, you'll benefit less than you would with six or eight straight hours of sleep."

A typical sleep cycle lasts about 90 minutes, with approximately one hour dedicated to non-REM, slow-wave sleep and 30 minutes to REM dream-state sleep, and ideally you'll experience several individual sleep cycles during the course of a good night's sleep.

During non-REM sleep, your pituitary gland is super active, releasing growth hormone to stimulate tissue repair and restoration, boost metabolism and increase aerobic capacity. This is also when you build bones, increase blood supply to muscles, restore energy and bolster your immune system. Age can make you sleep less soundly, leading to poor non-REM sleep, and of particular note to athletes, a large increase in training volume can cause a disruption in sleep patterns here, prohibiting your body from properly repairing itself.

During REM sleep, you focus on the brain, improving function, facilitating memory consolidation and experiencing dreams. Sleep that lacks a REM phase is non-restorative, meaning you'll feel fatigued and will have impaired memory and a reduced ability to learn. "It also affects your perception of pain, meaning that if two athletes incur the same injury, the less-rested one will feel it more intensely than the one who got enough sleep," Winter explains. Poor REM sleep also can lead to overtraining over the long term because your central nervous system — led by the brain — does not get a full reboot.

#### REVERSE AND MITIGATE YOUR DEBT

The good news is that any damage — mental or physical — caused by lack of sleep is easily reversible by simply logging more zzz's. "The very first night you get eight hours instead of five or six you'll feel

## BENEFITS OF SLEEP

1. Improves memory
2. Curbs inflammation
3. Improves immune function
4. Encourages creativity
5. Reduces your risk for heart disease, heart attack, obesity and diabetes
6. Reduces stress
7. Sharpens focus and attention
8. Decreases susceptibility to illness
9. Promotes weight loss

better and will have significant mental and physical benefits," Winter says. "The real question is how long will it take you to repay the debt? Likely several days to several weeks before you're peaking in performance once more."

There are many non-pharmaceutical ways to develop good "sleep hygiene" and increase your sleep quality and quantity, starting today. Implement them into your daily routine and be on your way to a leaner body, more intense workouts, heavier lifts and improved mental performance, on and off the field.

► **Stick to a Schedule.** According to the National Sleep Foundation, going to bed and getting up at the same time helps regulate your circadian rhythm, or sleep/wake cycle. Set a realistic bedtime that fits with your schedule and try to stick to it, even on the weekends, Winter advises. If you're still wide awake when bedtime comes, don't stress; do something relaxing such as reading a book or taking a bath. Contrarily, if you're nodding off before your prescribed sack time, get up and do something mildly stimulating, such as folding laundry or tidying up.

► **Power Down.** The blue light emanating from computers, phones, televisions and tablets increases brain activity at a time

when you're supposed to be winding down, reducing the production of the sleep hormone melatonin, disrupting sleep patterns and decreasing the amount of REM sleep you get, according to a Harvard Medical School study. And while reading is an excellent option for relaxation, choose a good old-fashioned book rather than a backlit e-reader, which can be just as disruptive as a tablet or phone.

► **Mattress Mayhem.** Even the best mattress has a life span of about 10 years before it gets lumpy, bumpy and frumpy. If yours has exceeded its useful life span, it's time to shop for a new one.

► **Control Your Environment.** A cooler bedroom — in the range of 60 to 67 degrees — is the ideal temperature for sleeping. Your bedroom also should be quiet and relaxing and, aside from your significant other, no one else should inhabit your bed. Sure, it's lovely to snuggle with your pets and kids, but all those extra arms and legs (and tails!) could ultimately prevent you from getting a restful sleep.

► **Learn to Relax.** Ruminating, worrying and planning at night when you should be sleeping can cause insomnia. End your day with deep breathing, which has been shown to stimulate the parasympathetic nervous system, promoting relaxation and calm. To practice, inhale slowly for two seconds, hold for two seconds, then exhale slowly for four seconds. Repeat.

► **Rein in Your Vices.** Smoking, caffeine and alcohol are the three most notorious sleep vampires: Nicotine and caffeine are stimulants, preventing you from falling asleep or sleeping soundly, and should be curtailed in the early afternoon. Smokers are also four times as likely to report feeling tired when they wake up as nonsmokers, and even though a cocktail before bed might initially help you relax, it suppresses certain neurotransmitters, preventing you from entering REM sleep and leading to poor sleep quality.

► **Make Your Bed.** A poll from the National Sleep Foundation found that those who make their beds in the morning are more likely to report getting a good night's sleep. Though uncertain why, they theorize that perhaps making your bed restores order and reduces clutter, which helps reduce stress. ☛

 **SLEEP DEBT NEGATIVELY IMPACTS AN ATHLETE'S MOOD, DRIVE AND FATIGUE LEVEL.**