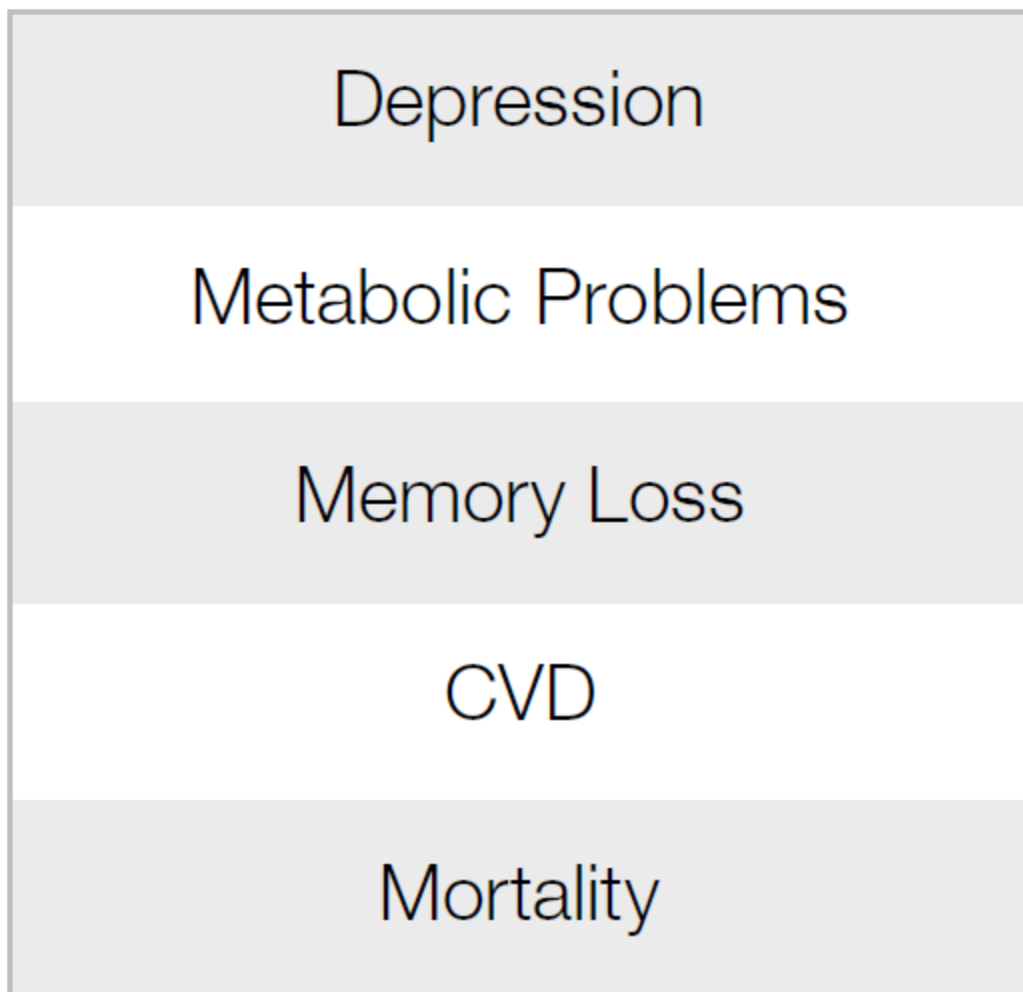


Sleep Core Concepts

Hey, everybody. In this presentation, we're going to talk about core concepts for sleep. Sleep is an uncontested requirement for good health, and there is just now an overwhelming body of evidence that confirms this. Research suggests that most people need between seven and nine hours of sleep to function properly, and despite the fact that most of us know that sleep is good for us, American and industrialized society in general, I think, promotes an "I'll sleep when I'm dead" attitude. About one-third of Americans now get fewer than six hours of sleep per night, and this is up from 50 years ago when only about 2 percent of Americans got this little sleep.



Chronic sleep deprivation can seem normal in our society, but it's anything but normal to our bodies. It's associated with a wide range of issues ranging from depression to metabolic problems to memory loss to cardiovascular disease to increased mortality.

In our modern society, light pollution is a major problem contributing to lack of sleep. If you think about it, hunter-gatherer populations with no access to artificial light live in the natural rhythms of day and night, but we now use artificial light to be active during the night. We use computers, phones, tablets, and televisions long after the sun has gone down in many cases. While this isn't necessarily a bad thing for any other reason, the exposure to artificial light after dark is something that our bodies are just not genetically hardwired for. The result is that we see with exposure to this kind of light a decrease in melatonin production. Melatonin plays numerous biological functions, but one of the most important is regulating sleep-wake cycles.

