

Module 15 Transcript

Your Brain On Sleep

“O dearest charm of sleep, ally against sickness.”

-Euripides

It's 1959, in New York City, and radio personality Peter Tripp has an interesting idea. To raise money for a charitable cause--and to drum up some publicity--he's going to break a record by staying awake and broadcasting for eight straight days, or two hundred hours. He began the experiment in good spirits, but, as the hours and days wore on, he began to experience severe physical and mental symptoms. The researchers observing Tripp noted that his mood changes drastically-- his capacity for words and memory begin to fail. His body temperature drops, more and more. Soon, the hallucinations start, and Tripp's connection to reality becomes tenuous. While Tripp did achieve his record, his mental symptoms lingered for years afterward--mood swings, anxiety, forgetfulness.

This is extreme, obviously, but the lessons can be easily extrapolated to modern society on the whole. The reality is that most of us don't give sleep the attention it deserves and, sadly, the millions of people suffering from too little or low quality sleep will almost certainly experience some degree of impact on their mental health and brain health...

Sleep, a common denominator of every living person. We all experience this state of unconsciousness every day, to varying degrees of success, yet, ironically, the purpose of sleep is unclear to most people. Have you ever asked yourself the basic question: what even is sleep? Why do our brains crave it? What really is “good” sleep? And what happens when we deprive our bodies of that meaningful rest? Surprisingly, some of these answers are more difficult to answer than they may first appear, and the new science around sleep continues to push boundaries of what we thought possible.

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We know what sleep looks like. We know that when we're sleeping, we're unconscious, although it's different from other forms of unconsciousness--like, say, a coma--in that it's easy to snap into being awake. We know that the mind and brain are working in some capacity; we do dream and we keep breathing, regulating our temperature, and our brain cells burn just as many calories as when we are awake. We know that there are some easily identifiable side effects to not getting enough sleep. But up until relatively recently--just a matter of decades--we really had very little understanding of what's happening in the brain, and why it is designed to snooze for a third of our lives.

Sleep and mental health are intimately linked. It's no coincidence that chronic sleep problems affect 50% to 80% of patients with mental health diagnoses, compared with 10% to 18% of adults in the general U.S. population, and sleep problems are particularly prevalent in patients with anxiety, depression, bipolar disorder, and ADHD.

The most common sleep disorders include insomnia--a difficulty falling or remaining asleep, and narcolepsy, its opposite. Any sleep disorder is, regardless of cause, is by definition a deviation from the restful, rejuvenating sleep required for good health. A newborn sleeps 14 to 17 hours a day. Teens, nine to eleven hours. And for most adults, a good night's sleep is somewhere in the seven to nine hour range.

Sleep happens in four stages. The first three power the brain down and bring you into a more deep rest. The fourth stage of sleep, called REM (or Rapid Eye Movement) sleep is different. Here, the eyes begin to shift and flick in different directions. Heart rate and breathing increase. And you begin to dream. The brain is more active in general, with activity approaching that of a waking mind. And contrary to outward appearances, a great deal is happening while you snooze that directly affects your waking hours.

Take a look at the hippocampus, which, again, is the memory center of the brain. In a controlled study on sleep habits, researchers observed healthy activity in the hippocampus

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in those who receive the normal eight hours of sleep, and worse readings on those who go without. Or examine the immune system. Those who cut their sleep in half to four hours a night show a seventy percent reduction in cells that fight foreign invaders.

And then there's the glymphatic system, which stands for glial-dependent lymphatic transport. Only truly discovered in 2012, this complex system has been described as a "macroscopic waste clearance system." In other words, while you're sleeping your brain is being thoroughly cleansed. You see this glymphatic system is most active while you're asleep, removing waste metabolites and neurotoxic waste materials harmful to your brain cells, while simultaneously distributing compounds like minerals, fats, amino acids, and glucose. Think of your brain like an office building. During the day, the essential functions of the office create trash. Whiteboards get written on. Papers get moved around. It's at night, when the lights are out, that the cleaning happens, waste baskets are emptied, papers are organized away, and the whole place is put back into working, productive order. Or you know the feeling after you've cleaned a room in your house and it's fresh and everything is in its place? Sometime I think that's what my brain is like in the morning after a good night's sleep.

Did you know that the brain generates 7 grams of waste every day? That's one and a half teaspoons of just trash coming out of your brain cells each day. New knowledge of the glymphatic system has fundamentally changed the ways we think about sleep, its importance, and the ramifications of not getting enough. And studies conducted on mice show a correlation between these systems and depression and initial research, not surprisingly, suggests that the glymphatic system in humans is complex and dynamic throughout our sleep and likely to be a new frontier in understanding how to optimize our brain health and recovery.

Sleep's effects on mental fitness are myriad. It archives experiences we have during the day, turning short-term memories into long-term memories. It makes you much less likely

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to experience poor mood or lash out. It increases reported levels of optimism and sociability, and decreases stress and paranoia.

So perhaps it's time for a fundamental shift in how we think about sleep. For too long there's been a strange romanticization of sleep-deprivation. Of the student staying up all night to cram for a test. The office worker burning the candle at both ends, finishing that report. The "I'll sleep when I'm dead" crowd. But, ironically, this worshipful dedication to productivity is fostering a culture of brain fog, exhaustion, and long-term brain health and mental health symptoms.