

SLEEP

Sleep allows our body and mind to recharge. We need rest to feel refreshed and alert when we wake up, as well, sleep promotes a healthy immune system. Sleep also effects our ability to control our mood and reactions. A healthy diet and lifestyle help us sleep optimally. Without enough sleep, our brain cannot function properly; this can impair our ability to remember, process emotions, concentrate and think clearly.

Several lines of evidence implicate sleep in the consolidation of synaptic plasticity (change that occurs at synapses: the junctions between neurons that allow them to communicate with each other), and long-term memory. Stress disrupts sleep while impairing synaptic plasticity and cognitive performance.

Our internal clock, as regular clocks operate on a 24 hour cycle. Our internal clock is known as the Circadian Rhythm. In a normal functioning human, they will feel refreshed after sleep, and become increasingly tired throughout the day, with tiredness peaking just before bedtime. Feeling tired as the sun sets, and away as the sun rises is a sign of a synchronised Circadian Rhythm. Research shows that a disruption in the Circadian Rhythm through shift work or insomnia can impact our physical, mental and emotional health.

Adults typically require 7 - 9 hours sleep minimum. Teens and children need far more sleep.

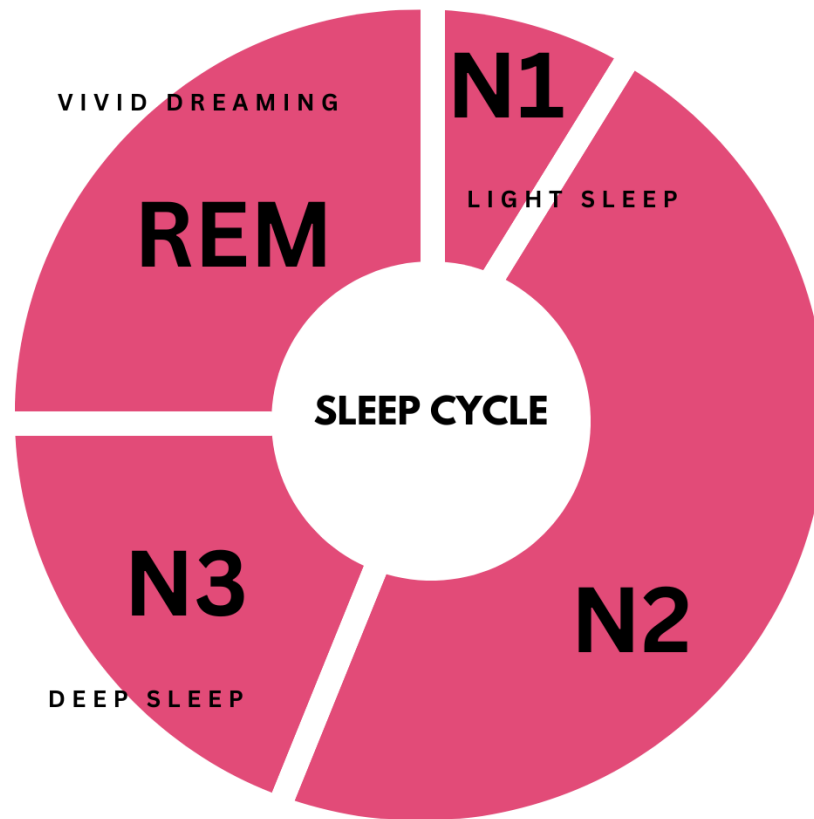
SLEEP CYCLES

We often place value on the number of hours that we sleep, however other factors play an important role; such as the cycles of sleep.

We must understand that sleep is not uniform. Over the course of the night, our total sleep is made up of several rounds of the sleep cycle, which is composed of four stages. In a typical night, a person goes through four to six sleep cycles. Each cycle lasts approximately 90 minutes.

There are three phases of non-REM sleep (N1, N2 & N3). Each stage can last from 5 to 25 minutes. You go through all three phases before reaching REM sleep.

The sleep cycles are represented by an "N", meaning "normal stage).



N1 - Light Sleep

Occurs right after you fall asleep and is very short (usually less than 10 minutes). It involves light sleep from which you can be awakened easily.

This is the lightest stage of sleep and begins when more than 50% of the alpha waves are replaced with low-amplitude mixed-frequency (LAMF) activity. Muscle tone is present in the skeletal muscle, and breathing tends to occur at a regular rate.

Getting sufficient light sleep (N1 & N2) is essential to meeting your overall sleep needs. Chronic sleep deprivation is associated with high blood pressure and heart disease, as well as obesity, depression and problems with your immune system.

N2 - Light Sleep

Lasts from about 30 to 60 minutes. During this stage, your muscles become more relaxed and you may begin to have slow-wave (delta) brain activity. Your heart rate also slows and your body temperature drops. Your body is getting ready for deep sleep. This can last for 10-25 minutes.

N3 - Deep Wave Sleep

Stage N3 is deep sleep and lasts about 20 to 40 minutes. During this stage, delta brain activity increases and you may have some body movements. It is very hard to wake up someone in stage N3; as their brain activity during this period has an identifiable pattern of what are known as delta waves. Once they do wake, they may appear groggy and out of it.