Having access to artificial light after the sun has gone down has not only had an impact on the way we spend our time at home, but it's also meant that our work hours have increased. While our ancestors were active during the day and rested at night, in many cases, our workdays continue to get longer. Longer workdays have had a negative impact on our sleep duration, but the other impact that artificial light has had is that it has enabled shift work where people are actually working throughout the night and exposed to artificial light that entire time.

Studies have clearly linked shift work with poorer health outcomes, particularly alternating shifts where the person doesn't work the same shifts each week, and he rotates back and forth between day and night shifts, and his body can never really adapt to that. Regular shift work is still associated with poorer outcomes but nowhere near as bad as the alternating shift work. Although some shift workers may not be able or willing to change their job or their schedule, it's still important to educate them about the effects that shift work can have on their health so that they can take whatever steps that they are able to to mitigate those effects.

With modern living also comes the ability to travel all over the world, which is great and something I've taken advantage of myself, but jet lag is also associated with poorer health outcomes. Studies of flight personnel, whether pilots or other staff who frequently cross time zones, or executives who travel and frequently cross time zones have shown that it can not only impair sleep quality and duration but is associated with an increased risk of cancer and many other diseases. Again, this is not always something that people can easily change, but there are some steps that can be taken to mitigate the impact, and we'll talk about those.

We also have access to many substances that can disrupt sleep such as caffeine, alcohol, cigarettes, and drugs, and these are associated with decreased sleep duration and quality. Patients may not be aware that some of these things can interfere with sleep, and physical inactivity has also been shown to have a negative impact on sleep, so there is a wide range of aspects of the modern lifestyle that are antithetical to good-quality sleep.

When sleep is disrupted, it can cause several health problems, including cardiometabolic disease, immune dysfunction, decreased stress tolerance, poor cognitive function, and mood issues, so let's talk a little bit more about each of these.

First up is cardiometabolic disease. Research has shown that even in those with no pre-existing metabolic problems, sleep deprivation can cause insulin resistance. A randomized clinical trial with

225 participants showed that restricting sleep for five nights led to increased caloric intake and weight gain. Another study showed that eight days of sleep restriction caused the participants to eat an extra 566 calories per day. If you have metabolic syndrome patients, asking about sleep duration and quality is a must. Note that metabolic issues are also related to sleep apnea.

In immune dysfunctions and other negative outcomes of sleep deprivation, melatonin not only affects our sleep-wake cycles but also plays an important role in the immune system. In a study at Johns Hopkins University, researchers injected a cancer-causing agent into two groups of mice. One group was exposed to 16 hours of darkness per day, and the other group was exposed to 16 hours of light per day. Melatonin levels were significantly higher in the group in the dark, as you might expect, none of which developed cancer. In the group that was exposed to daylight for 16 hours, 90 percent of the mice developed cancerous tumors. The authors speculated that adequate periods of darkness are required for proper immune function.

In human studies, those with melatonin suppression such as shift workers are at higher risk of several types of cancers as well as influenza and chronic infections, and this is especially important to remember for patients who are fighting off chronic infections or have autoimmune disease. Proper sleep is crucial in that context.

Sleep deprivation doesn't just cause long-term health issues. It has almost immediate short-term negative impacts as well. These include decreased stress tolerance, decreased cognitive function, and emotional instability. If you're a parent, you probably remember those first few months that you weren't sleeping well. You were likely feeling less tolerant of stress, less able to focus and think clearly, and emotionally reactive. Research has confirmed that all of these things are a result of lost sleep. Sleep-deprived people report significantly greater subjective stress, anger, anxiety, and response to low-grade stress. Sleep loss also increases cortisol levels, which can be the beginning of HPA axis dysfunction, and sleep deprivation also decreases short-term memory, reduces learning capacity, and causes a decline in mental stamina and reduction in attention.

Lack of sleep can be viewed as a chronic stressor. As the body tries to maintain homeostasis, sleep deprivation overloads the body's capacity to do that, which results in increased disease risk. Because it is such a stressor on the body, it can lead to HPA axis dysfunction, which is why it's important to fix as soon as you see it in your patients.

Every patient should be assessed for sleep problems. You should check not only for sleep duration but also sleep quality. In other words, even if they are in bed for eight hours a night, are they waking feeling rested and energetic? How many awakenings do they have throughout the night? It can be sometimes difficult to determine the chicken or the egg. Was it sleep issues that caused other health problems or vice versa? In my experience, it's often both, and you need to address both at the same time in order to resolve the problem. Sleep is absolutely critical for good health, as you know now, and it should not be overlooked in any patient.

Okay, thanks for watching. In the next presentation, we'll talk about the best practices for good sleep.