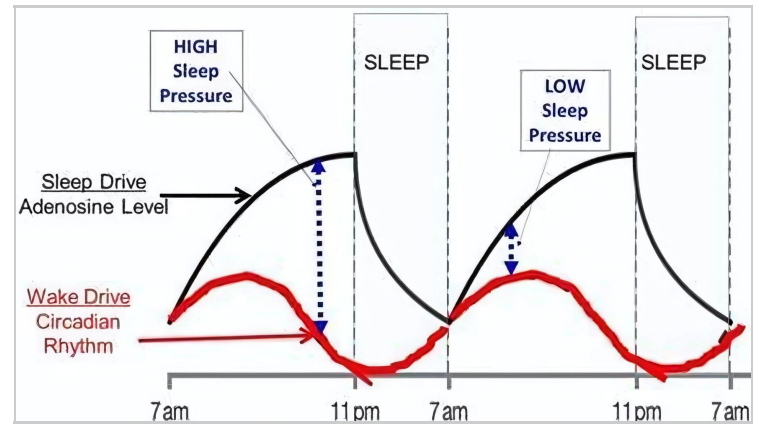
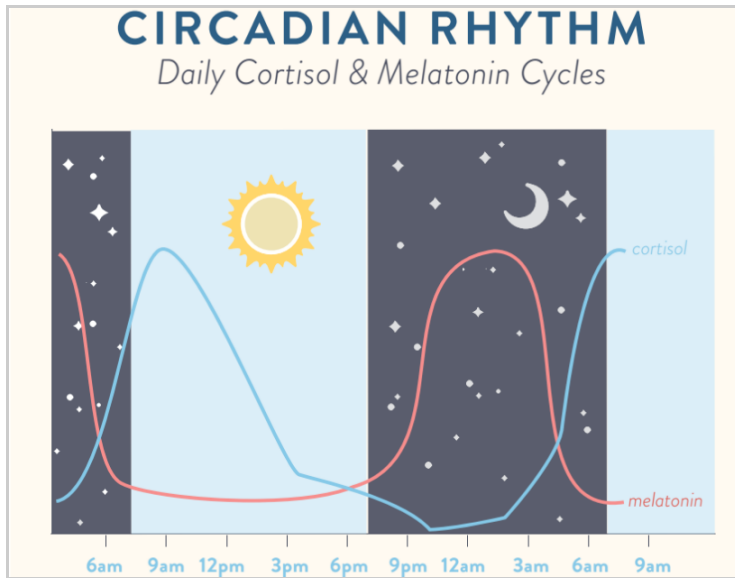


Balancing Sleep-Related Hormones



Cortisol regulation, enhance melatonin production, and accumulate adenosine.

1. Cortisol

Definition: Cortisol is a steroid hormone produced by the adrenal glands, often referred to as the "stress hormone" due to its role in the body's stress response.

Role in Sleep: Cortisol follows a diurnal pattern, peaking in the early morning to promote wakefulness and gradually declining throughout the day to reach its lowest levels at night, facilitating sleep onset. Elevated cortisol levels in the evening can disrupt this natural rhythm, leading to difficulties in falling asleep or maintaining sleep.

Factors Affecting Cortisol Levels:

- **Stress:** Chronic stress can lead to persistently high cortisol levels, impairing sleep quality.
- **Sleep Hygiene:** Irregular sleep schedules and excessive screen time can disrupt cortisol rhythms.
- **Diet:** Consuming caffeine or sugar late in the day may elevate cortisol levels.

Strategies for Regulation:

- **Consistent Sleep Schedule:** Maintaining regular bedtimes and wake-up times helps regulate cortisol production.
- **Stress Management:** Practices such as mindfulness, meditation, and deep breathing exercises can reduce stress and lower cortisol levels.

- **Morning Sunlight Exposure:** Spending time in natural light during the morning can help reset your internal clock and properly regulate cortisol levels.

2. Melatonin

Definition: Melatonin is a hormone produced by the pineal gland in response to darkness, often called the "sleep hormone" because of its crucial role in regulating the sleep-wake cycle.

Role in Sleep: Melatonin levels rise in the evening, signaling to your body that it's time to wind down, and remain elevated throughout the night to promote sustained sleep.

Factors Affecting Melatonin Production:

- **Light Exposure:** Exposure to artificial light, (screens) can suppress melatonin production.
- **Age:** Melatonin production tends to decrease with age, potentially affecting sleep quality.

3. Adenosine

Definition: Adenosine is a neurotransmitter and biochemical compound that accumulates in the brain throughout the day as a byproduct of energy consumption (ATP breakdown). It plays a key role in promoting sleep pressure, or the feeling of sleepiness.

Role in Sleep: Adenosine levels gradually rise while we are awake, increasing sleep pressure and signaling the brain that it's time to rest. As we sleep, adenosine is gradually cleared, resetting the cycle for the next day. High levels of adenosine encourage deep sleep, which is essential for recovery and cognitive function.

Factors Affecting Adenosine Accumulation:

- **Caffeine Consumption:** Caffeine blocks adenosine receptors in the brain, reducing sleep pressure and delaying fatigue. This is why caffeine can make you feel more alert but may also disrupt sleep if consumed too late in the day.
- **Sleep Deprivation:** When you don't get enough sleep, adenosine levels remain elevated, leading to excessive daytime drowsiness.

Strategies to Optimize Adenosine Function:

- **Limit Caffeine Intake:** Avoid caffeine in the afternoon and evening to prevent interference with adenosine's sleep-promoting effects.
- **Prioritize Sleep Consistency:** Aim for regular sleep and wake times.
- **Engage in Physical Activity:** Regular exercise helps regulate adenosine levels, making it easier to fall asleep at night.

Disclaimer: The information is based on Peter Attia's The Drive podcast (47-49, 126, 233) and that the information may go beyond traditional physical therapy and Matt Pechacek, PT, cannot be held liable for decisions made based on this information.