Insufficient N3 sleep due to sleep deprivation, medication side effects, or insomnia may cause an impaired ability to process and store memories. Decreased time spent in N3 may also be associated with epilepsy and depression.

REM - Rapid Eye Movement / Vivid Dreaming

During REM sleep, your eyes twitch and your brain is active. Brain activity measured during REM sleep is similar to your brain's activity during waking hours. Dreaming usually happens during REM sleep. Your muscles normally become limp to prevent you from acting out your dreams, also our brain exhibits mixed frequency brain wave activity likely due to dreaming.

Usually, REM sleep happens 90 minutes after you fall asleep. The first period of REM typically lasts 10 minutes. Each of your later REM stages gets longer, and the final one may last up to an hour. Your heart rate and breathing quickens.

You can have intense dreams during REM sleep, since your brain is more active. REM is important because it stimulates the areas of the brain that help with learning.

Babies can spend up to 50% of their sleep in the REM stage, compared to only about 20% for adults.

If you lack REM Sleep you may have trouble retaining new information.

DEEP SLEEP & REM ARE NOT THE SAME

Deep sleep and rapid eye movement (REM) sleep are not the same; they do not even overlap. They each have different brain wave patterns and physiological characteristics, occur at different times of our sleep cycle, and play different roles in our wellbeing.

While all types of sleep appear to be essential, deep wave sleep could be considered the most essential. It does many things for us, such as supporting our entire central nervous system. Its signature move makes us feel restored when we get it and unrefreshed when we don't. If your sleep is restless and non-restorative, you may lack sufficient deep sleep.

As mentioned above, one sleep cycle is about 90 minutes, so we typically sleep for four to six cycles per night. To expand on this point, some cycles have more deep delta sleep, some more REM. Some have both. No cycle is exactly like another because that is just how intricate and specialized our whole system is.

REM and deep sleep have important differences. Let's start with deep wave sleep. It goes by many names, including delta wave sleep (its predominant brain wave), Stage 3 or N3.

Deep Wave Sleep

- Deep sleep is one type, the deepest type of non-REM sleep. I like to think of it as when our sleep sleeps.
- Slow delta brain waves oscillate at about two to four waves per second and make up less than 25 percent of our nightly slumber.
- Deep sleep occurs after shallow sleep (N1 and N2) within a 90-minute sleep cycle.
- Deep sleep is generated from the frontal lobe and displays the brain at its most coordinated. It is synchronized with other brain waves, unlike the disharmony of wave patterns during REM sleep.
- This "neural resonance" may help the lymphatic system cleanse our brains by flushing them of beta-amyloid plaques and misshapen proteins associated with Alzheimer's disease.
- Deep sleep is more prevalent in the first half of the night. The brain seems to prioritize it, dipping down into deep sleep about an hour after you nod off and then a few more times throughout the night.

- Deep sleep tends to disappear in the last cycles of the night when REM increases. (Thank goodness because it is difficult to wake from deep sleep, and if someone or something dares do this, you may feel disoriented and irritable).
- Growth hormone production occurs in deep sleep and both decrease with age.
- When we lack deep wave sleep, our risk for almost every disease goes up. The research is clear: we need deep wave sleep to be well.
- Things that zap deep sleep include alcohol, benzodiazepines (found in meds to treat anxiety, seizure and sleep medications), opioid medications (typically found in pain meds), lack of activity, and oversleeping (sleeping past your regular wake-up time).

REM Sleep

- REM Sleep is quite different from the other stages because the brain appears awake, but the body stays immobile. It is also called paradoxical sleep for this reason, Stage 4, N4, NREM or simply REM.
- REM brain waves are shorter than delta waves and are not synchronized like deep wave sleep.
- REM usually occurs later in a 90-minute sleep cycle and commonly just before waking.
- Dreams commonly occur during REM sleep, but muscles lose all tone, which prevents (most of) us from acting out our dreams.
- However, blood pressure, heart rate, and breathing quicken, and our eyes dart beneath our eyelids, thus named rapid-eye-movement sleep, regardless of whether we are dreaming.
- REM sleep is important for learning. It strengthens memories the night after you learn something new, like clicking "Save" for a new document. (Power naps may help this too).
- REM sleep assists memory differently than deep sleep, focusing on social-emotional memories and even salvaging forgotten memories.
- REM also helps us make connections our brain wouldn't even dare try during the day. It is incredibly creative in the connections it attempts beyond what our daytime thinking is capable of.
- REM is often followed by brief periods of wakefulness, which are normal in a sleep cycle. If you wake briefly several times a night but fall back to sleep, you have not missed any of the good stuff.

- REM sleep is no longer assumed to be just restorative; it is also preparatory. It stimulates the central nervous system, preparing us to wake up. This is ideal just before your alarm goes off.
- REM sleep is also very susceptible to the negative effects of alcohol, just like deep sleep. Alcohol and quality sleep do not mix well.

Yoga Nidra is a state where advanced practitioners can consciously enter a state of deep non-REM sleep, yet remain fully aware.

During the deep stages of REM sleep, the body repairs and grows tissue, builds bone and muscle, and strengthens the immune system.

As you get older, you sleep more lightly and get less deep sleep. Ageing is also linked to shorter time spans of sleep, although studies show you still need as much sleep as when you were younger.