

Melatonin Facts

Underlying causes of insomnia may be

- A. Behavioral: inappropriate sleep associations, bedtime resistance
 - B. Physiological: delayed sleep phase syndrome
 - C. Underlying mood disorder: including anxiety, depression, bipolar
- All forms of insomnia are more common in children with neurodevelopmental disabilities (learning difficulties, ADHD, autism)

Treatment of insomnia

- A. Behavioral interventions are first line. These include removal of distractions (such as TVs or mobile devices) from the sleeping space, using the bed only for sleep, heading to bed and waking up at the same time daily, practicing relaxation before bed. More guidance for parents can be found on healthychildren.org, under healthy living section, sleep subsection, article titled "Sleep Tips for Your Family's Mental Health" (reference 2).
- B. If there is an underlying mood disorder, treatment of such may improve sleep.
- C. Melatonin is often used to treat insomnia and may be efficacious.

Melatonin mechanism of action:

- Melatonin is a hormone secreted by the pineal gland.
- Melatonin secretion is inhibited by bright light. Melatonin production precedes the onset of natural sleep by about 2 hours. Melatonin levels remain elevated until dawn.
- Melatonin has a very short half-life of 0.5-6 min. It is cleared through first pass metabolism in the liver.

Available formulations of melatonin:

- Over-the-counter melatonin is food-grade, rather than pharmaceutical-grade.
- Melatonin comes in fast-release and slow-release preparations.

Melatonin efficacy:

- Melatonin improved time taken to fall asleep in individuals with primary sleep disorders (without accompanying medical or psychiatric disorders). It was most efficacious in individuals with delayed sleep phase.
- Melatonin improved time to fall asleep and total sleep time in children with neurodevelopmental disorders (ADHD, ASD, intellectual disability).
- Melatonin was not efficacious in individuals with secondary sleep disorders.

Melatonin side effects:

- A very small case series reported melatonin worsens seizures and exacerbates asthma in the short term. In more recent, large, placebo-controlled studies, there were no excess adverse effects in treatment group. A Cochrane review found no worsening of seizure frequency in patients with epilepsy given melatonin.
- Adverse events associated with melatonin include fatigue, dizziness, headache, irritability, and somnolence. Disorientation, confusion, sleep-walking, vivid dreams, and nightmares have also been observed.

Melatonin dose:

- Optimal dose is unknown, and there is no evidence to support a direct relationship between dose and response. In one large study, 18% of children seemed to respond to 500 ug, while others required up to 12 mg. For physiological dosing, an individual may take 500ug 2 hours before bedtime. For sedative effect, a patient may need higher doses shortly before bedtime.

References:

1. Taylor, D. et. al., *The Maudsley Prescribing Guidelines in Psychiatry*. 13th ed. Page 517-519 Wiley Blackwell, 2018.
2. American Academy of Pediatrics. (2016, Nov 4) *Sleep Tips for Your Family's Mental Health*. HealthyChildren.org <https://www.healthychildren.org/English/healthy-living/sleep/Pages/Sleep-and-Mental-Health.aspx>
3. Sadock, B.J. et. al., *Concise Textbook of Psychiatry*. 4th ed. Wolters Kluwer, 2017.